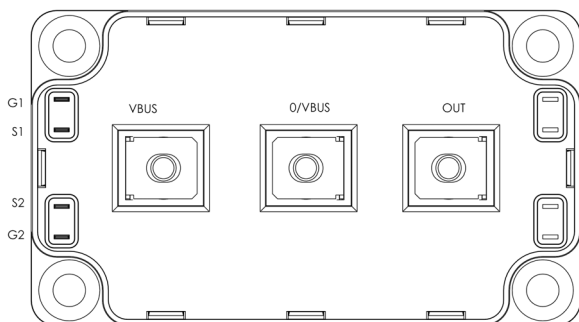
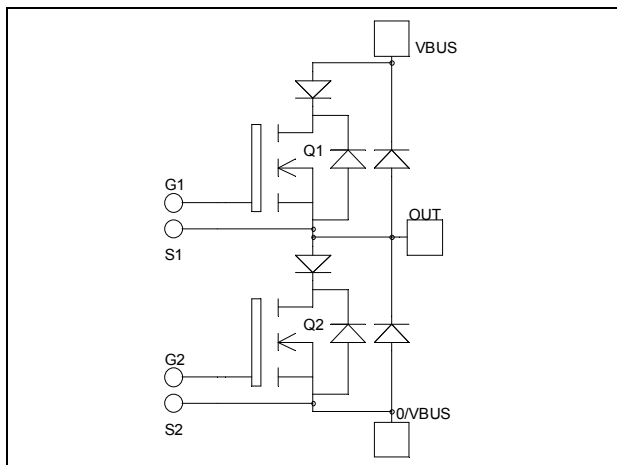


*Phase leg  
Series & parallel diodes  
MOSFET Power Module*

$$V_{DSS} = 1000V$$

$$R_{DSon} = 130m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 65A \text{ @ } T_c = 25^\circ C$$


**Application**

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

**Features**

- Power MOS 7<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Fast intrinsic reverse diode
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - M5 power connectors
- High level of integration

**Benefits**

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

**All ratings @  $T_j = 25^\circ C$  unless otherwise specified**

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	1000	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
$I_{DM}$	Pulsed Drain current	240	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	156	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	W
$I_{AR}$	Avalanche current (repetitive and non repetitive)	24	A
$E_{AR}$	Repetitive Avalanche Energy	30	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1300	



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

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 1000V T <sub>j</sub> = 25°C			600	μA
		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 800V T <sub>j</sub> = 125°C			2	mA
R <sub>DS(on)</sub>	Drain – Source on Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 32.5A		130	156	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 6mA	3		5	V
I <sub>GSS</sub>	Gate – Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0V			±450	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		15.2		nF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		2.6		
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1MHz		0.42		
Q <sub>g</sub>	Total gate Charge	V <sub>GS</sub> = 10V V <sub>Bus</sub> = 500V I <sub>D</sub> = 65A		562		nC
Q <sub>gs</sub>	Gate – Source Charge			75		
Q <sub>gd</sub>	Gate – Drain Charge			363		
T <sub>d(on)</sub>	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V V <sub>Bus</sub> = 667V I <sub>D</sub> = 65A R <sub>G</sub> = 0.5Ω		9		ns
T <sub>r</sub>	Rise Time			9		
T <sub>d(off)</sub>	Turn-off Delay Time			50		
T <sub>f</sub>	Fall Time			24		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 667V I <sub>D</sub> = 65A, R <sub>G</sub> = 0.5Ω		2.13		mJ
E <sub>off</sub>	Turn-off Switching Energy			0.46		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 667V I <sub>D</sub> = 65A, R <sub>G</sub> = 0.5Ω		4.4		mJ
E <sub>off</sub>	Turn-off Switching Energy			0.57		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.1	°C/W

**Series diode ratings and characteristics**

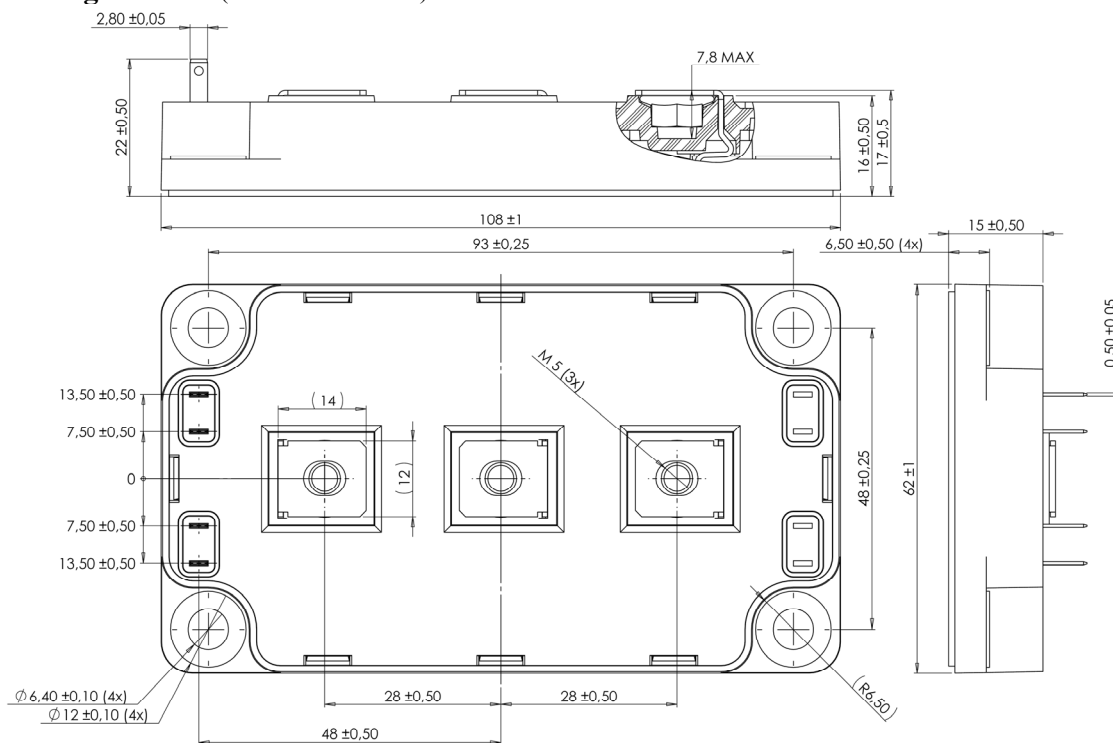
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V <sub>RRM</sub>	Maximum Repetitive Reverse Voltage		1000			V
I <sub>RM</sub>	Maximum Reverse Leakage Current	V <sub>R</sub> = 1000V			350	μA
I <sub>F</sub>	DC Forward Current	T <sub>c</sub> = 100°C		120		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 120A		1.9	2.5	V
		I <sub>F</sub> = 240A		2.2		
		I <sub>F</sub> = 120A T <sub>j</sub> = 125°C		1.7		
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 120A V <sub>R</sub> = 667V di/dt = 400A/μs	T <sub>j</sub> = 25°C	280		ns
			T <sub>j</sub> = 125°C	350		
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> = 120A V <sub>R</sub> = 667V di/dt = 400A/μs	T <sub>j</sub> = 25°C	1520		nC
			T <sub>j</sub> = 125°C	7200		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.46	°C/W

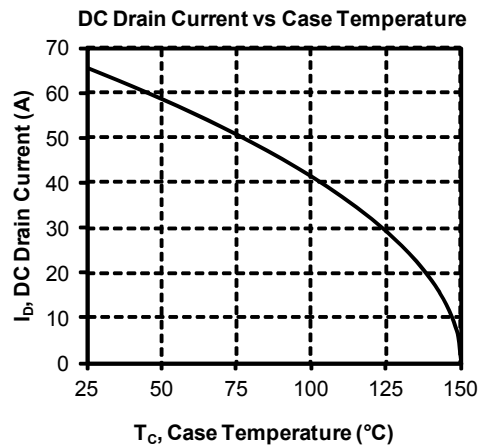
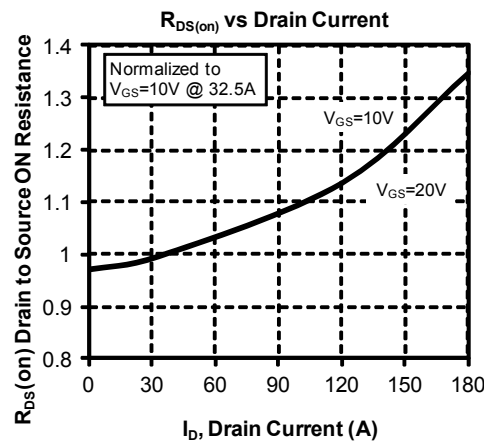
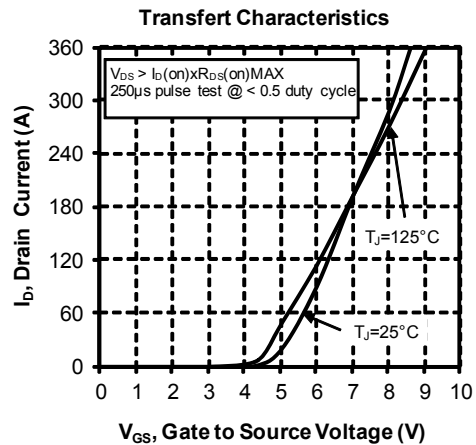
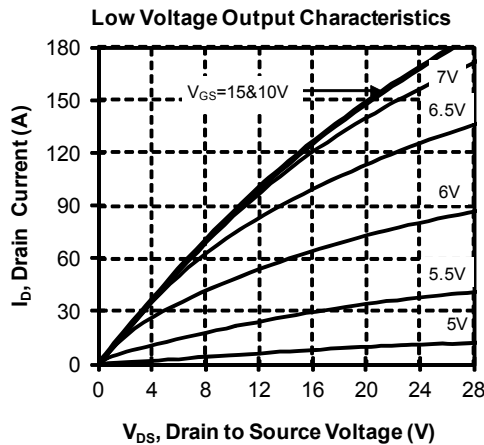
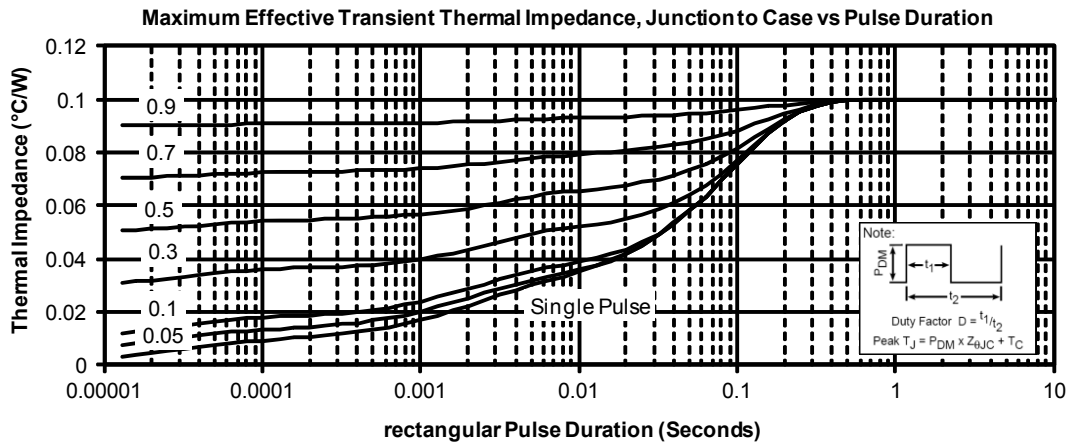
**Parallel diode ratings and characteristics**

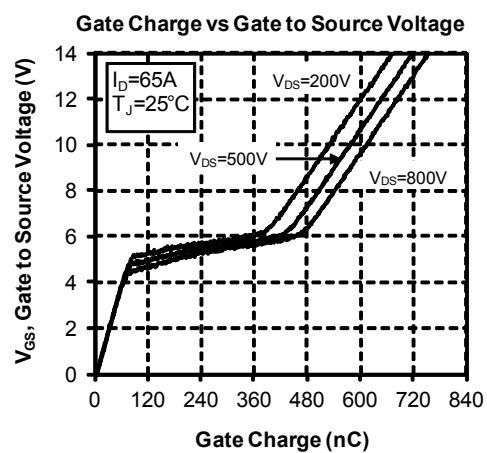
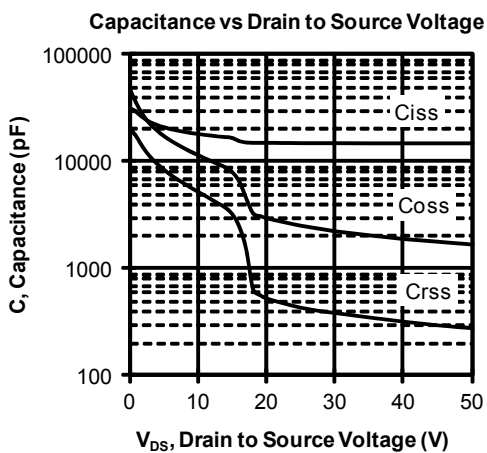
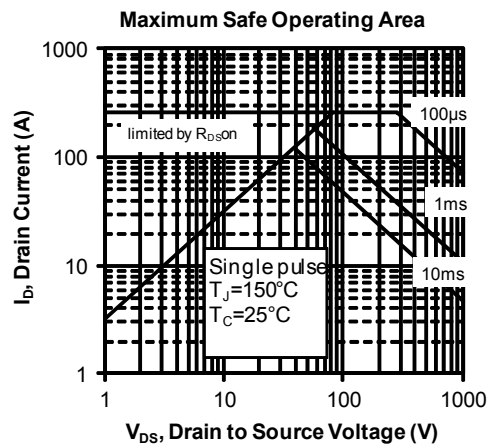
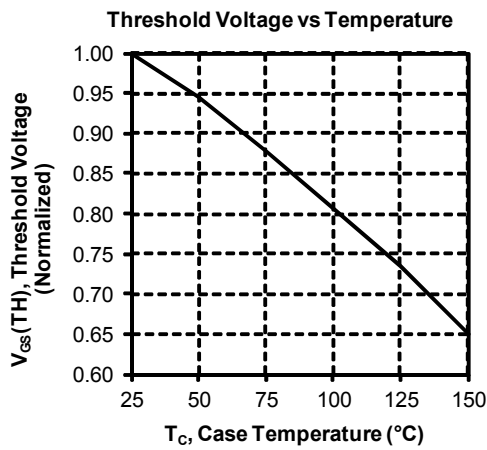
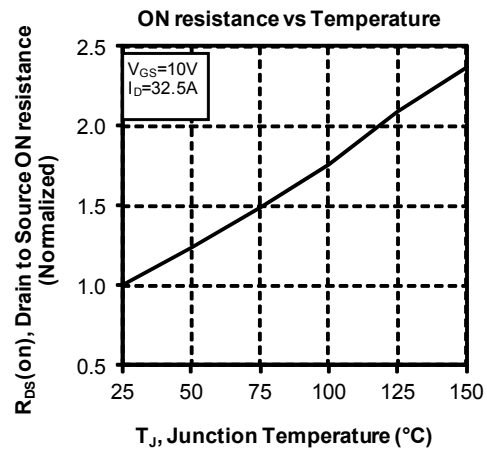
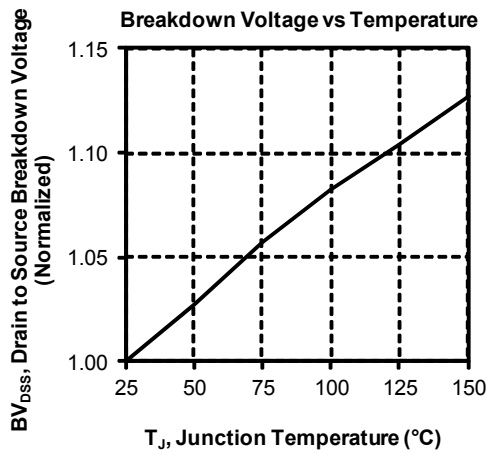
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$V_{RRM}$	Maximum Repetitive Reverse Voltage			1000			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1000V$				350	$\mu A$
$I_F$	DC Forward Current		$T_c = 100^\circ C$		120		A
$V_F$	Diode Forward Voltage	$I_F = 120A$			1.9	2.5	V
		$I_F = 240A$			2.2		
		$I_F = 120A$	$T_j = 125^\circ C$		1.7		
$t_{rr}$	Reverse Recovery Time	$I_F = 120A$ $V_R = 667V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$		280		ns
			$T_j = 125^\circ C$		350		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 120A$ $V_R = 667V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$		1520		nC
			$T_j = 125^\circ C$		7200		
$R_{thJC}$	Junction to Case Thermal Resistance					0.46	$^\circ C/W$

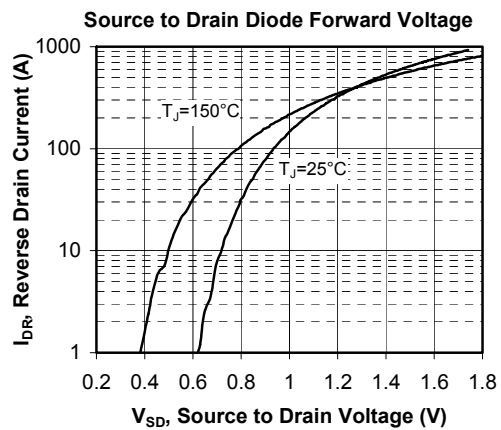
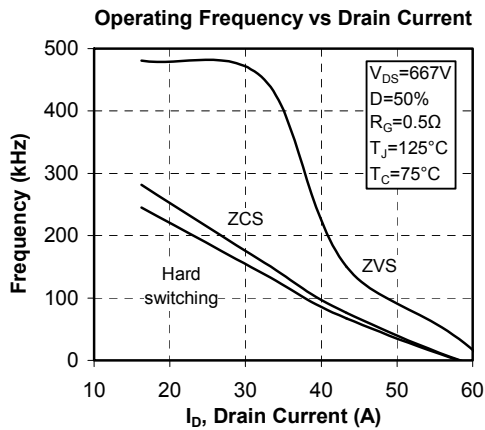
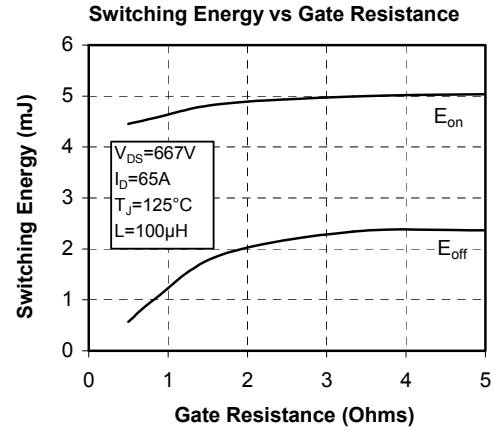
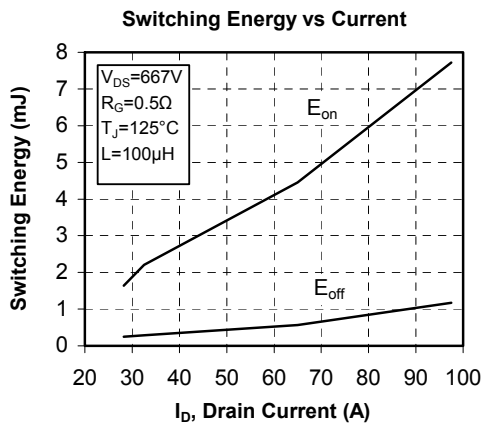
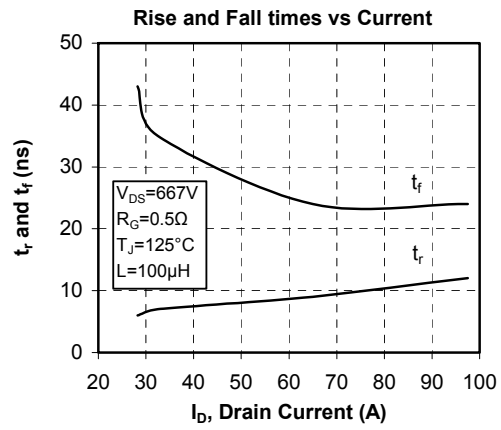
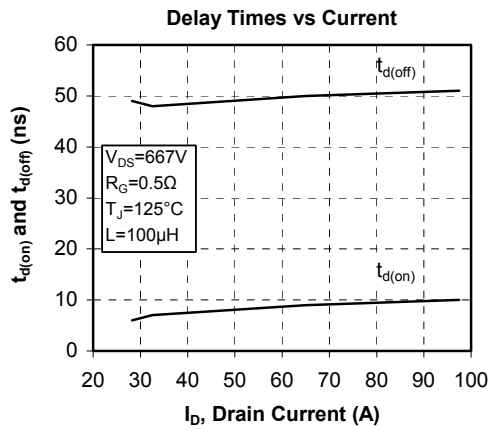
**Thermal and package characteristics**

Symbol	Characteristic			Min	Typ	Max	Unit
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t = 1$ min, 50/60Hz			4000			V
$T_J$	Operating junction temperature range			-40		150	$^\circ C$
$T_{STG}$	Storage Temperature Range			-40		125	
$T_C$	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M6	3		5	N.m
		For terminals	M5	2		3.5	
Wt	Package Weight					300	g

**SP6 Package outline (dimensions in mm)**

 See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

**Typical Performance Curve**






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