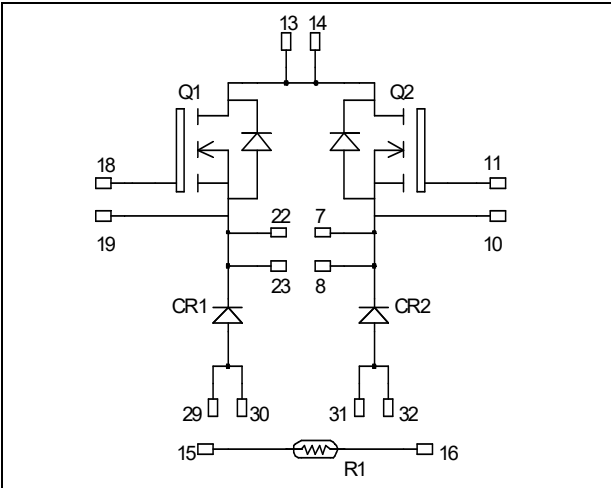


## Dual Buck chopper MOSFET Power Module

$V_{DSS} = 100V$   
 $R_{DSon} = 19m\Omega \text{ typ @ } T_j = 25^\circ C$   
 $I_D = 70A \text{ @ } T_c = 25^\circ C$



### Application

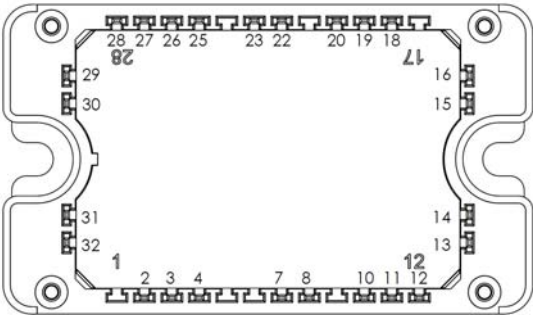
- AC and DC motor control
- Switched Mode Power Supplies

### Features

- **Power MOS V<sup>®</sup> MOSFETs**
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
- Internal thermistor for temperature monitoring

### 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
- Each leg can be easily paralleled to achieve a single buck of twice the current capability
- RoHS Compliant



All multiple inputs and outputs must be shorted together  
 Example: 13/14 ; 29/30 ; 22/23 ...

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

### Absolute maximum ratings (per MOSFET)

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Voltage	100	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	70
		$T_c = 80^\circ C$	50
$I_{DM}$	Pulsed Drain current	300	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	21	$m\Omega$
$P_D$	Power Dissipation	$T_c = 25^\circ C$	208
$I_{AR}$	Avalanche current (repetitive and non repetitive)	75	A
$E_{AR}$	Repetitive Avalanche Energy	30	mJ
$E_{AS}$	Single Pulse Avalanche Energy	1500	

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

**Electrical Characteristics** (per MOSFET)

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> = 100V			250	μA
R <sub>DS(on)</sub>	Drain – Source on Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 35A		19	21	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 1mA	2		4	V
I <sub>GSS</sub>	Gate – Source Leakage Current	V <sub>GS</sub> = ±30 V, V <sub>DS</sub> = 0V			±100	nA

**Dynamic Characteristics** (per MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		5100		pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		1900		
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1MHz		800		
Q <sub>g</sub>	Total gate Charge	V <sub>GS</sub> = 10V		200		nC
Q <sub>gs</sub>	Gate – Source Charge	V <sub>Bus</sub> = 100V		40		
Q <sub>gd</sub>	Gate – Drain Charge	I <sub>D</sub> = 70A		92		
T <sub>d(on)</sub>	Turn-on Delay Time	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V V <sub>Bus</sub> = 66V I <sub>D</sub> = 70A R <sub>G</sub> = 5Ω		35		ns
T <sub>r</sub>	Rise Time			70		
T <sub>d(off)</sub>	Turn-off Delay Time			95		
T <sub>f</sub>	Fall Time			125		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 25°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 66V I <sub>D</sub> = 70A, R <sub>G</sub> = 5Ω		276		μJ
E <sub>off</sub>	Turn-off Switching Energy			302		
E <sub>on</sub>	Turn-on Switching Energy	<b>Inductive switching @ 125°C</b> V <sub>GS</sub> = 15V, V <sub>Bus</sub> = 66V I <sub>D</sub> = 70A, R <sub>G</sub> = 5Ω		304		μJ
E <sub>off</sub>	Turn-off Switching Energy			320		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.6	°C/W

**Chopper diode ratings and characteristics** (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage				200	V
I <sub>RM</sub>	Reverse Leakage Current	V <sub>R</sub> = 200V			250	μA
I <sub>F</sub>	DC Forward Current	T <sub>c</sub> = 80°C		60		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 60A		1.1		V
		I <sub>F</sub> = 120A		1.4		
		I <sub>F</sub> = 60A, T <sub>j</sub> = 125°C		0.9		
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> = 60A V <sub>R</sub> = 133V	T <sub>j</sub> = 25°C	31		ns
			T <sub>j</sub> = 125°C	60		
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt = 200A/μs	T <sub>j</sub> = 25°C	60		nC
			T <sub>j</sub> = 125°C	250		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.9	°C/W

### Thermal and package characteristics

Symbol	Characteristic	Min	Max	Unit		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000		V		
T <sub>J</sub>	Operating junction temperature range	-40	150	°C		
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> - 25			
T <sub>STG</sub>	Storage Temperature Range	-40	125			
T <sub>C</sub>	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

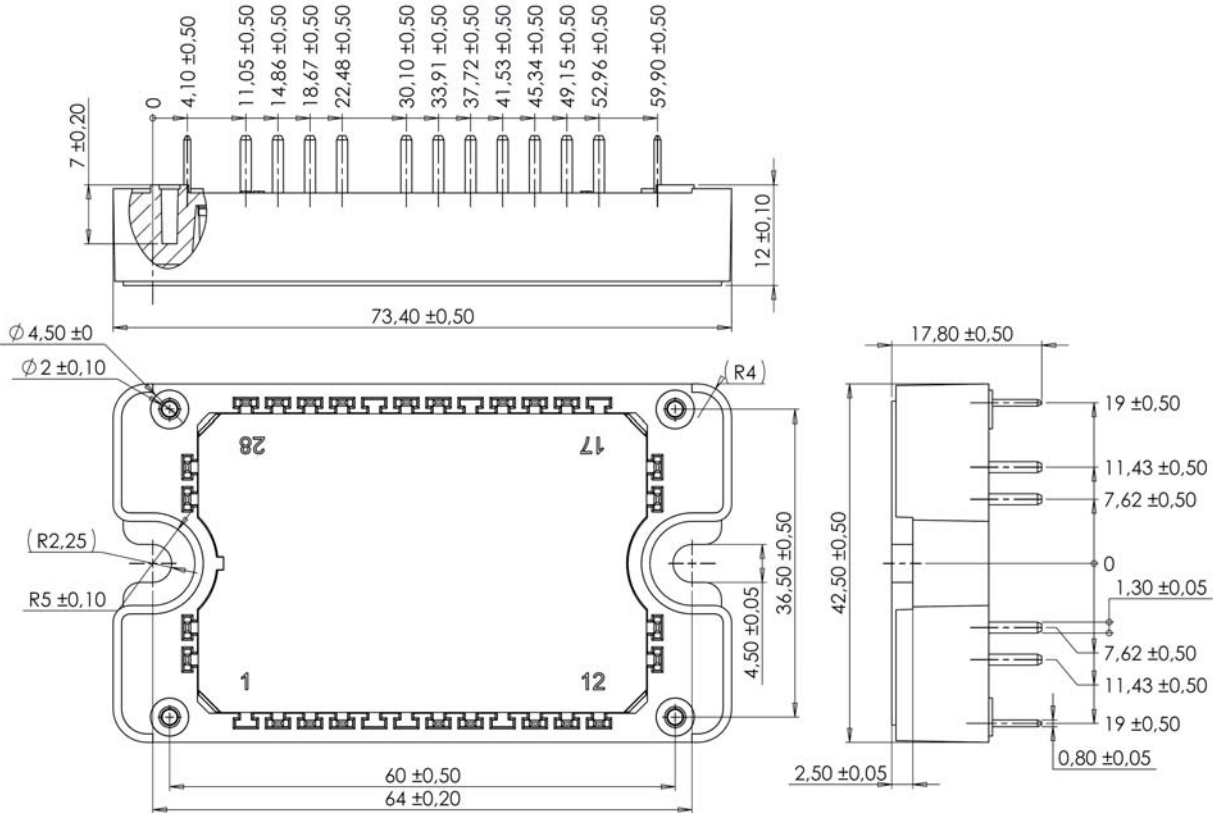
### Temperature sensor NTC (see application note APT0406 on [www.microsemi.com](http://www.microsemi.com) for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		50		kΩ
ΔR <sub>25</sub> /R <sub>25</sub>			5		%
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K		3952		K
ΔB/B		T <sub>C</sub> = 100°C	4		%

$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

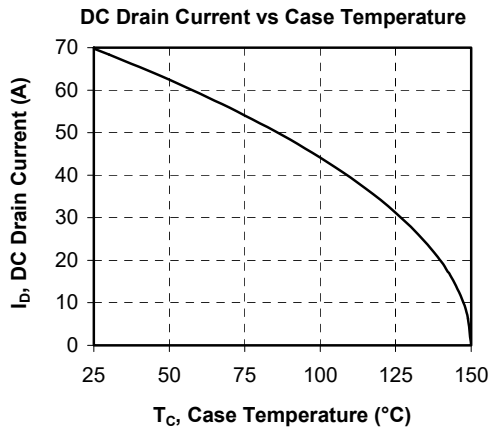
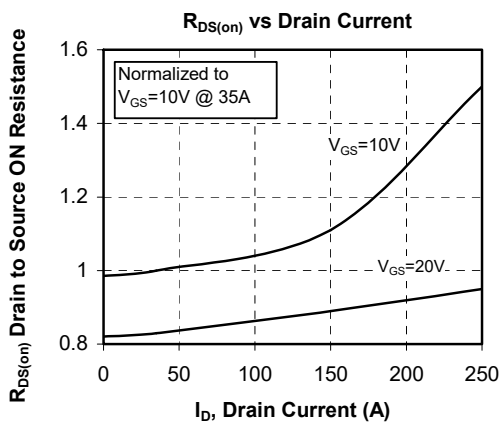
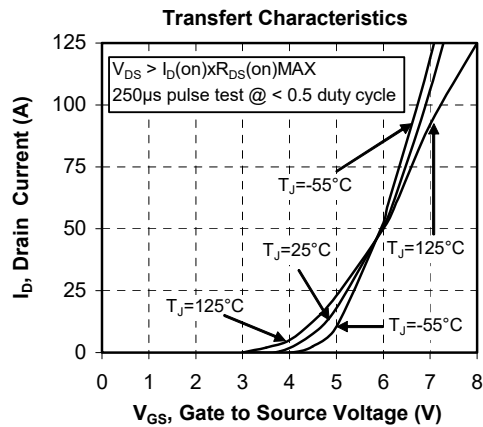
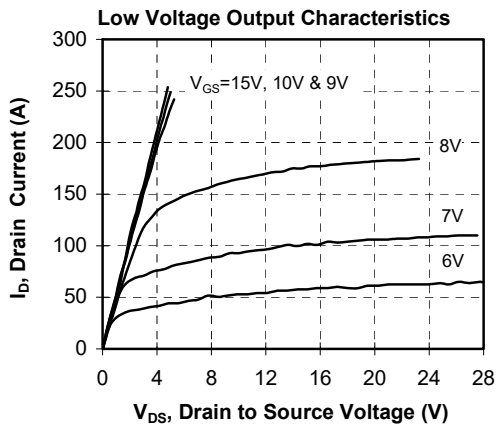
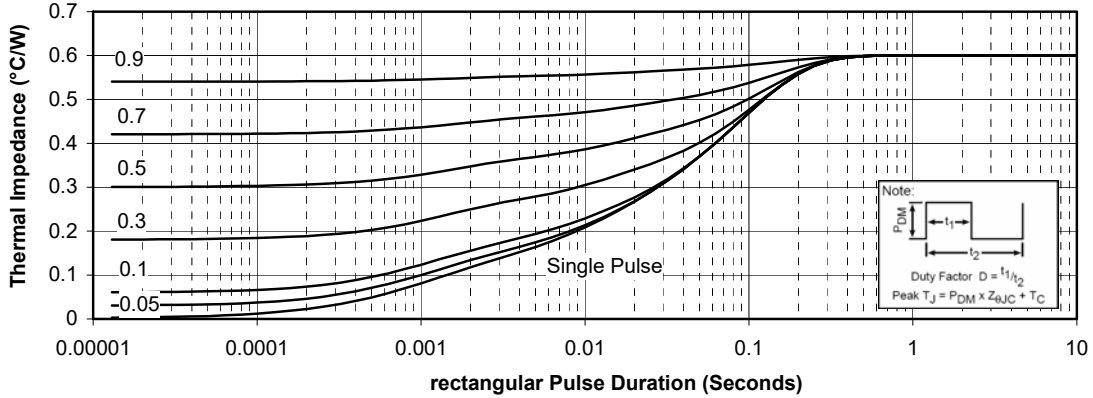
### Package outline (dimensions in mm)

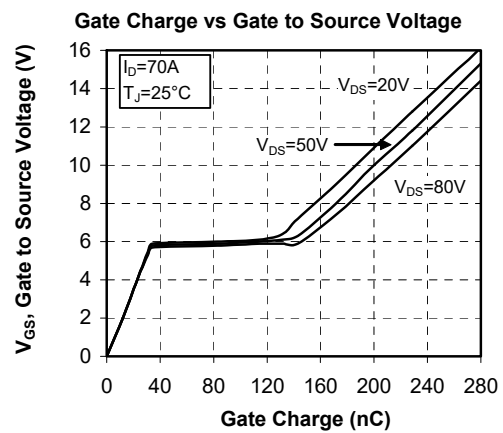
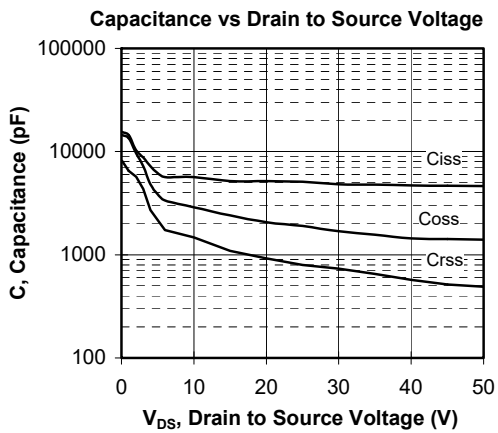
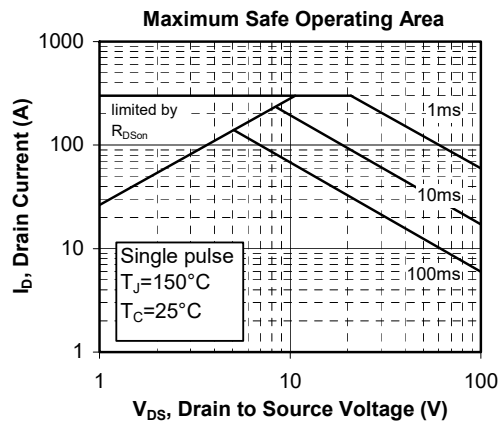
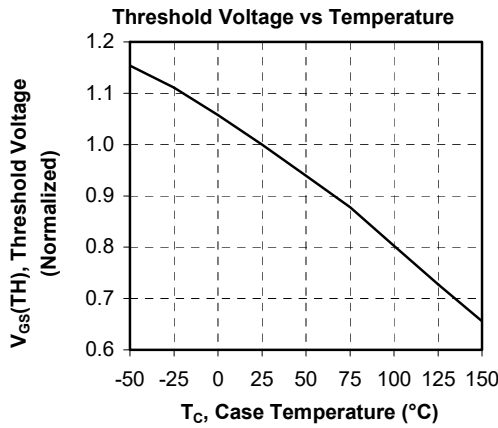
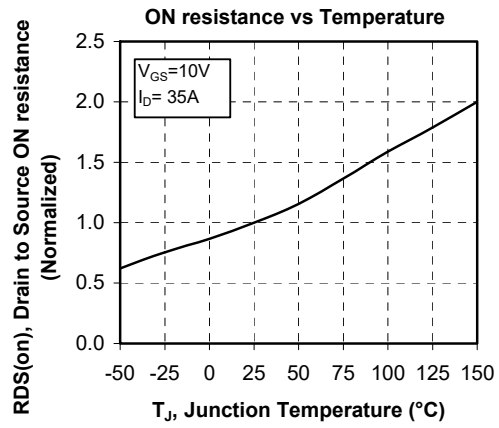
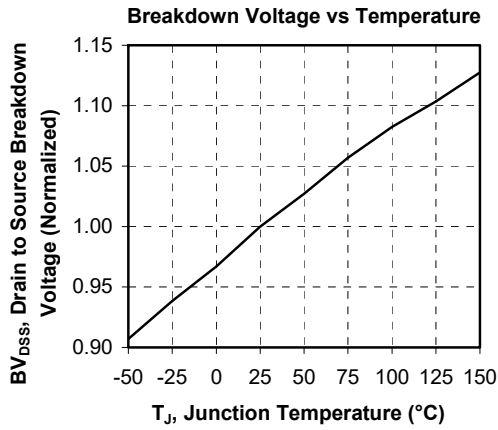


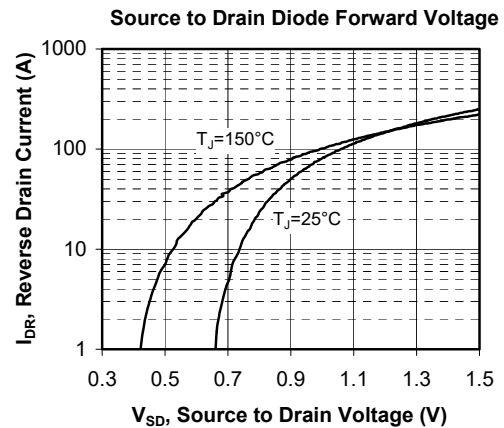
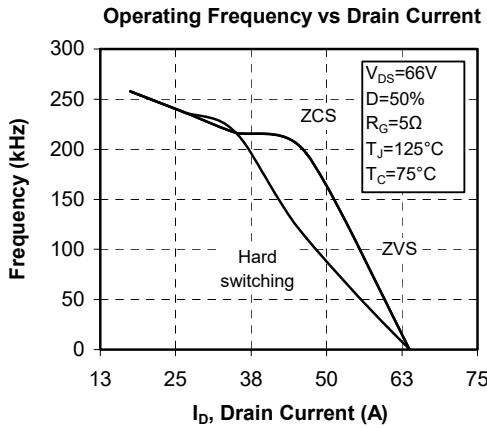
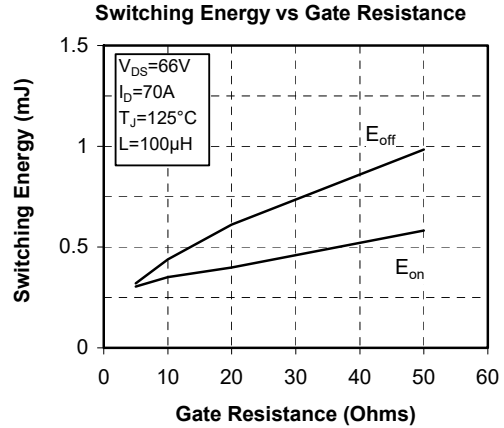
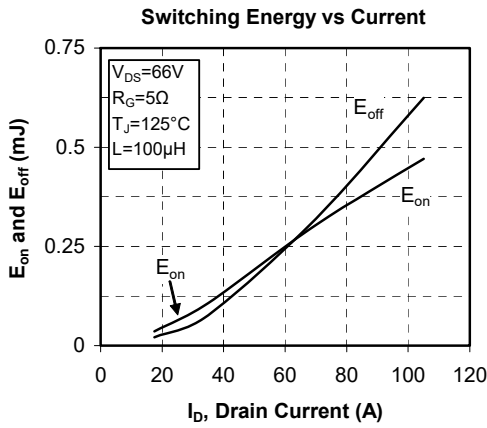
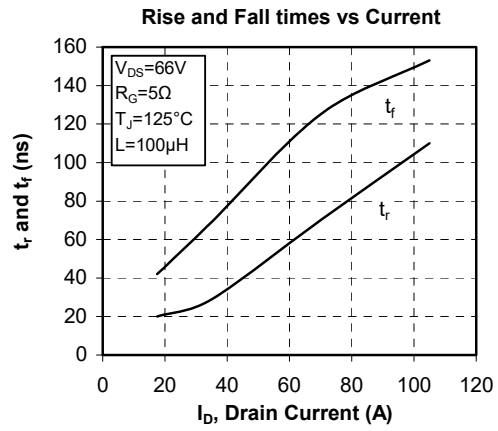
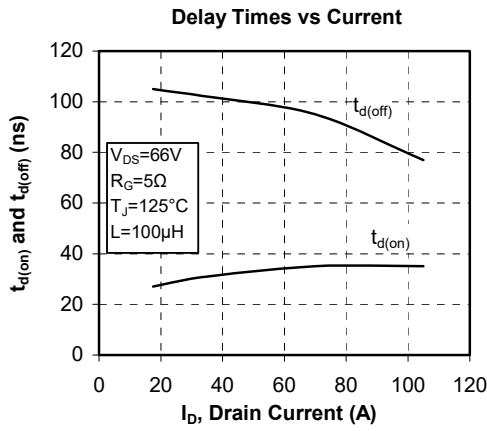
See application note 1906 - Mounting Instructions for SP3F Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve

Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration







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