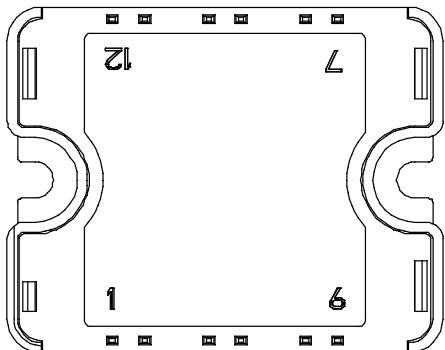
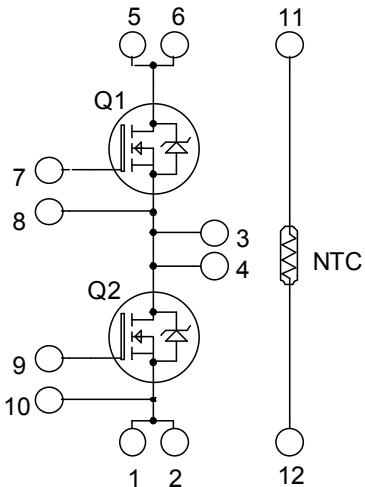


**Phase leg
MOSFET Power Module**

$V_{DSS} = 600V$
 $R_{DSon} = 90m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 40A$ @ $T_c = 25^\circ C$



Pins 1/2 ; 3/4 ; 5/6 must be shorted together

Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- Power MOS 8™ FREDFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Fast intrinsic reverse diode
 - Avalanche energy rated
 - Very rugged
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	600	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	40
		$T_c = 80^\circ C$	30
I_{DM}	Pulsed Drain current	245	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	110	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	390
I_{AR}	Avalanche current (repetitive and non repetitive)	33	A

 **CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600\text{V}$ $V_{GS} = 0\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			100	μA	
						1000		
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}$, $I_D = 33\text{A}$			90	110	$\text{m}\Omega$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 2.5\text{mA}$		3	4	5	V	
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{ V}$				± 100	nA	

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$			10552		pF
C_{oss}	Output Capacitance				1210		
C_{rss}	Reverse Transfer Capacitance				108		
Q_g	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 300\text{V}$ $I_D = 33\text{A}$			330		nC
Q_{gs}	Gate – Source Charge				70		
Q_{gd}	Gate – Drain Charge				140		
$T_{d(on)}$	Turn-on Delay Time	Resistive switching @ 25°C $V_{GS} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_D = 33\text{A}$ $R_G = 2.2\Omega$			75		ns
T_r	Rise Time				85		
$T_{d(off)}$	Turn-off Delay Time				225		
T_f	Fall Time				70		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)		$T_c = 25^\circ\text{C}$ $T_c = 80^\circ\text{C}$			40	A
						30	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{V}$, $I_S = - 33\text{A}$				1	V
dv/dt	Peak Diode Recovery ①					30	V/ns
t_{rr}	Reverse Recovery Time	$I_S = - 33\text{A}$ $V_R = 100\text{V}$ $di_S/dt = 100\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$			250	ns
			$T_j = 125^\circ\text{C}$			460	
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		1.27		μC
			$T_j = 125^\circ\text{C}$		3.32		

 ① dv/dt numbers reflect the limitations of the circuit rather than the device itself.

 $I_S \leq - 33\text{A}$ $di/dt \leq 1000\text{A}/\mu\text{s}$ $V_{DD} \leq 400\text{V}$ $T_j \leq 125^\circ\text{C}$

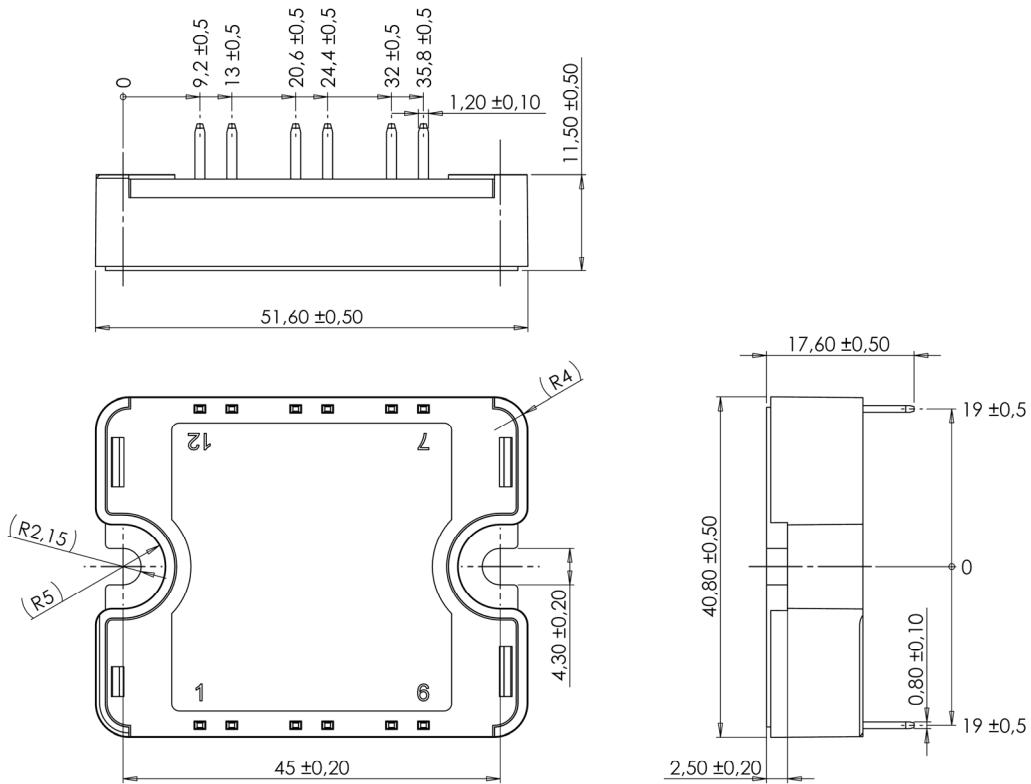
Thermal and package characteristics

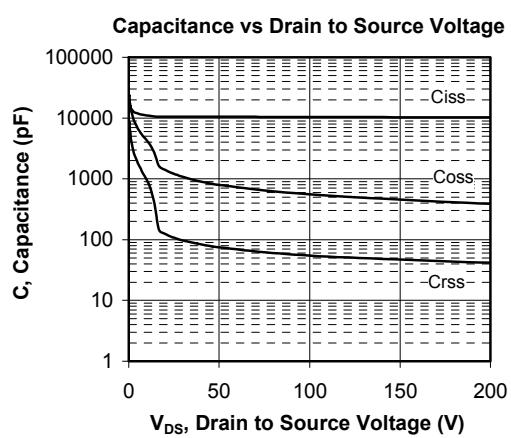
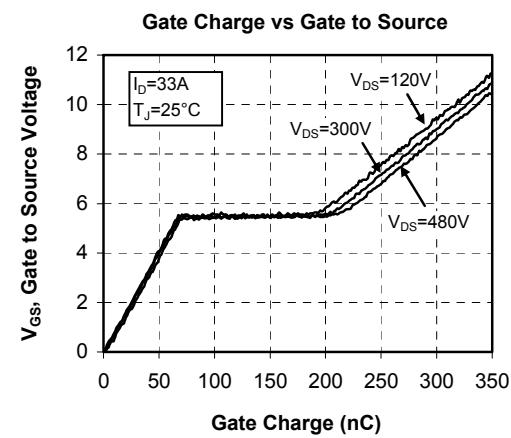
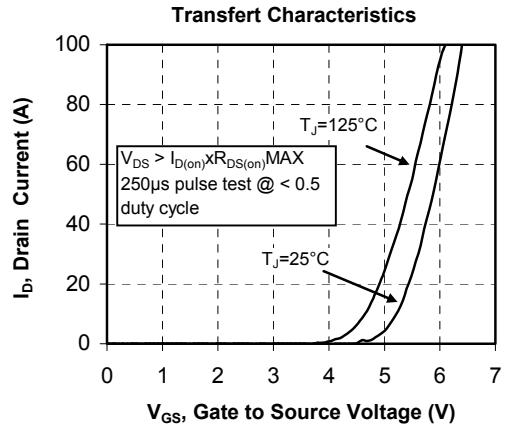
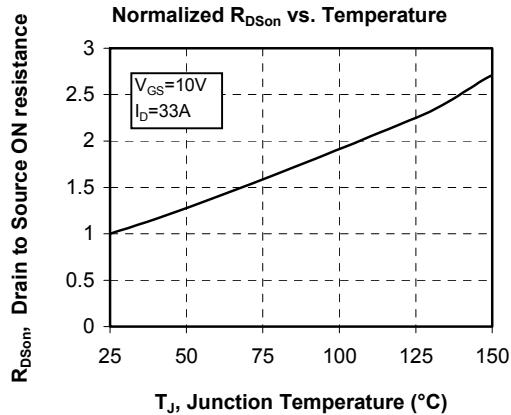
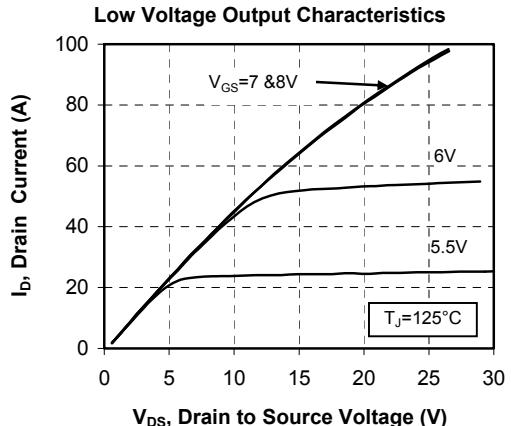
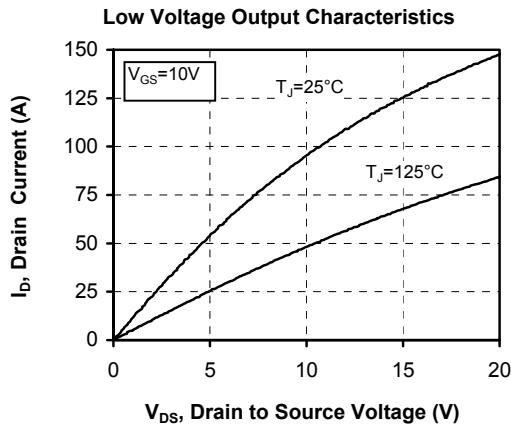
Symbol	Characteristic		Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance			0.32		°C/W
V_{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz		4000			V
T_J	Operating junction temperature range		-40		150	
T_{STG}	Storage Temperature Range		-40		125	°C
T_C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				80	g

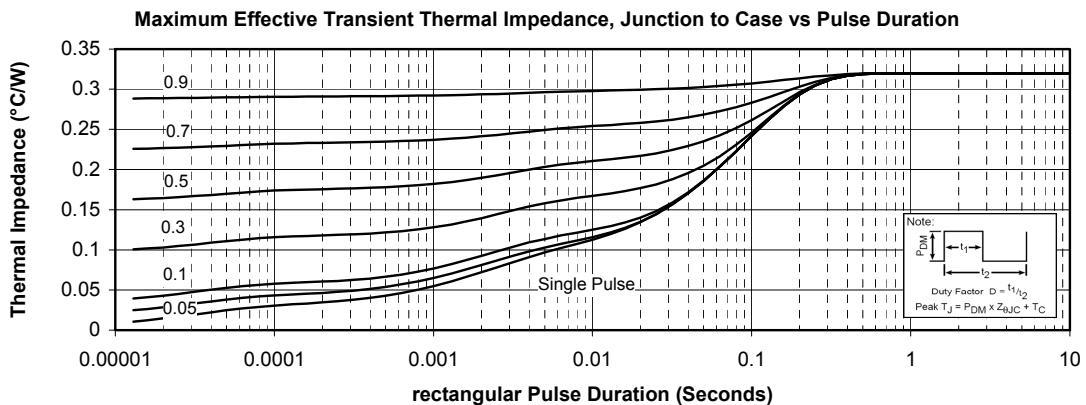
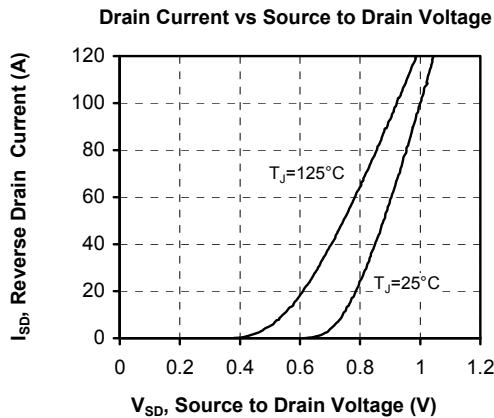
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic		Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C			50		kΩ
$B_{25/85}$	$T_{25} = 298.15 \text{ K}$			3952		K

$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]} \quad \begin{matrix} \text{T: Thermistor temperature} \\ \text{R}_T: \text{Thermistor value at T} \end{matrix}$$

SP1 Package outline (dimensions in mm)

 See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical Performance Curve




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