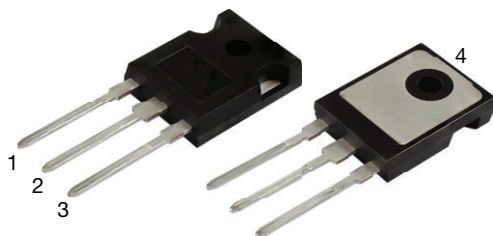
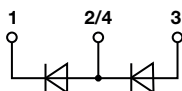


## Phase Leg High Voltage Standard Rectifier



TO-247AD 3L



### FEATURES

- Oxide planar chip junction
- Low forward conduction
- High surge current capability
- High avalanche capability
- High junction temperature capability
- Solder bath temperature 275 °C maximum, 10 s per JESD 22-B106
- AEC-Q101 qualified available:
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see [www.vishay.com/doc299912](http://www.vishay.com/doc299912)

AUTOMOTIVE  
GRADE  
Available



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

OBC for EV/HEV, single or three phase bridge rectification, industrial inverter power

### MECHANICAL DATA

**Case:** TO-247AD 3L

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

**Polarity:** as marked

**Mounting torque:** 10 in-lbs maximum

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	2 x 45 A
$V_{RRM}$	1200 V
$I_{FSM}$	480 A
$V_F$ at $I_F = 45$ A ( $T_J = 125$ °C)	1.14
$E_{AS}$	20 mJ
$T_J$ max.	175 °C
Package	TO-247AD 3L
Circuit configuration	Phase leg

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	SEP4512	UNIT
Maximum repetitive peak reverse voltage	$V_{RRM}$	1200	V
Maximum average forward rectified current, per device	$I_{F(AV)}$ <sup>(1)</sup>	45	A
Peak forward surge current 10 ms single half sine-wave	$I_{FSM}$	480	A
Typical Non-repetitive Avalanche energy at $I_{AS} = 1$ A, $T_J = 25$ °C	$E_{AS}$	20	mJ
Operating junction and storage temperature range	$T_J, T_{STG}$ <sup>(2)</sup>	-55 to +175	°C

#### Notes

<sup>(1)</sup> With heatsink

<sup>(2)</sup> The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL CHARACTERISTICS (T <sub>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	I <sub>F</sub> = 22.5 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.05	-	V
	I <sub>F</sub> = 45 A			1.19	1.26	
	I <sub>F</sub> = 22.5 A	T <sub>J</sub> = 125 °C		0.95	-	
	I <sub>F</sub> = 45 A			1.14	-	
		T <sub>J</sub> = 150 °C		-	1.23	
Reverse current at rated V <sub>R</sub> per diode	V <sub>R</sub> = rated V <sub>R</sub>	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	10	μA
		T <sub>J</sub> = 125 °C		40	-	
		T <sub>J</sub> = 150 °C		-	1	mA
Typical junction capacitance	400 V, 1 MHz		C <sub>J</sub>	27	-	pF

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
 (2) Pulse test: Pulse width  $\leq 40\text{ ms}$

THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	SEP4512	UNIT
Typical thermal resistance per device	$R_{\theta JA}^{(1)(2)}$	32	$^{\circ}\text{C/W}$
Typical thermal resistance per device	$R_{\theta JM}^{(3)}$	0.5	$^{\circ}\text{C/W}$

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction-to ambient  $dP_D/dT_J < 1/R_{\theta JA}$   
 (2) Thermal resistance junction to ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint  
 (3) Thermal resistance junction-to-mount to follow JEDEC® 51-14 transient dual interface test method (TDIM)

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
SEP4512-M3/P	5.78	P	25/tube	Tube
SEP4512HM3/P <sup>(1)</sup>	5.78	P	25/tube	Tube

**Note**

- (1) AEC-Q101 qualified

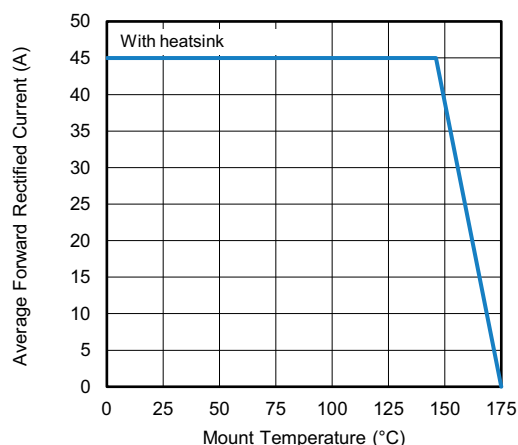
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

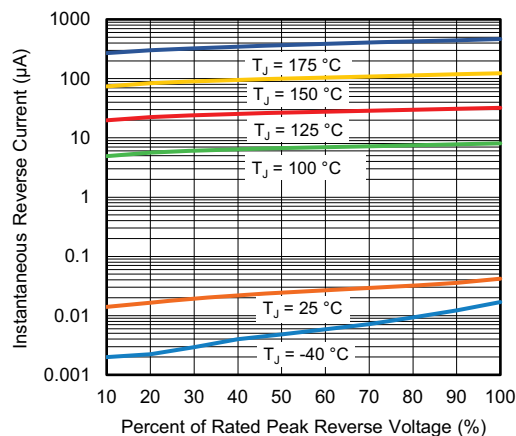


Fig. 4 - Typical Reverse Characteristics

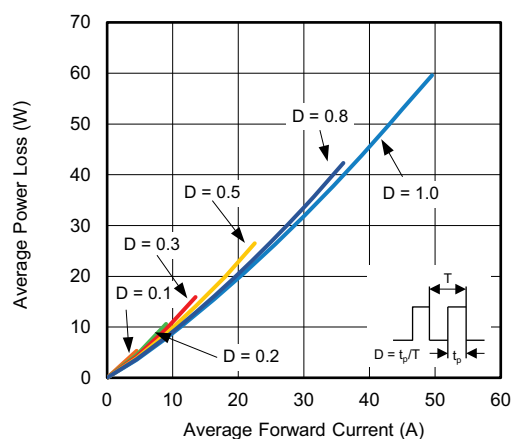


Fig. 2 - Average Power Loss Characteristics

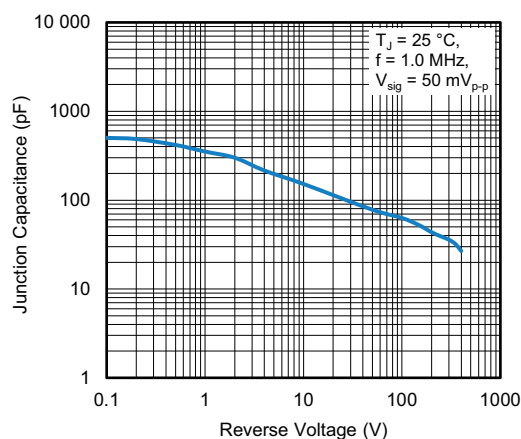


Fig. 5 - Typical Junction Capacitance

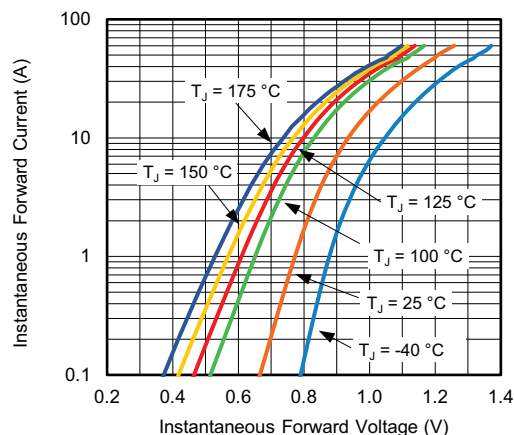


Fig. 3 - Typical Instantaneous Forward Characteristics

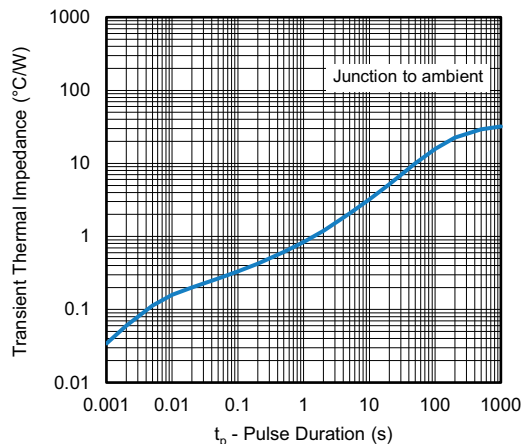
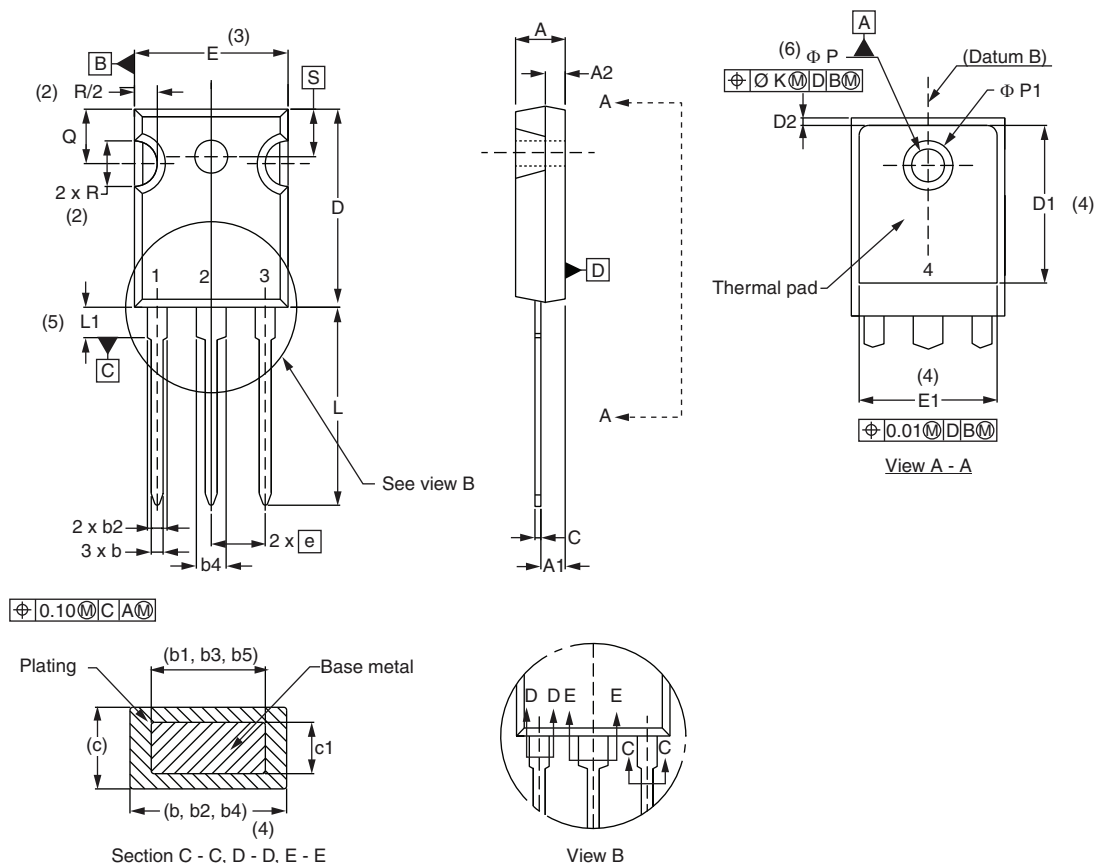


Fig. 6 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in millimeters (inches) **TO-247AD 3L**

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
e	5.46 BSC		0.215 BSC		
→K	0.254		0.010		
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
→P	3.56	3.66	0.14	0.144	
→P1	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		

**Notes**

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC® outline TO-247 with exception of dimension A min., D, E min., Q min., S, and note 4



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