



FEATURED PRODUCTS

- Standard Recovery Diode Modules
- Fast Recovery Diode Modules
- Schottky Modules
- Ultrafast Modules
- Thyristor Modules
- IGBT Modules

RESOURCES

- For technical support, contact Modules@vishay.com
- For further information, visit <http://www.vishay.com> and click on Modules
- Material categorization: For definitions of compliance, please see <http://www.vishay.com/doc?99912>



RoHS
COMPLIANT





TABLE OF CONTENTS

Standard Diode Modules03

- Standard Recovery Diode Modules - Single04
- Standard Recovery Diode Modules - Dual05
- Fast Recovery Diode Modules06

Schottky Diode Modules07

- Schottky Diode Modules - Dual (Isolated).....07
- Schottky Diode Modules - Single (Not Isolated)07
- Schottky Diode Modules - Dual (Not Isolated).....08

Ultrafast Recovery Diode Modules.....12

- Ultrafast Diode Modules - FRED Pt®12
- Ultrafast Diode Modules - HEXFRED®14

Thyristor Modules.....16

- Thyristor Modules - Single16
- Thyristor Modules - Dual.....17

Bridge Rectifier Modules.....20

IGBT Modules23

- Single-Switch IGBT Modules26
- Chopper IGBT Modules27
- Half-Bridge IGBT Modules28
- Full-Bridge IGBT Modules.....30
- 4-PAK IGBT Modules31
- 6-PAK IGBT Modules31
- 3-Levels IGBT Modules.....32
- Double Interleaved Boost.....32
- Dual Forward IGBT Modules.....33
- Primary Rectifier and PFC Modules.....33

POWER MODULES

Standard Diode Modules

Versatile and high-efficiency power diode and SCR modules from Vishay Intertechnology feature industry-standard outlines with a choice of diode and thyristor rectifiers. Offering single-rectifying/switch component, half-bridge, and center-tapped configurations, these modules are the ideal choice for input rectification applications at either low or high voltages.

Vishay modules fulfill a single or composite function within a single package that offers a thermally conductive, but electrically isolated, path to the outside circuit. This electrical isolation between the baseplate and the active semiconductors provides a key advantage over discrete components. The modules are RoHS-compliant and meet industry standards for safety, including UL approval.

State-of-the-art compression bonding (for current ratings higher than 250 A) and ultrasonic aluminum wire bonding technologies allow the modules to achieve outstanding performance. Vishay's high-power modules are recognized throughout the world for their ruggedness, high reliability, and consistency of mechanical specifications and electrical characteristics.

Features

- Wide range of industry-standard package styles
- Direct mounting on heatsink
- Choice of rectifier and thyristor technologies
- Optimized high-voltage diode and SCR
- Fast recovery diode modules available
- High isolation voltage (2500 V)
- RoHS-compliant
- Low thermal resistance
- Low- / high-temperature performance (-40 °C to +175 °C)
- UL approved

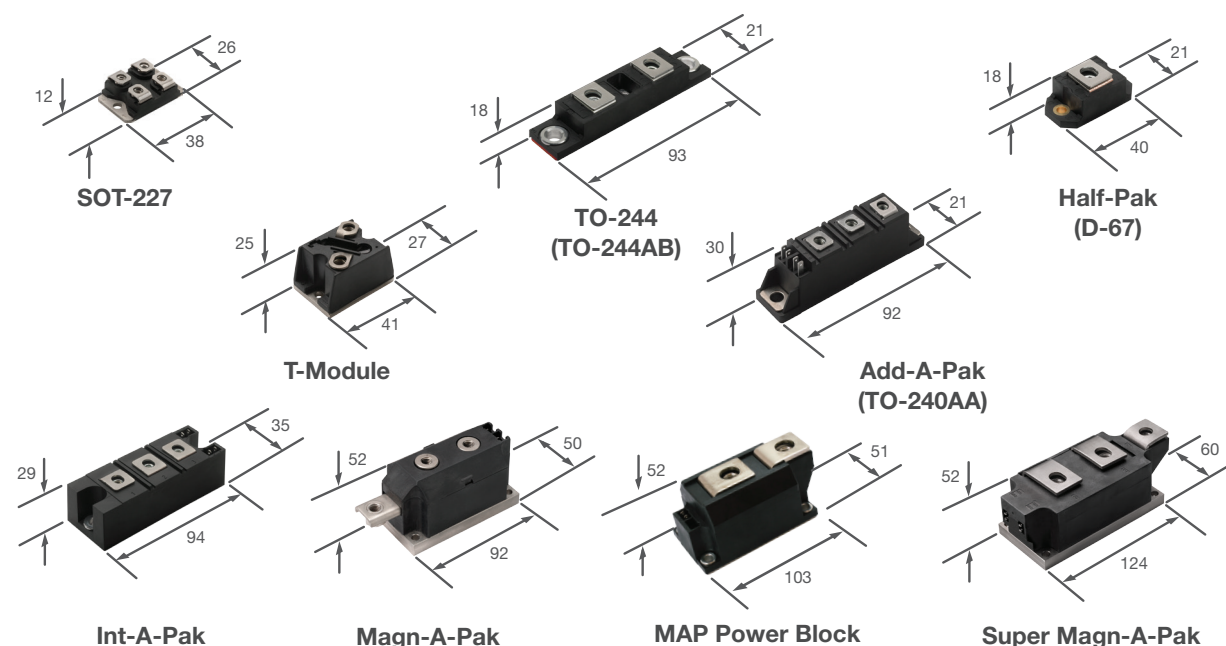
Options

- Customizable for specific application needs
- Gate and auxiliary cathode accessories available upon request

Applications

- Single- and three-phase input rectification
- Industrial welding
- Switch mode power supplies
- Motor drives
- UPS
- Anti-parallel thyristors (AC switches)

Dimensions in Millimeters



POWER MODULES

Power Diode Modules

Standard Recovery Diode Modules - Single



	Device ⁽⁶⁾	Package	Pin Out	V _{RRM} Range (V)	I _{F(AV)} at T _C		Max V _F at I _F		I _{FSM} ⁽⁴⁾ (A)
					(A)	(°C)	(V)	(A)	
	VS-T20HF220	T-Module ⁽¹⁾	Screwable	2200	20	72	1.3	60	380
	VS-T40HF10 to VS-T40HF120	T-Module ⁽¹⁾	Screwable	100 to 1200	40	85	1.3	126	570
	VS-T70HF10 to VS-T70HF120	T-Module ⁽¹⁾	Screwable	100 to 1200	70	85	1.35	220	1200
	VS-T85HF10 to VS-T85HF120	T-Module ⁽¹⁾	Screwable	100 to 1200	85	85	1.27	267	1700
	VS-T110HF10 to VS-T110HF120	T-Module ⁽¹⁾	Screwable	100 to 1200	110	85	1.35	345	2000
	VS-VSKE56/04 to VS-VSKE56/16	Add-A-Pak ⁽¹⁾ (TO-240AA)	Screwable	400 to 1600	60	114	1.6	188	1300
	VS-VSKE71/04 to VS-VSKE71/16	Add-A-Pak ⁽¹⁾ (TO-240AA)	Screwable	400 to 1600	80	110	1.6	251	1500
	VS-VSKE91/04 to VS-VSKE91/16	Add-A-Pak ⁽¹⁾ (TO-240AA)	Screwable	400 to 1600	100	112	1.55	314	2000
	VS-VSKE166/04PBF to VS-VSKE166/16PBF	Int-A-Pak ⁽¹⁾	Screwable	400 to 1600	165	100	1.43	518	4000
	VS-VSKE196/04PBF to VS-VSKE196/16PBF	Int-A-Pak ⁽¹⁾	Screwable	400 to 1600	195	100	1.38	612	4750
	VS-VSKE236/04PBF to VS-VSKE236/16PBF	Int-A-Pak ⁽¹⁾	Screwable	400 to 1600	230	100	1.46	722	5500
	VS-VSKE250-04PBF to VS-VSKE250-20PBF	Magn-A-Pak ⁽¹⁾	Screwable	400 to 2000	250	100	1.29	785	7015
	VS-VSKE270-04PBF to VS-VSKE270-20PBF	Magn-A-Pak ⁽¹⁾	Screwable	400 to 2000	270	100	1.48	848	8920
	VS-VSKE320-04PBF to VS-VSKE320-20PBF	Magn-A-Pak ⁽¹⁾	Screwable	400 to 2000	320	100	1.28	1005	10110

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. x = Circuit configuration. Replace "x" with any of the following letters to determine part number for each circuit configuration

D = Two diodes double circuit

C = Two diodes common cathode

J = Two diodes common anode

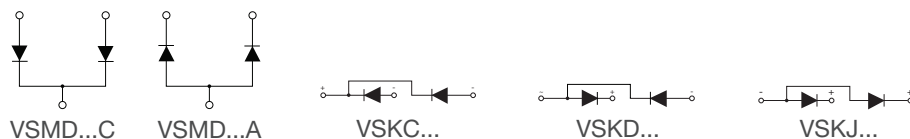
Some configurations might not be available for some packages. Contact Vishay for more information and feasibilities

4. t = 10 mS, no voltage reapplied, sinusoidal half-wave, initial T_j = T_j max

POWER MODULES

Power Diode Modules

Standard Recovery Diode Modules - Dual



	Device ⁽³⁾	Package	Pin Out	V_{RRM} Range (V)	$I_{F(AV)}$ at T_C		Max V_F at I_F		$I_{FSM}^{(4)}$ (A)
					(A)	(°C)	(V)	(A)	
	VS-VSKx56/04 to VS-VSKx56/16	Add-A-Pak (TO-240AA) ⁽¹⁾	Screwable	400 to 1600	60	114	1.6	188	1300
	VS-VSKx71/04 to VS-VSKx71/16	Add-A-Pak (TO-240AA) ⁽¹⁾	Screwable	400 to 1600	80	110	1.6	251	1500
	VS-VSKx91/04 to VS-VSKx91/16	Add-A-Pak (TO-240AA) ⁽¹⁾	Screwable	400 to 1600	100	112	1.55	314	2000
	VSMD400AW60	TO-244 (TO-244AB) ⁽²⁾	Screwable	600	200	133	1.31	200	2500
	VSMD400CW60	TO-244 (TO-244AB) ⁽²⁾	Screwable	600	200	133	1.31	200	2500
	VS-VSKx166/04PBF to VS-VSKx166/16PBF	Int-A-Pak ⁽¹⁾	Screwable	400 to 1600	165	100	1.43	518	4000
	VS-VSKx196/04PBF to VS-VSKx196/16PBF	Int-A-Pak ⁽¹⁾	Screwable	400 to 1600	195	100	1.38	612	4750
	VS-VSKx236/04PBF to VS-VSKx236/16PBF	Int-A-Pak ⁽¹⁾	Screwable	400 to 1600	230	100	1.46	722	5500
	VS-VSKx250-04PBF to VS-VSKx250-20PBF	Magn-A-Pak ⁽¹⁾	Screwable	400 to 2000	250	100	1.29	785	7015
	VS-VSKx270-04PBF to VS-VSKx270-30PBF	Magn-A-Pak ⁽¹⁾	Screwable	400 to 3000	270	100	1.48	848	8920
	VS-VSKx320-04PBF to VS-VSKx320-20PBF	Magn-A-Pak ⁽¹⁾	Screwable	400 to 2000	320	100	1.28	1005	10 110
	VS-VSKD600-04PBF to VS-VSKD600-20PBF	Super Magn-A-Pak ⁽¹⁾	Screwable	400 to 2000	600	100	1.45	1800	19 000

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3. x = Circuit configuration. Replace "x" with any of the following letters to determine part number for each circuit configuration

D = Two diodes double circuit

C = Two diodes common cathode

J = Two diodes common anode

Some configurations might not be available for some packages. Contact Vishay for more information and feasibilities

4. $t = 10$ ms, no voltage reapplied, sinusoidal half-wave, initial $T_j = T_j \text{ max}$



POWER MODULES

Power Diode Modules

Fast Recovery Diode Modules



	Device ^(B)	Package	Type	Pin Out	V _{RRM} Range (V)	I _{F(AV)} at T _C		Max V _F at I _F		Typ. t _{rr} at 25 °C		Typ. Q _{rr} at 125 °C	
						(A)	(°C)	(V)	(A)	(ns)	setup (I _F , di _F / dt, V _R)	(nC)	
	VS-T40HFL20S02 to VS-T40HFL60S02	T-Module ⁽¹⁾	Fast Soft Recovery	Screwable	200 to 600	40	70	1.60	126	200	126 A, 25 A/μs, 30 V	550	
	VS-T40HFL20S05 to VS-T40HFL100S05	T-Module ⁽¹⁾	Fast Soft Recovery	Screwable	200 to 1000	40	70	1.60	126	500	126 A, 25 A/μs, 30 V	2000	
	VS-T70HFL20S02 to VS-T70HFL60S02	T-Module ⁽¹⁾	Fast Soft Recovery	Screwable	200 to 600	70	70	1.73	220	200	220 A, 25 A/μs, 30 V	600	
	VS-T70HFL10S05 to VS-T70HFL100S05	T-Module ⁽¹⁾	Fast Soft Recovery	Screwable	100 to 1000	70	70	1.73	220	500	220 A, 25 A/μs, 30 V	2100	
	VS-T85HFL10S02 to VS-T85HFL60S02	T-Module ⁽¹⁾	Fast Soft Recovery	Screwable	200 to 600	85	70	1.55	267	200	267 A, 25 A/μs, 30 V	800	
	VS-T85HFL20S05 to VS-T85HFL100S05	T-Module ⁽¹⁾	Fast Soft Recovery	Screwable	200 to 1000	85	70	1.55	267	500	267 A, 25 A/μs, 30 V	3500	

Note:
 B. Bold indicates new product
 1. Isolated package
 2. Not isolated package

POWER MODULES

Schottky Diode Modules



UF...FA

Schottky TMBS Diode Modules - Dual (Isolated)

	Device ^(B)	Package	Type	Pin Out	V_{RRM} (V)	$I_{F(AV)}$ at $T_C^{(3)}$		Max. V_F at $I_F^{(4)}$		$I_{FSM}^{(5)}$ (A)
						(A)	(°C)	(V)	(A)	
	VS-QA250FA20	SOT-227	Two Separated Diodes, Parallel Pin Out	Screwable	200	250	95	1 (typ)	200	1360



...NQ

Schottky Diode Modules - Single (Not Isolated)

	Device ^(B)	Package	Type	Pin Out	V_{RRM} (V)	$I_{F(AV)}$ at $T_C^{(3)}$		Max. V_F at $I_F^{(4)}$		$I_{FSM}^{(5)}$ (A)
						(A)	(°C)	(V)	(A)	
	VS-125NQ015PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	15	120	74	0.43	120	1700
	VS-122NQ030PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	30	120	115	0.57	120	2000
	VS-120NQ045PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	45	120	105	0.63	120	1550
	VS-121NQ045PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	45	120	137	0.65	120	2000
	VS-123NQ100PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	100	120	133	0.91	120	1800
	VS-182NQ030PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	30	180	108	0.59	180	2500
	VS-180NQ045PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	45	180	105	0.60	180	2400
	VS-183NQ100PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	100	240	128	0.91	180	2500
	VS-245NQ015PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	15	240	73	0.52	240	3000
	VS-242NQ030PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	30	240	118	0.54	240	3000
	VS-240NQ045PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	45	240	104	0.72	240	3400
	VS-241NQ045PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	45	240	144	0.8	240	3450
	VS-243NQ100PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	100	240	132	0.95	240	3300
	VS-249NQ150PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	150	240	121	1.21	240	2300

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

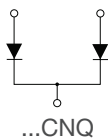
4. $T_J = 25\text{ °C}$

5. 10 ms sine pulse, no voltage reapplied

POWER MODULES

Schottky Diode Modules

Schottky Diode Modules - Dual (Not Isolated)



Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _c ⁽³⁾		Max. V _F at I _F ⁽⁴⁾		I _{FSM} ⁽⁵⁾ (A)
					(A)	(°C)	(V)	(A)	
VS-220CNQ030PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	30	220	122	0.59	220	1950
VS-200CNQ045PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	45	200	116	0.73	200	1550
VS-201CNQ045PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	45	200	146	0.81	200	2000
VS-203CNQ100PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	100	200	142	1.03	200	1700
VS-209CNQ135PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	135	200	131	1.33	200	1200
VS-209CNQ150PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	150	200	131	1.33	200	1200
VS-300CNQ045PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	45	300	111	0.77	300	2400
VS-301CNQ040PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	40	300	132	0.9	300	3200
VS-301CNQ045PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	45	300	132	0.9	300	3200
VS-303CNQ100PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	100	300	138	1.09	300	2500
VS-401CNQ040PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	40	400	114	0.73	400	3400
VS-400CNQ045PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	45	400	114	0.73	400	3400
VS-401CNQ045PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	45	400	147	0.78	400	3450
VS-403CNQ100PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	100	400	141	1.07	400	3300
VS-409CNQ135PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	135	400	129	1.46	400	2300

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

4. T_j = 25 °C

5. 10 ms sine pulse, no voltage reapplied



POWER MODULES

Schottky Diode Modules

Schottky Diode Modules - Dual (Not Isolated), continued

	Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C ⁽³⁾		Max. V _F at I _F ⁽⁴⁾		I _{FSM} ⁽⁵⁾ (A)
						(A)	(°C)	(V)	(A)	
	VS-409CNQ150PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	150	400	129	1.46	400	2300
	VS-440CNQ030PBF	T0-244 (T0-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	30	440	125	0.63	440	3000

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

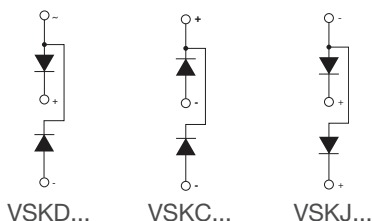
4. T_J = 25 °C

5. 10 ms sine pulse, no voltage reapplied

POWER MODULES

Schottky Diode Modules

Schottky Diode Modules - Dual (Isolated)



Device ^(B)	Package	Type	Pin Out	V_{RRM} (V)	$I_{F(AV)}$ at $T_C^{(3)}$		Max. V_F at $I_F^{(4)}$		$I_{FSM}^{(5)}$ (A)
					(A)	(°C)	(V)	(A)	
VS-VSKDS201/045	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	45	200	123	1.04	200	1850
VS-VSKCS201/045	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	45	200	123	1.04	200	1850
VS-VSKDS203/100	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	100	200	121	1.34	200	1700
VS-VSKCS203/100	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	100	200	121	1.34	200	1700
VS-VSKJS203/100	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Anode)	Screwable	100	200	121	1.34	200	1700
VS-VSKDS209/150	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	150	200	113	1.35	200	1600
VS-VSKCS209/150	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	150	200	113	1.35	200	1600
VS-VSKJS209/150	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Anode)	Screwable	150	200	113	1.35	200	1600
VS-VSKDS220/030	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	30	220	110	0.78	220	2000
VS-VSKCS220/030	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	30	220	110	0.78	220	2000
VS-VSKDS400/045	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	45	400	91	0.92	400	3400
VS-VSKCS400/045	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	45	400	91	0.92	400	3400
VS-VSKDS401/045	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	45	400	120	0.98	400	3450
VS-VSKCS401/045	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	45	400	120	0.98	400	3450

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

4. $T_J = 25\text{ °C}$

5. 10 ms sine pulse, no voltage reapplied



POWER MODULES

Schottky Diode Modules

Schottky Diode Modules - Dual (Isolated), continued

	Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C ⁽³⁾		Max. V _F at I _F ⁽⁴⁾		I _{FSM} ⁽⁵⁾ (A)
						(A)	(°C)	(V)	(A)	
	VS-VSKDS408/060	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	60	400	102	1.09	400	3300
	VS-VSKCS408/060	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	60	400	102	1.09	400	3300
	VS-VSKDS403/100	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	100	400	111	1.3	400	3300
	VS-VSKCS403/100	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	100	400	111	1.30	400	3300
	VS-VSKDS409/150	Add-A-Pak (TO-240AA) ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	150	400	105	1.33	400	2300
	VS-VSKCS440/030	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Cathode)	Screwable	30	440	97	1.00	440	3000
	VS-VSKJS440/030	Add-A-Pak (TO-240AA) ⁽¹⁾	Dual Diode (Common Anode)	Screwable	30	440	97	1.00	440	3000

Note:

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1. Isolated package

2. Not isolated package

3. Per module

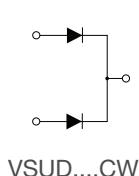
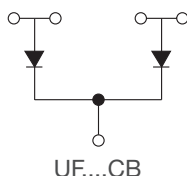
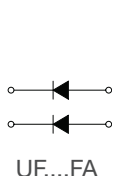
4. T_J = 25 °C

5. 10 ms sine pulse, no voltage reapplied

POWER MODULES

Ultrafast Recovery Diode Modules

Ultrafast Diode Modules - FRED Pt®



Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C ⁽³⁾		Max. V _F at I _F ⁽⁴⁾		Typ. t _{rr} at 25 °C (ns)	Typ. Q _{rr} at 125 °C	
					(A)	(°C)	(V)	(A)		setup (I _F , di _F / dt, V _R)	(nC)
VS-UFB80FA20	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	200	80	129	1.08	30	34	30 A, 200 A/μs, 100 V	184
VS-UFB80FA40	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	400	80	121	1.39	30	68	30 A, 200 A/μs, 200 V	900
VS-UFB80FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	80	104	1.69	30	79	30 A, 200 A/μs, 200 V	1085
VS-UFL80FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	80	115	1.43	30	115	30 A, 200 A/μs, 200 V	1900
VS-UFB130FA20	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	200	130	126	1.13	60	42	50 A, 200 A/μs, 100 V	295
VS-UFB130FA40	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	400	130	114	1.37	60	86	50 A, 200 A/μs, 200 V	1400
VS-UFB130FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	130	92	1.80	60	79	50 A, 200 A/μs, 200 V	1220
VS-UFL130FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	130	98	1.60	60	105	50 A, 200 A/μs, 200 V	1850
VS-UFB170FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	170	76	1.43	100	220	50 A, 500 A/μs, 200 V	9100
VS-UFB201FA40	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	400	200	86	1.28	100	80	50 A, 200 A/μs, 200 V	1300
VS-UFB280FA20	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	200	280	100	1.10	120	34	150 A, 200 A/μs, 160 V	300
VS-UFB280FA40	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	400	280	90	1.24	100	93	150 A, 200 A/μs, 200 V	1740

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

4. T_J = 25 °C

5. Very low thermal resistance



POWER MODULES

Ultrafast Recovery Diode Modules

Ultrafast Diode Modules - FRED Pt[®], continued

	Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C ⁽³⁾		Max. V _F at I _F ⁽⁴⁾		Typ. t _{rr} at 25 °C (ns)	Typ. Q _{rr} at 125 °C	
						(A)	(°C)	(V)	(A)		setup (I _F , di _F / dt, V _R)	(nC)
	VS-UFB211FA40	SOT-227	Two Separated Diodes, Parallel Pin Out	Screwable	400	210	133	1.24	100	93	150 A, 200 A/μs, 200 V	1740
	VS-UFB230FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	230	88	1.78	100	83	50 A, 200 A/μs, 200 V	1595
	VS-UFL230FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	230	102	1.44	100	104	50 A, 200 A/μs, 200 V	2200
	VS-UFB250FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	250	113	1.19	100	166	50 A, 500 A/μs, 200 V	10 000 (150 °C)
	VS-UFB310CB40	SOT-227 ⁽²⁾	Not isolated: two separated diodes, common cathode	Screwable	400	310	119	1.34	100	89	50 A, 200 A/μs, 200 V	1840
	VS-UFL250C*B60	SOT-227 ⁽²⁾	Not isolated: two separated diodes, common cathode	Screwable	600	250	119	1.44	100	104	50 A, 200 A/μs, 200 V	2200
	VS-VSUD360CW40	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	400	360	116	1.50	360	74	180 A, 200 A/μs, 200 V	1295 (150 °C)
	VS-VSUD400CW60	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	600	400	97	2.30	400	90	200 A, 200 A/μs, 200 V	4730
	VS-VSUD405CW60	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	600	400	132	1.72	400	124	50 A, 500 A/μs, 200 V	5000
	VS-VSUD410CW60	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	600	400	85	1.37	400	215	50 A, 500 A/μs, 200 V	15100
	VS-VSKEF500/06PBF	Int-A-Pak ⁽¹⁾	Single Diode	Screwable	600	519	90	1.66	500	104	50 A, 500 A/μs, 200 V	13800

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

4. T_J = 25 °C

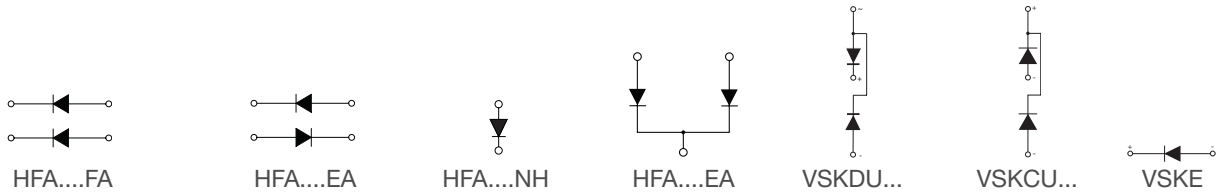
5. Very low thermal resistance



POWER MODULES

Ultrafast Recovery Diode Modules

Ultrafast Diode Modules - HEXFRED®



	Device ^(B)	Package	Type	Pin Out	V_{RRM} (V)	$I_{F(AV)}$ at T_C ⁽³⁾		Max. V_F at I_F ⁽⁴⁾		Typ. t_{rr} at 25 °C (ns)	Typ. Q_{rr} at 125 °C	
						(A)	(°C)	(V)	(A)		setup ($I_F, di_F / dt, V_R$)	(nC)
	VS-HFA70FA120	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	1200	70	94	3.80	60	134	50 A, 200 A/μs, 200 V	1770
	VS-HFA70EA120	SOT-227 ⁽¹⁾	Two Separated Diodes, Anti-Parallel Pin Out	Screwable	1200	70	121	4.00	60	145	50 A, 200 A/μs, 200 V	1920
	VS-HFA90FA120	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	1200	90	63	3.30	40	80	50 A, 200 A/μs, 200 V	740
	VS-HFA140FA60	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	600	140	110	2.04	120	90	50 A, 200 A/μs, 200 V	1180
	VS-HFA140FA120	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	1200	140	74	5.03	120	145	50 A, 200 A/μs, 200 V	1920
	VS-HFA220FA120	SOT-227 ⁽¹⁾	Two Separated Diodes, Parallel Pin Out	Screwable	1200	220	68	4.70	200	157	50 A, 200 A/μs, 200 V	2850
	VS-HFA90NH40PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	400	106	100	1.45	90	90	90 A, 200 A/μs, 200 V	1200
	VS-HFA135NH40PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	400	138	100	1.65	135	77	135 A, 200 A/μs, 200 V	2800
	VS-HFA180NH40PBF	Half-Pak (D-67) ⁽²⁾	Single Diode (Cathode to Base)	Screwable	400	200	100	1.46	180	90	135 A, 200 A/μs, 200 V	2650
	VS-HFA140NJ60CPBF	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	600	168	100	2.10	140	80	70 A, 200 A/μs, 200 V	980
	VS-HFA210NJ60CPBF	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	600	240	100	2.25	210	90	105 A, 200 A/μs, 200 V	1200
	VS-HFA240NJ40CPBF	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	400	394	100	1.50	240	77	140 A, 200 A/μs, 200 V	2300
	VS-HFA280NJ60CPBF	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	600	298	100	2.10	210	92	105 A, 200 A/μs, 200 V	1400

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. Per module

4. $T_J = 25\text{ °C}$

5. Very low thermal resistance



POWER MODULES

Ultrafast Recovery Diode Modules

Ultrafast Diode Modules - HEXFRED®, continued

	Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C ⁽³⁾		Max. V _F at I _F ⁽⁴⁾		Typ. t _{rr} at 25 °C		Typ. Q _{rr} at 125 °C (nC)
						(A)	(°C)	(V)	(A)	(ns)	setup (I _F , di _F / dt, V _R)	
	VS-HFA320NJ40CPBF	TO-244 (TO-244AB) ⁽²⁾	Dual Diode (Common Cathode)	Screwable	400	320	115	1.54	320	90	160 A, 200 A/μs, 200 V	2600
	VS-VSKDU162/12PBF	Int-A-Pak ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	1200	110	100	3.90	160	150	160 A, 200A/μs, 200 V	2000 (25°C)
	VS-VSKCU300/06PBF	Int-A-Pak ⁽¹⁾	Two Diodes Common Cathode	Screwable	600	230	100	1.96	300	130	50 A, 200 A/μs, 400 V	1800
	VS-VSKDU300/06PBF	Int-A-Pak ⁽¹⁾	Two Diodes Doubler Circuit	Screwable	600	230	100	1.96	300	130	50 A, 200 A/μs, 400 V	1800
	VS-VSKEU300/12PBF	Int-A-Pak ⁽¹⁾	Single Diode	Screwable	1200	300	60	2.23	300	233	50 A, 500 A/μs, 200 V	10400

Note:
 B. Bold indicates new product
 1. Isolated package
 2. Not isolated package

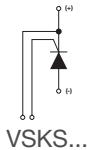
3. Per module
 4. T_J = 25 °C
 5. Very low thermal resistance



POWER MODULES

Thyristor Modules

Thyristor Modules - Single



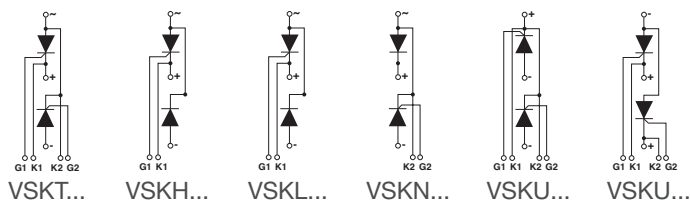
	Device ^(B)	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C		Max. V _F at I _F ⁽³⁾		I _{FSM} ⁽⁴⁾ (A)
						(A)	(°C)	(V)	(A)	
	VS-VSKS500/08PbF	MAP Power Block ⁽¹⁾	Single Thyristor	Screwable	800	500	76	1.1	500	16 646

Note:
 B. Bold indicates new product
 1. Isolated package
 2. Not isolated package
 3. T_J = 25 °C
 4. t = 10 mS, no voltage reapplied, sinusoidal half-wave, initial T_J = T_J max
 5. Under development

POWER MODULES

Thyristor Modules

Thyristor Modules - Dual



	Device ^{(B)(3)}	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C		Max. V _F at I _F ⁽⁴⁾		I _{FSM} ⁽⁵⁾ (A)
						(A)	(°C)	(V)	(A)	
	VS-VSKx26/04 to VS-VSKx26/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	27	85	1.65	85	400
	VS-VSKx41/04 to VS-VSKx41/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	45	85	1.81	141	850
	VS-VSKx41/04 to VS-VSKx41/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Common Anode (Cathode)	Screwable	400 to 1600	45	85	1.81	141	850
	VS-VSKx56/04 to VS-VSKx56/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	60	85	1.70	188	1200
	VS-VSKx56/04 to VS-VSKx56/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Common Anode (Cathode)	Screwable	400 to 1600	60	85	1.70	188	1200
	VS-VSKx71/04 to VS-VSKx71/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	75	85	1.72	236	1300
	VS-VSKx71/04 to VS-VSKx71/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Common Anode (Cathode)	Screwable	400 to 1600	75	85	1.72	236	1300
	VS-VSKx91/04 to VS-VSKx91/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	95	85	1.73	298	2000
	VS-VSKx91/04 to VS-VSKx91/16	Add-A-Pak (T0-240AA) ⁽¹⁾	Common Anode (Cathode)	Screwable	400 to 1600	95	85	1.73	298	2000

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. x = circuit configuration. Replace "x" with any of the following letters to determine part number for each circuit configuration.

– Thyristor/diode and thyristor/thyristor half-bridge configurations: T = half-bridge fully controlled; h = half-bridge positive controlled; L = half-bridge negative controlled; n = half-bridge, half-controlled common anode

– common anode or common cathode configuration: U = Dual ScR common cathode; V = Dual ScR common anode

Some configurations might not be available for some packages. Contact Vishay for more information and feasibilities.

4. T_j = 25 °C

5. t = 10 mS, no voltage reapplied, sinusoidal half-wave, initial T_j = T_j max

POWER MODULES

Thyristor Modules

Thyristor Modules - Dual, continued

	Device ^{(B)(3)}	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C		Max. V _F at I _F ⁽⁴⁾		I _{FSM} ⁽⁵⁾ (A)
						(A)	(°C)	(V)	(A)	
	VS-VSKx105/04 to VS-VSKx105/16	Add-A-Pak (TO-240AA) ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	105	85	1.80	330	2000
	VS-VSKx105/04 to VS-VSKx105/16	Add-A-Pak (TO-240AA) ⁽¹⁾	Common Anode (Cathode)	Screwable	400 to 1600	105	85	1.80	330	2000
	VS-VSKx136/04PBF to VS-VSKx136/16PBF	Int-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	135	85	1.57	424	3200
	VS-VSKx142/04PBF to VS-VSKx142/16PBF	Int-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	140	85	1.55	440	4500
	VS-VSKx162/04PBF to VS-VSKx162/16PBF	Int-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	160	85	1.54	502	4870
	VS-VSKx170-04PBF to VS-VSKx170-16PBF	Magn-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 1600	170	85	1.60	534	5100
	VS-VSKx230-04PBF to VS-VSKx230-20PBF	Magn-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 2000	230	85	1.59	722	7500
	VS-VSKV230-08PBF	Magn-A-Pak ⁽¹⁾	Common Anode	Screwable	800	230	85	1.59	722	7500
	VS-VSKx250-04PBF to VS-VSKx250-20PBF	Magn-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	400 to 2000	250	85	1.44	785	8500
	VS-VSKT320-08PBF to VS-VSKT320-16PBF	Magn-A-Pak ⁽¹⁾	Thyristor/Thyristor Half-Bridge	Screwable	800 to 1600	320	70	1.37	1005	9000

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. x = circuit configuration. Replace "x" with any of the following letters to determine part number for each circuit configuration.

– Thyristor/diode and thyristor/thyristor half-bridge configurations: T = half-bridge fully controlled; h = half-bridge positive controlled; L = half-bridge negative controlled; n = half-bridge, half-controlled common anode

– common anode or common cathode configuration: U = Dual ScR common cathode; V = Dual ScR common anode

Some configurations might not be available for some packages. Contact Vishay for more information and feasibilities.

4. T_J = 25 °C

5. t = 10 mS, no voltage reapplied, sinusoidal half-wave, initial T_J = T_J max



POWER MODULES

Thyristor Modules

Thyristor Modules - Dual, continued

	Device ^{(B)(3)}	Package	Type	Pin Out	V _{RRM} (V)	I _{F(AV)} at T _C		Max. V _F at I _F ⁽⁴⁾		I _{FSM} ⁽⁵⁾ (A)
						(A)	(°C)	(V)	(A)	
	VS-VSKx430-16PBF to VS-VSKx430-20PBF	Super Magn-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	1600 to 2000	430	82	1.65	1350	15 700
	VS-VSKx500-08PBF to VS-VSKx500-16PBF	Super Magn-A-Pak ⁽¹⁾	Thyristor/Diode and Thyristor/Thyristor Half-Bridge	Screwable	800 to 1600	500	82	1.50	1570	17 800
	VS-VSKT570-16PBF	Super Magn-A-Pak⁽¹⁾	Thyristor/Thyristor Half-Bridge	Screwable	1600	570	85	1.36	1500	18 800
	VS-VSKT570-18PBF	Super Magn-A-Pak ⁽¹⁾	Thyristor/Thyristor Half-Bridge	Screwable	1800	570	74	1.50	1790	17 800

Note:

B. Bold indicates new product

1. Isolated package

2. Not isolated package

3. x = circuit configuration. Replace "x" with any of the following letters to determine part number for each circuit configuration.

– Thyristor/diode and thyristor/thyristor half-bridge configurations: T = half-bridge fully controlled; h = half-bridge positive controlled; L = half-bridge negative controlled; n = half-bridge, half-controlled common anode

– common anode or common cathode configuration: U = Dual ScR common cathode; V = Dual ScR common anode

Some configurations might not be available for some packages. Contact Vishay for more information and feasibilities.

4. T_J = 25 °C

5. t = 10 mS, no voltage reapplied, sinusoidal half-wave, initial T_J = T_J max

POWER MODULES

Bridge Rectifier Modules

Versatile and high-efficiency bridge modules from Vishay Intertechnology feature industry-standard outlines with a choice of single-phase and three-phase rectifying bridges. The modules are the ideal choice for input rectification applications at either low or high voltages, with the electrical isolation between the baseplate and the active semiconductors providing a key advantage over discrete components. External electrical connections are provided with a choice of different terminal option, including fast-on, solderable pins, and bolt-down.

Vishay high-power bridge modules are RoHS-compliant and meet industry standards for safety, including UL approval. The devices are recognized throughout the world for their ruggedness, high reliability, and consistency of mechanical specifications and electrical characteristics.

Features

- Wide range of package styles and configurations with diode and / or thyristor technologies
- Direct mounting on heatsink
- Compact case styles for screw, solderable pin, and fast-on plug terminations
- PressFit pins NOW available on MTP package
- High isolation voltage: up to 4000 V
- RoHS-compliant
- Low thermal resistance
- UL approval
- High surge current: up to 1880 A

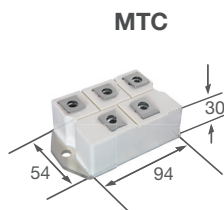
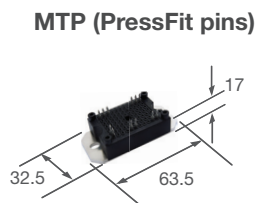
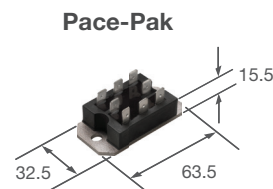
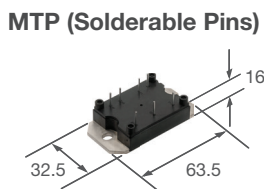
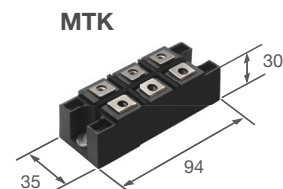
Options

- Customizable for specific application needs
- Temperature sensor available in some package styles

Applications

- Single- and three-phase input rectification

Dimensions in Millimeters



POWER MODULES

Bridge Rectifier Modules

Bridge Rectifier Modules

	Device ⁽¹⁾	Package	Type	I _o	V _(BR) Range (V)	Max. V _F at I _F ⁽²⁾	
						(V)	(A)
	VS-40MT160KPBF	MTK (Screwable)	Three-Phase Bridge	40	1600	2.0	100
	VS-53MT80KPBF to VS-53MT160KPBF	MTK (Screwable)	Full-Controlled Three-Phase Bridge	55	800 to 1600	2.68	150
	VS-51MT80KPBF to VS-51MT160KPBF	MTK (Screwable)	Negative Half-Controlled Three-Phase Bridge	55	800 to 1600	2.68	150
	VS-52MT80KPBF to VS-52MT160KPBF	MTK (Screwable)	Positive Half-Controlled Three-Phase Bridge	55	800 to 1600	2.68	150
	VS-60MT80KPBF to VS-60MT160KPBF	MTK (Screwable)	Three-Phase Bridge	60	800 to 1600	1.75	100
	VS-70MT80KPBF to VS-70MT160KPBF	MTK (Screwable)	Three-Phase Bridge	70	800 to 1600	1.6	100
	VS-93MT80KPBF to VS-93MT160KPBF	MTK (Screwable)	Full-Controlled Three-Phase Bridge	90	800 to 1600	1.65	150
	VS-113MT80KPBF to VS-113MT160KPBF	MTK (Screwable)	Full-Controlled Three-Phase Bridge	90	800 to 1600	1.57	150
	VS-91MT80KPBF to VS-91MT160KPBF	MTK (Screwable)	Negative Half-Controlled Three-Phase Bridge	90	800 to 1600	1.65	150
	VS-111MT80KPBF to VS-111MT160KPBF	MTK (Screwable)	Negative Half-Controlled Three-Phase Bridge	90	800 to 1600	1.57	150
	VS-92MT80KPBF to VS-92MT160KPBF	MTK (Screwable)	Positive Half-Controlled Three-Phase Bridge	90	800 to 1600	1.65	150
	VS-112MT80KPBF to VS-112MT160KPBF	MTK (Screwable)	Positive Half-Controlled Three-Phase Bridge	90	800 to 1600	1.57	150
	VS-90MT80KPBF to VS-90MT160KPBF	MTK (Screwable)	Three-Phase Bridge	90	800 to 1600	1.6	150
	VS-104MT80KPBF to VS-104MT160KPBF	MTK (Screwable)	Three-Phase AC Switch	100	800 to 1600	1.53	150
	VS-110MT80KPBF to VS-110MT160KPBF	MTK (Screwable)	Three-Phase Bridge	110	800 to 1600	1.4	150
	VS-130MT80KPBF to VS-130MT160KPBF	MTK (Screwable)	Three-Phase Bridge	130	800 to 1600	1.63	200
	VS-160MT80KPBF to VS-160MT160KPBF	MTK (Screwable)	Three-Phase Bridge	160	800 to 1600	1.49	200

Note:

1. Bold indicates new product

2. V_F limits are per diode

3. Voltage suppressor available (identified by suffix "K")

4. With both voltage suppression and freewheeling diode available (identified by suffix "KW")

POWER MODULES

Bridge Rectifier Modules

Bridge Rectifier Modules, continued

	Device ⁽¹⁾	Package	Type	I _o	V _(BR) Range (V)	Max. V _F at I _F ⁽²⁾	
						(V)	(A)
	VS-200MT40KPBF	MTK (Screwable)	Three-Phase Bridge	200	400	1.4	200
	VS-130MT160C and VS-130MT180C	MTC	Three-Phase Bridge	130	1600 to 1800	2.05	300
	VS-160MT160C and VS-160MT180C	MTC	Three-Phase Bridge	160	1600 to 1800	1.85	300
	VS-300MT160C and VS-300MT180C	MTC	Three-Phase Bridge	300	1600 to 1800	1.70	300
	VS-40MT160BPBPF and VS-40MT160PAPBF	MTP Solderable Pins	Three-Phase Bridge	45	1600	1.45	40
	VS-70MT160BPBPF and VS-70MT160PAPBF	MTP Solderable Pins	Three-Phase Bridge	75	1600	1.45	70
	VS-100MT160BPBPF and VS-100MT160PAPBF	MTP Solderable Pins	Three-Phase Bridge	75	1600	1.51	100
	VS-40MT160P-P	MTP (PressFit Pins)	Three-Phase Bridge	45	1600	1.45	40
	VS-70MT160P-P	MTP (PressFit Pins)	Three-Phase Bridge	75	1600	1.45	70
	VS-100MT160P-P	MTP (PressFit Pins)	Three-Phase Bridge	100	1600	1.51	100
	VS-P101 to P105⁽³⁾⁽⁴⁾	PACE-PAK (D-19)	Single-Phase Semi-Controlled Bridge Common Cathode	25	400 to 1200	1.35	79
	VS-P131 to P135	PACE-PAK (D-19)	Single-Phase Fully-Controlled Bridge	25	400 to 1200	1.35	79
	VS-P121 to P125	PACE-PAK (D-19)	Single-Phase Semi-Controlled Bridge Doubler	25	400 to 1200	1.35	79
	VS-P431 to P435	PACE-PAK (D-19)	Single-Phase Fully-Controlled Bridge	40	400 to 1200	1.4	126
	VS-P421 to P425	PACE-PAK (D-19)	Single-Phase Semi-Controlled Bridge Doubler	40	400 to 1200	1.4	126
	VS-P401 to P405⁽³⁾⁽⁴⁾	PACE-PAK (D-19)	Single-Phase Semi-Controlled Bridge Common Cathode	40	400 to 1200	1.4	126

Note:

1. Bold indicates new product

2. V_F limits are per diode

3. Voltage suppressor available (identified by suffix "K")

4. With both voltage suppression and freewheeling diode available (identified by suffix "KW")

POWER MODULES

IGBT Modules

High-efficiency IGBT modules from Vishay Intertechnology feature industry-standard outlines with a choice of PT, NPT, and Trench IGBT technologies. Configured as single switches, inverters, choppers, half-bridges, or in custom configurations, these modules are the ideal choice for high-frequency power applications that demand high-efficiency performance. They are designed for use as a main switching device in switch mode power supplies, uninterruptible power supplies, industrial welding, motor drives, and power factor correction systems. Typical applications include boost and buck converters, forward and double forward converters, half bridges, full bridges (H-bridge), and three-phase bridges. Low thermal resistance allows Vishay IGBT modules to operate at higher case temperatures while maintaining the operating junction temperature within safe limits. Electrically isolated from the circuit, the base plate is exposed, allowing for direct mounting to the heat sink. With improved current sharing and lower operating junction temperatures, designers can now achieve higher system reliability. Vishay IGBT modules are RoHS-compliant and meet industry standards for safety including UL approval.

Features

- Wide range of industry-standard package styles
- Direct mount on heat sink
- Choice of PT, NPT, and Trench IGBT technologies
- Low- $V_{CE(on)}$ IGBT
- Switching frequency from 1 kHz to 150 kHz
- Optimized anti-parallel ultrafast diode with soft recovery characteristics
- Rugged transient performance
- High isolation voltage up to 3500 V
- 100 % lead (Pb)-free and RoHS-compliant
- Low thermal resistance
- Wide operating temperature range (-40 °C to +175 °C)
- UL-approved
- PressFit pins technology now available on selected packages
- Gradually introducing modules using proprietary Vishay 600 V and 650 V IGBT silicon (Trench PT and Trench Field-Stop technologies)

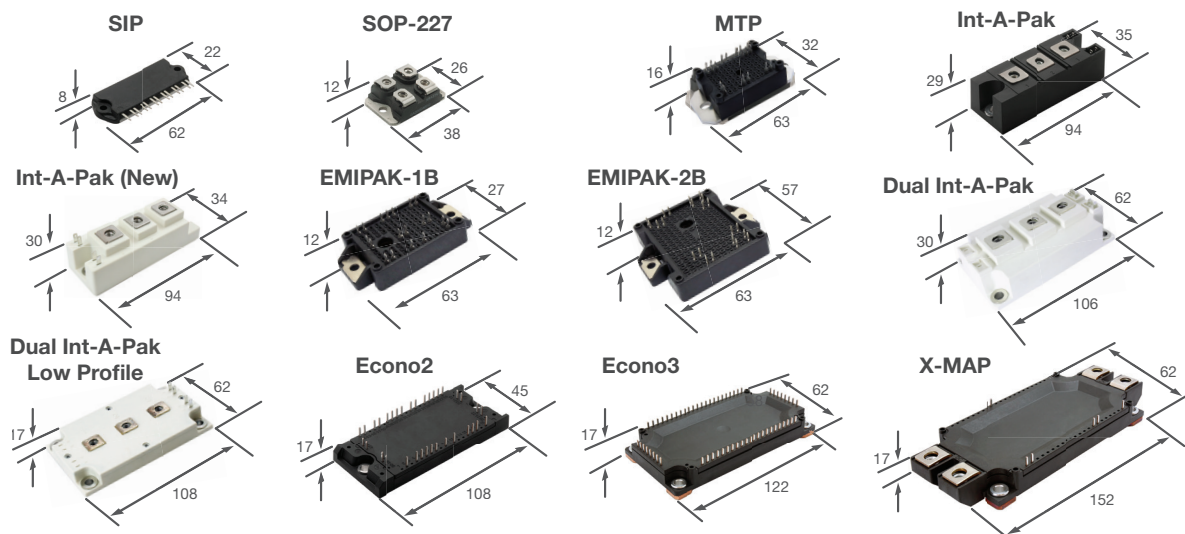
Options

- Short-circuit capability available on many configurations
- Optional SMD integrated thermistor
- Customizable for specific application needs
- Automotive products upon request

Applications

- Industrial high-frequency welding
- Switch mode power supplies
- Uninterruptible power supplies
- Motor drives
- Power factor correction
- Solar inverters

Dimensions in Millimeters

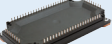




POWER MODULES

IGBT Modules

IGBT Modules

Product	Package Model	Max Dimensions L x W x H (mm)	Pin-Out	Circuit configuration Available	Voltage Range (V)	Current Ratings at 25 °C (A)	Frequency Speed Grade (kHz)
	SIP	62 x 22 x 8	Solderable Pins	6PAK Inverter Customized Configuration	600	8 to 30	1 to 60
	SOT-227	38 x 26 x 12	Screwable	Single Switch Chopper Customized Configuration	600 to 1200	50 to 200	DC to 150
	MTP	63 x 32 x 16	Screwable (PressFit Coming Soon)	Half Bridge Full Bridge Dual Forward Primary Rectifier and PFC Customized Configuration	600 to 1200	up to 100	up to 60
	EMIPAK-1B	63 x 34 x 12	PressFit	Neutral Point Clamp Topology Customized Configurations	600-1200	up to 55	up to 80
	EMIPAK-2B	63 x 57 x 12	PressFit	Double Interleaved Boost Converter 3-Levels Half-Bridge Inverter Customized Configurations	600-1200	up to 160	up to 80
	IAP (Int-A-Pak)	94 x 35 x 29	Screwable	Half Bridge Single Switch Customized Configuration	600 to 1200	100 to 20	DC to 60
	IAP (Int-A-Pak) New	94x34x30	Screwable	Single Switch Half Bridge Chopper Customized Configuration	600 to 1200	up to 100	up to 60
	ECON02	108 x 45 x 17	Solderable (PressFit Coming Soon)	4PAK Customized Configuration	600 to 1200	up to 100	up to 60
	ECON03	122 x 62 x 17	Solderable	4PAK	1200	up to 182	8 to 60



POWER MODULES

IGBT Modules

IGBT Modules, continued

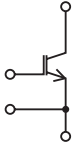
Product	Package Model	Max Dimensions L x W x H (mm)	Pin-Out	Circuit configuration Available	Voltage Range (V)	Current Ratings at 25 °C (A)	Frequency Speed Grade (kHz)
	DIAP (Dual Int-A-Pak)	106 x 62 x 30	Screwable	Single Switch	600 to 1200	up to 100	up to 60
				Half-Bridge			
				Chopper			
				Customized Configuration			
	DIAP LP (Dual Int-A-Pak Low Profile)	108 x 62 x 17	Screwable	Half-Bridge	600	up to 750	up to 30
				3-Levels Inverter			
				Customized Configuration			
	X-MAP	152 x 62 x 17	Screwable / Solderable	Half-Bridge	600/650	up to 880	DC to 30
				Customized Configuration			



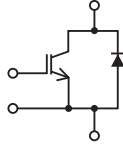
POWER MODULES

IGBT Modules

Single-Switch IGBT Modules



Single-Switch No Diode



Single-Switch with Diode

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-GB90DA120U	SOT-227	Single-Switch with Diode	Screwable	1200	149	90	90	3.30	5.8	8 to 60
	VS-GB90SA120U	SOT-227	Single-Switch No Diode	Screwable	1200	149	90	90	3.30	5.8	8 to 60
	VS-GB90DA60U	SOT-227	Single-Switch with Diode	Screwable	600	147	90	90	2.40	1.76	up to 150
	VS-GT120DA65U	SOT-227	Single-Switch with Diode	Screwable	650	167	120	90	1.71	2.4	up to 20
	VS-GT140DA60U	SOT-227	Single-Switch with Diode	Screwable	600	200	140	90	1.70	2.55	4 to 30
	VS-GT175DA120U	SOT-227	Single-Switch with Diode	Screwable	1200	288	175	90	1.73	15.7	4 to 30
	VS-GA200SA60UP	SOT-227	Single-Switch No Diode	Screwable	600	200	100	100	1.60	6.5	up to 40
	VS-GP250SA60S	SOT-227	Single-Switch No Diode	Screwable	600	370	245	90	1.01	17.7	up to 5
	VS-GA250SA60S	SOT-227	Single-Switch No Diode	Screwable	600	400	250	90	1.33	43.7	up to 5
	VS-GB300AH120N	Dual Int-A-Pak	Single-Switch with Diode	Screwable	1200	620	300	80	1.90	58.0	8 to 60
	VS-GB400AH120N	Dual Int-A-Pak	Single-Switch with Diode	Screwable	1200	650	400	80	1.90	81.0	8 to 60
	VS-GB600AH120N	Dual Int-A-Pak	Single Switch with Diode	Screwable	1200	910	600	80	1.90	105.0	8 to 60

Note:

B. Bold indicates new product

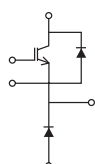
1. Under development

Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package

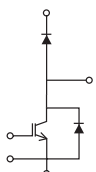
POWER MODULES

IGBT Modules

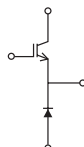
Chopper IGBT Modules



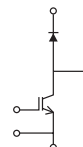
Chopper High-Side Switch
(with A/P Diode)



Chopper Low-Side Switch
(with A/P Diode)



Chopper High-Side Switch
(No A/P Diode – SOT-227)



Chopper Low-Side Switch
(No A/P Diode – SOT-227)

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-GB55LA120UX	SOT-227	Chopper Low Side Switch	Screwable	1200	84	57	80	3.30	4.7	8 to 60
	VS-GB55NA120UX	SOT-227	Chopper High Side Switch	Screwable	1200	84	57	80	3.30	4.7	8 to 60
	VS-GB75LA60UF	SOT-227	Chopper Low Side Switch	Screwable	600	109	75	80	2.31	1.1	up to 150
	VS-GB75NA60UF	SOT-227	Chopper High Side Switch	Screwable	600	109	75	80	2.31	1.1	up to 150
	VS-GT105LA120UX	SOT-227	Chopper Low Side Switch	Screwable	1200	134	92	80	2.26	12.5	4 to 30
	VS-GT105NA120UX	SOT-227	Chopper High Side Switch	Screwable	1200	134	92	80	2.26	12.5	4 to 30
	VS-GB50LP120N	Int-A-Pak (New)	Chopper Low Side Switch	Screwable	1200	100	50	80	1.70	8.8	8 to 60
	VS-GB100LP120N	Int-A-Pak (New)	Chopper Low Side Switch	Screwable	1200	200	100	80	1.80	18.5	8 to 60
	VS-GB100LH120N	Dual Int-A-Pak	Chopper Low Side Switch	Screwable	1200	200	100	80	1.77	14.2	8 to 60
	VS-GB100NH120N	Dual Int-A-Pak	Chopper High Side Switch	Screwable	1200	200	100	80	1.90	18.4	8 to 60
	VS-GB200LH120N	Dual Int-A-Pak	Chopper Low Side Switch	Screwable	1200	370	200	80	2.07	39.0	8 to 60
	VS-GB200NH120N	Dual Int-A-Pak	Chopper High Side Switch	Screwable	1200	420	200	80	1.80	39.0	8 to 60
	VS-GB300LH120N	Dual Int-A-Pak	Chopper Low Side Switch	Screwable	1200	500	300	80	2.00	67.4	8 to 60
	VS-GB300NH120N	Dual Int-A-Pak	Chopper High Side Switch	Screwable	1200	500	300	80	2.00	67.4	8 to 60

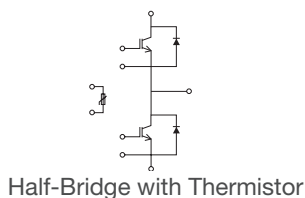
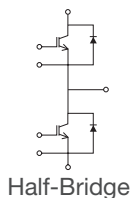
Note:

B. Bold indicates new product

1. Under development

Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package

Half-Bridge IGBT Modules



	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-40MT120UHAPBF	MTP	Half-Bridge	Solderable	1200	80	40	104	3.36	3.2	8 to 60
	VS-40MT120UHTAPBF	MTP	Half-Bridge with Thermistor	Solderable	1200	80	40	104	3.36	3.2	8 to 60
	VS-50MT060WHTAPBF	MTP	Half-Bridge with Thermistor	Solderable	600	114	50	109	2.30	2.4	60 to 100
	VS-70MT060WHTAPBF	MTP	Half-Bridge with Thermistor	Solderable	600	100	70	78	2.10	2.4	60 to 150
	VS-GP100TS60SFPBF	Int-A-Pak	Half-Bridge	Screwable	600	350	240	60	1.37	17.7	DC to 1
	VS-GA100TS60SFPBF	Int-A-Pak	Half-Bridge	Screwable	600	220	100	130	1.11	41.0	DC to 1
	VS-GB100TS60NPBF	Int-A-Pak	Half-Bridge	Screwable	600	108	74	80	2.60	2.1	8 to 60
	VS-GB150TS60NPBF	Int-A-Pak	Half-Bridge with SMD Gate Resistor	Screwable	600	138	93	80	2.64	6.6	8 to 60
	VS-GB200TS60NPBF	Int-A-Pak	Half-Bridge with SMD Gate Resistor	Screwable	600	209	142	80	2.60	11.6	8 to 60
	VS-GT50TP60N	Int-A-Pak (New)	Half-Bridge	Screwable	600	85	50	80	1.65	1.4	4 to 30
	VS-GB50TP120N	Int-A-Pak (New)	Half-Bridge	Screwable	1200	100	50	80	1.75	12.5	8 to 60
	VS-GT50TP120N	Int-A-Pak (New)	Half-Bridge	Screwable	1200	100	50	80	1.90	9.9	4 to 30
	VS-GB75TP120N	Int-A-Pak (New)	Half-Bridge	Screwable	1200	150	75	80	1.80	16.8	8 to 60
	VS-GB75TP120U	Int-A-Pak (New)	Half-Bridge	Screwable	1200	105	75	80	3.20	10.0	8 to 60
	VS-GT100TP60N	Int-A-Pak (New)	Half-Bridge	Screwable	600	160	100	80	1.65	2.5	4 to 30

Note:

B. Bold indicates new product

1. Under development

Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package



POWER MODULES

IGBT Modules

Half-Bridge IGBT Modules, continued

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-GB100TP120N	Int-A-Pak (New)	Half-Bridge	Screwable	1200	200	100	80	1.80	18.4	8 to 60
	VS-GT200TP065N	Int-A-Pak (New)	Half-Bridge	Screwable	650	221	166	80	1.90	6.8	up to 30
	VS-GB100TH120U	Dual Int-A-Pak	Half-Bridge	Screwable	1200	200	100	80	3.46	14.0	8 to 60
	VS-GB100TH120N	Dual Int-A-Pak	Half-Bridge	Screwable	1200	200	100	80	1.80	14.2	8 to 60
	VS-GB150TH120N	Dual Int-A-Pak	Half-Bridge	Screwable	1200	225	150	80	1.70	37.0	8 to 60
	VS-GB150TH120U	Dual Int-A-Pak	Half-Bridge	Screwable	1200	280	150	80	3.1	28.5	8 to 60
	VS-GA200TH60S	Dual Int-A-Pak	Half-Bridge	Screwable	600	260	200	80	1.90	16.4	DC to 1
	VS-GB200TH120N	Dual Int-A-Pak	Half-Bridge	Screwable	1200	360	200	80	1.90	38.2	8 to 60
	VS-GB200TH120U	Dual Int-A-Pak	Half-Bridge	Screwable	1200	330	200	80	3.10	38.2	8 to 60
	VS-GB300TH120N	Dual Int-A-Pak	Half-Bridge	Screwable	1200	500	300	80	2.00	67.4	8 to 60
	VS-GB300TH120U	Dual Int-A-Pak	Half-Bridge	Screwable	1200	530	300	80	3.10	53.3	8 to 60
	VS-GT400TH60N	Dual Int-A-Pak	Half-Bridge	Screwable	600	530	400	80	1.60	40.0	4 to 30
	VS-GB400TH120U	Dual Int-A-Pak	Half-Bridge	Screwable	1200	660	400	80	3.1	63.3	8 to 60

Note:

B. Bold indicates new product

1. Under development

Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package



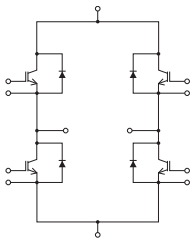
POWER MODULES

IGBT Modules

Half-Bridge IGBT Modules, continued

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-GP300TD60S	Dual Int-A-Pak Low-Profile	Half-Bridge	Screwable	600	580	400	80	1.30	62.4	DC to 1
	VS-GP400TD60S	Dual Int-A-Pak Low-Profile	Half-Bridge	Screwable	600	758	525	80	1.30	81.2	DC to 1

Full-Bridge IGBT Modules



Full-Bridge

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-20MT120UFAPbF	MTP	Full-Bridge	Solderable	1200	40	20	96	3.29	1.5	8 to 60
	VS-20MT120UFP	MTP	Full-Bridge	Solderable	1200	40	20	106	3.29	2.1	8 to 60
	VS-25MT060WFAPbF	MTP	Full-Bridge	Solderable	600	69	46	80	2.22	0.9	8 to 60

Note:

B. Bold indicates new product

1. Under development

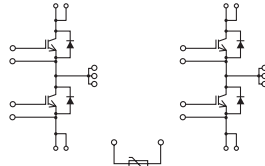
Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package



POWER MODULES

IGBT Modules

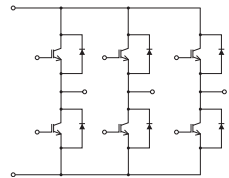
4-PAK IGBT Modules



4-Pak (Thermistor Option Available)

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I ^c at 25 °C (A)	I _c at T _c		V _{CE(on)} at T _j = 25 °C typ. (V)	E _{tot} at T _j = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-GB50YF120N	ECON02	4-Pak	Solderable	1200	66	44	80	3.49	3.5	8 to 60
	VS-GB75YF120N	ECON02	4-Pak	Solderable	1200	100	67	80	3.40	7.6	8 to 60
	VS-GB75YF120UT	ECON02	4-Pak with Thermistor	Solderable	1200	100	67	80	3.40	4.8	8 to 60
	VS-GB100YG120NT	ECON03	4-Pak	Solderable	1200	127	87	80	3.52	8.8	8 to 60
	VS-GB150YG120NT	ECON03	4-Pak	Solderable	1200	182	124	80	3.87	14.94	8 to 60

6-PAK IGBT Modules



Three-Phase Inverter

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I ^c at 25 °C (A)	I _c at T _c		V _{CE(on)} at T _j = 25 °C typ. (V)	E _{tot} at T _j = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-CPV362M4FPbF	SIP	Three-Phase Inverter	Solderable	600	8.8	4.8	100	1.41	0.9	1 to 10
	VS-CPV362M4UPbF	SIP	Three-Phase Inverter	Solderable	600	7.2	3.9	100	1.70	0.4	Over 5
	VS-CPV363M4UPbF	SIP	Three-Phase Inverter	Solderable	600	13	6.8	100	1.70	0.5	1 to 10
	VS-CPV364M4FPbF	SIP	Three-Phase Inverter	Solderable	600	27	15	100	1.35	2.5	1 to 10
	VSCP364M4KPbF	SIP	Three-Phase Inverter	Solderable	600	24	13	100	1.80	1.3	Over 5
	VS-CPV364M4UPbF	SIP	Three-Phase Inverter	Solderable	600	20	10	100	1.56	0.7	Over 5

Note:

B. Bold indicates new product

1. Under development

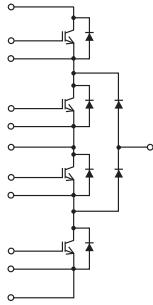
Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package



POWER MODULES

IGBT Modules

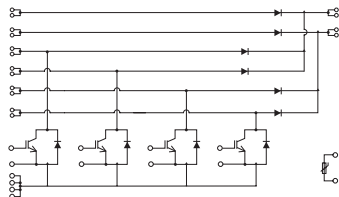
3-Levels IGBT Modules



Three-Levels Half-Bridge
Inverter Stage

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	<u>VS-ETF075Y60U</u>	EMIPAK-2B	3-Levels Half-Bridge Inverter Stage	PressFit	600	154	113	80	1.45	2.8	up to 20
	<u>VS-ETF150Y65U</u>	EMIPAK-2B	3-Levels Half-Bridge Inverter Stage	PressFit	650	180	150	60	2.04	2.10	up to 20
	<u>VS-ETF150Y65N</u>	EMIPAK-2B	3-Levels Half-Bridge Inverter Stage	PressFit	650	201	171	60	1.70	5.1	up to 20
	<u>VS-GT300FD060N</u>	DIAP Low-Profile	3-Levels Half-Bridge Inverter Stage	Screwable	600	396	300	80	1.72	27.6	4 to 30

Double Interleaved Boost



Double Interleaved Boost Converter

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	<u>VS-ETL015Y120H</u>	EMIPAK-2B	Double Interleaved Boost Converter	PressFit	1200	22	15	80	2.61	1.89	up to 20

Note:

B. Bold indicates new product

1. Under development

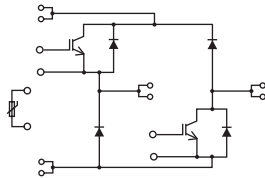
Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package



POWER MODULES

IGBT Modules

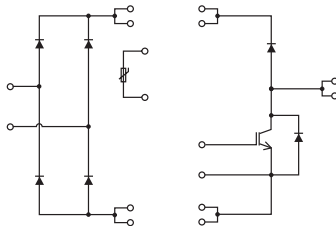
Dual Forward IGBT Modules



Dual Forward

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-100MT060WDF	MTP	Dual Forward	Solderable	600	121	83	80	1.93	2.6	6 to 150
	VS-150MT060WDF	MTP	Dual Forward	Solderable	600	138	96	80	2.11	3.4	70 to 200
	VS-150MT060WDF-P	MTP (PressFit Pins)	Dual Forward	PressFit	600	138	96	80	2.11	3.4	50 to 200

Primary Rectifier and PFC IGBT Modules



Primary Rectifier and PFC

	Device ^(B)	Package	Circuit	Pin Out	V _{CES} (V)	I _C at 25 °C (A)	I _C at T _C		V _{CE(on)} at T _J = 25 °C typ. (V)	E _{tot} at T _J = 125 °C (mJ)	Speed (kHz)
							(A)	(°C)			
	VS-70MT060WSP	MTP	Primary Rectifier and PFC	Solderable	600	96	66	80	1.93	0.57	up to 150
	VS-100MT060WSP	MTP	Primary Rectifier and PFC	Solderable	600	107	73	80	2.14	1.95	up to 150

Note:

B. Bold indicates new product

1. Under development

Contact Vishay for customization of circuit topology, IGBT speed, etc. for any listed package

**SEMICONDUCTORS*****MOSFETs Segment***

MOSFETs

- Low-Voltage TrenchFET® Power MOSFETs
- Medium-Voltage Power MOSFETs
- High-Voltage Planar MOSFETs
- High-Voltage Superjunction MOSFETs
- Automotive-Grade MOSFETs

ICs

- VRPower® DrMOS Integrated Power Stages
- Power Management and Power Control ICs
- Smart Load Switches
- Analog Switches and Multiplexers

Diodes Segment

Rectifiers

- Schottky Rectifiers
- Ultra-Fast Recovery Rectifiers
- Standard and Fast Recovery Rectifiers
- High-Power Rectifiers/Diodes
- Bridge Rectifiers

Small-Signal Diodes

- Schottky and Switching Diodes
- Zener Diodes
- RF PIN Diodes

Protection Diodes

- TVS Diodes or TRANSZORB® (unidirectional, bidirectional)
- ESD Protection Diodes (including arrays)

Thyristors/SCRs

- Phase-Control Thyristors
- Fast Thyristors

IGBTs

- Field Stop Trench
- Punch-Through Trench

Power Modules

- Input Modules (diodes and thyristors)
- Output and Switching Modules (contain MOSFETs, IGBTs, and diodes)
- Custom Modules

Optoelectronic Components Segment

Infrared Emitters and Detectors

Optical Sensors

- Proximity
- Ambient light
- Light Index (RGBW, UV, IR)
- Humidity
- Quadrant Sensors
- Transmissive
- Reflective

Infrared Remote Control Receivers

Optocouplers

- Phototransistor, Photodarlington
- Linear
- Phototriac
- High-Speed
- IGBT and MOSFET Driver

Solid-State Relays

LEDs and 7-Segment Displays

Infrared Data Transceiver Modules

Custom Products

PASSIVE COMPONENTS***Resistors and Inductors Segment***

Film Resistors

- Metal Film Resistors
- Thin Film Resistors
- Thick Film Resistors
- Power Thick Film Resistors
- Metal Oxide Film Resistors
- Carbon Film Resistors

Wirewound Resistors

- Vitreous, Cemented, and Housed Resistors
- Braking and Neutral Grounding Resistors
- Custom Load Banks

Power Metal Strip® Resistors

Battery Management Shunts

Crowbar and Steel Blade Resistors

Thermo Fuses

Chip Fuses

Pyrotechnic Initiators / Igniters

Variable Resistors

- Cermet Variable Resistors
- Wirewound Variable Resistors
- Conductive Plastic Variable Resistors
- Contactless Potentiometers
- Hall Effect Position Sensors
- Precision Magnetic Encoders

Networks/Arrays

Non-Linear Resistors

- NTC Thermistors
- PTC Thermistors
- Thin Film RTDs
- Varistors

Magnetics

- Inductors
- Wireless Charging Coils
- Planar Devices
- Transformers
- Custom Magnetics

Connectors

Capacitors Segment

Tantalum Capacitors

- Molded Chip Tantalum Capacitors
- Molded Chip Polymer Tantalum Capacitors
- Coated Chip Tantalum Capacitors
- Solid Through-Hole Tantalum Capacitors
- Wet Tantalum Capacitors

Ceramic Capacitors

- Multilayer Chip Capacitors
- Disc Capacitors
- Multilayer Chip RF Capacitors
- Chip Antennas
- Thin Film Capacitors

Film Capacitors

Power Capacitors

Heavy-Current Capacitors

Aluminum Electrolytic Capacitors

ENYCAP™ Energy Storage Capacitors