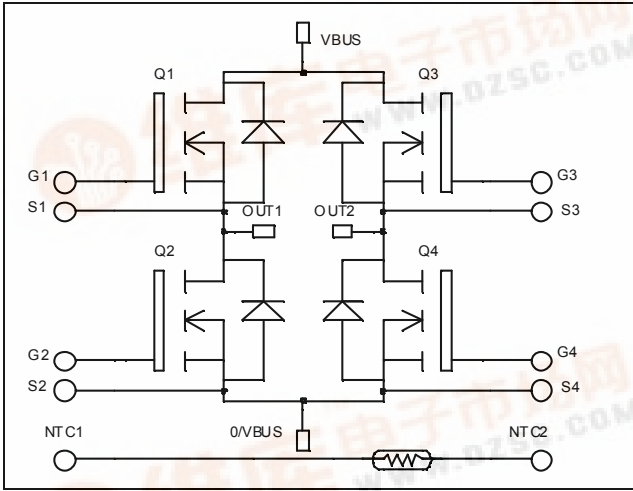




APT50HM75FTG

Full - Bridge MOSFET Power Module

$V_{DSS} = 500V$
 $R_{DSon} = 75m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 46A$ @ $T_c = 25^\circ C$

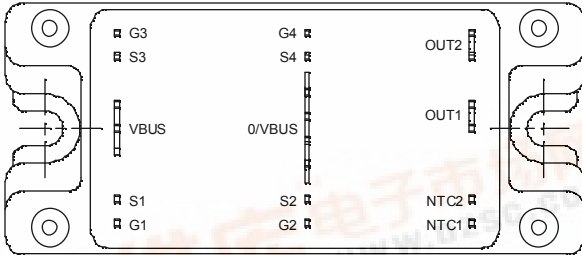


Application

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

Features

- Power MOS 7[®] FREDFETs
 - 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
 - Lead frames for power connections
- 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	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	46
		$T_c = 80^\circ C$	34
I_{DM}	Pulsed Drain current	184	A
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	90	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	357
I_{AR}	Avalanche current (repetitive and non repetitive)	46	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	2500	

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	$V_{GS} = 0V, V_{DS} = 500V$			100	μA
		$V_{GS} = 0V, V_{DS} = 400V$	$T_j = 25^\circ\text{C}$		500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 23A$		75	90	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		5600		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		1200		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		90		
Q_g	Total gate Charge	$V_{GS} = 10V$		123		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 250V$		33		
Q_{gd}	Gate – Drain Charge	$I_D = 46A$		65		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 46A$ $R_G = 5\Omega$		18		ns
T_r	Rise Time			35		
$T_{d(off)}$	Turn-off Delay Time			87		
T_f	Fall Time			77		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 46A, R_G = 5\Omega$		755		μJ
E_{off}	Turn-off Switching Energy			726		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 46A, R_G = 5\Omega$		1241		μJ
E_{off}	Turn-off Switching Energy			846		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			46	A
		$T_c = 80^\circ\text{C}$			34	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -46A$			1.3	V
dv/dt	Peak Diode Recovery ①				15	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -46A$ $V_R = 333V$ $di_s/dt = 100A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		233	ns
			$T_j = 125^\circ\text{C}$		499	
Q_{rr}	Reverse Recovery Charge	$I_S = -46A$ $V_R = 333V$ $di_s/dt = 100A/\mu\text{s}$	$T_j = 25^\circ\text{C}$		1.9	μC
			$T_j = 125^\circ\text{C}$		5.7	

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

 $I_S \leq -46A$ $di/dt \leq 700A/\mu\text{s}$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ\text{C}$

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance			0.35	°C/W	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I _{isol} <1mA, 50/60Hz	2500			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To Heatsink	M5	2.5	4.7	N.m
Wt	Package Weight				160	g

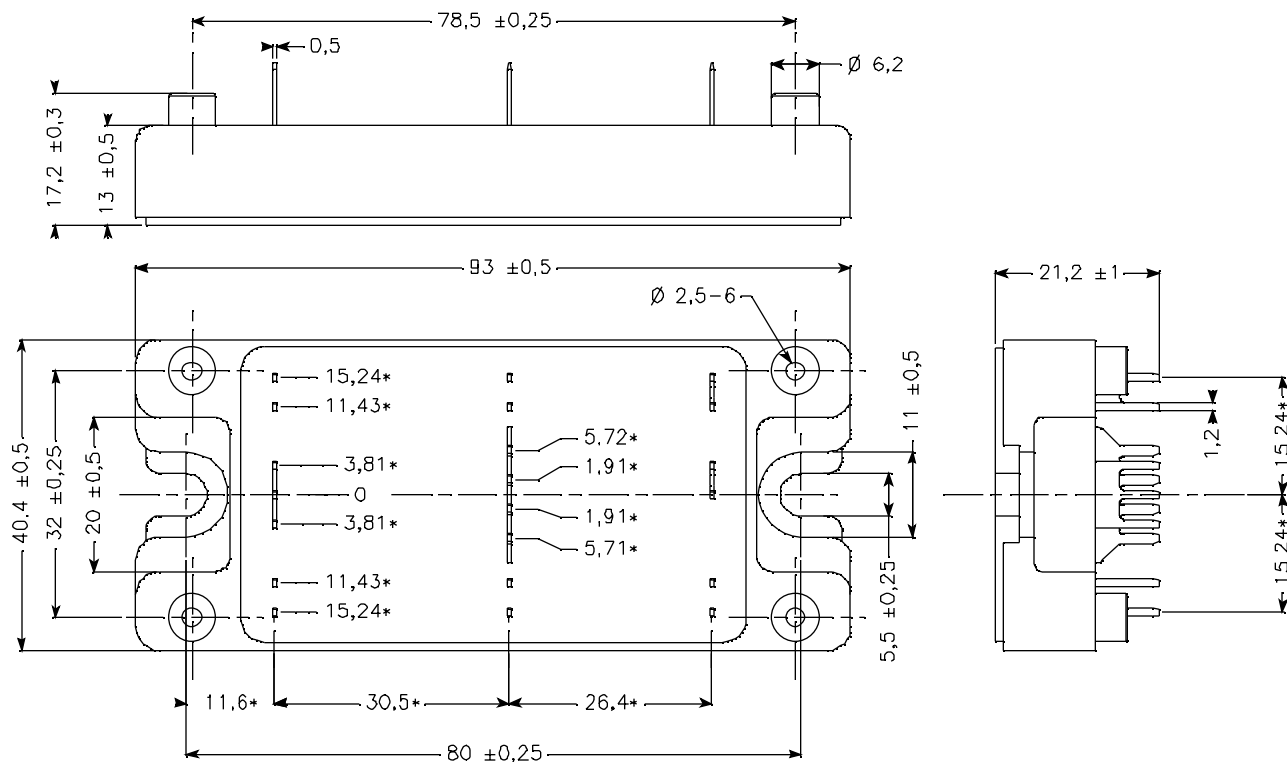
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

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

T: Thermistor temperature
 R_T: Thermistor value at T

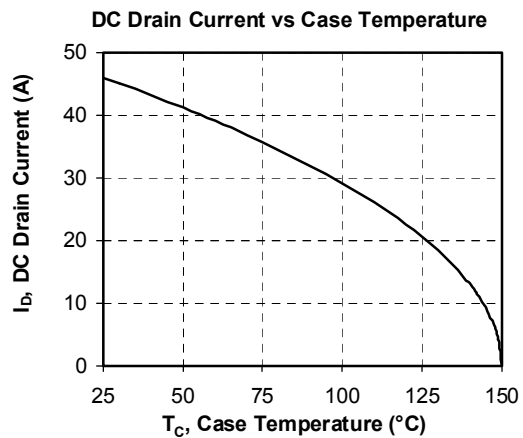
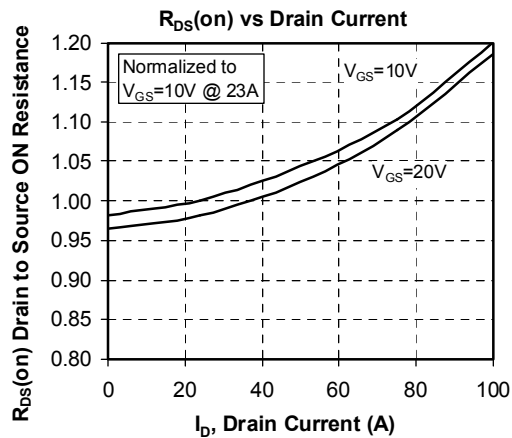
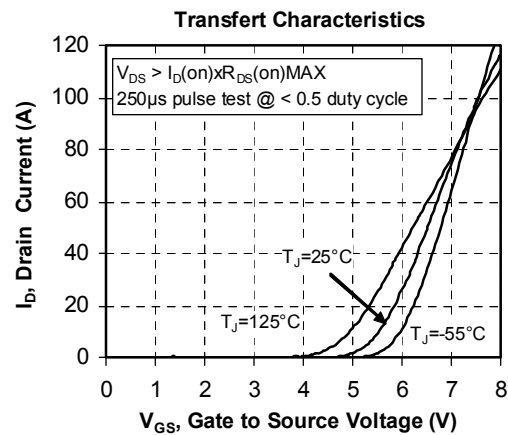
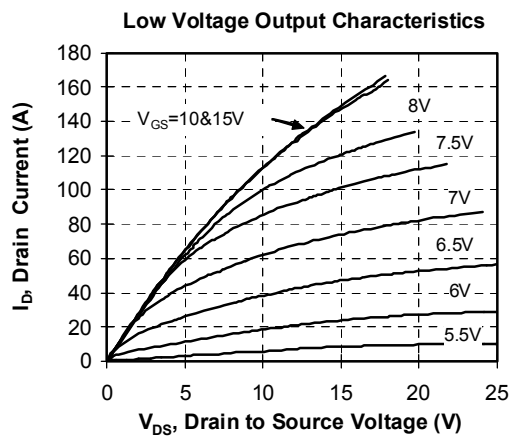
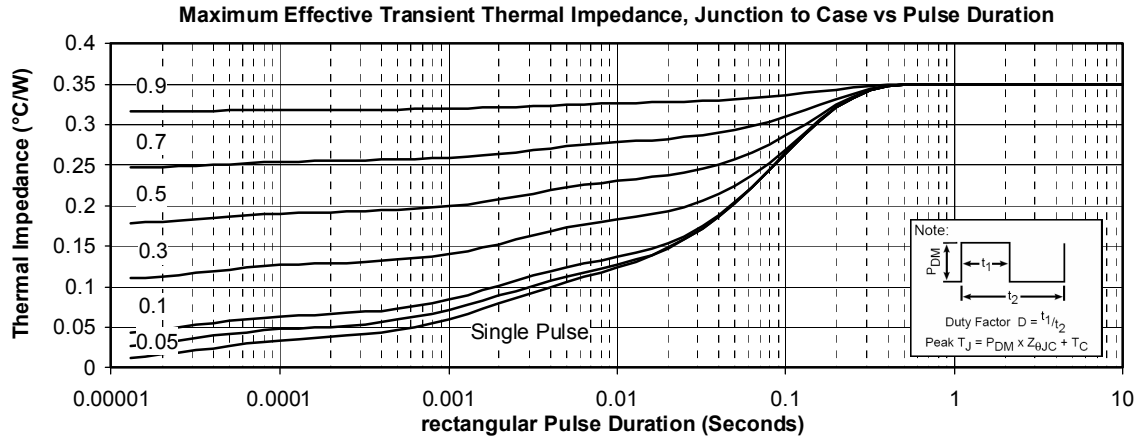
SP4 Package outline (dimensions in mm)

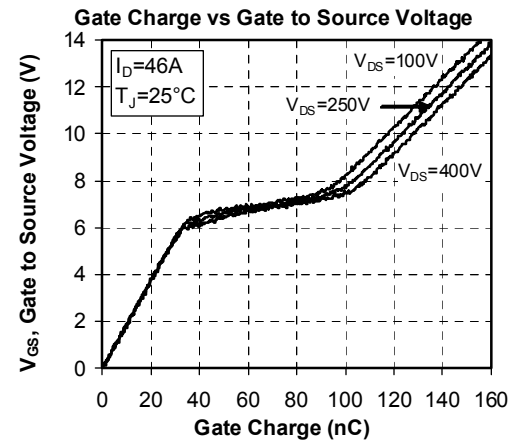
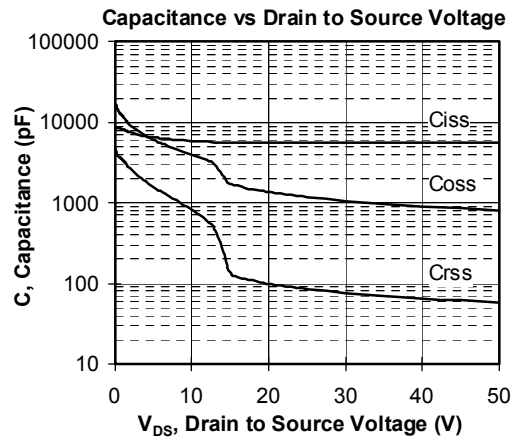
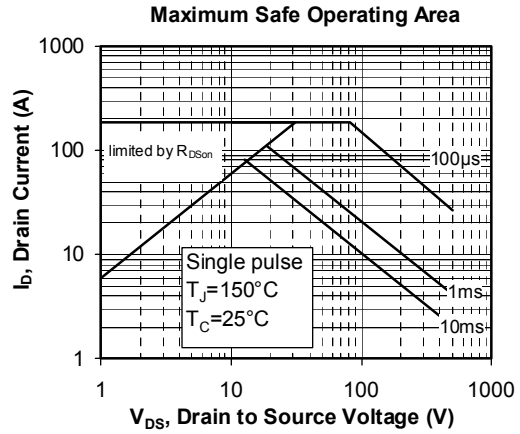
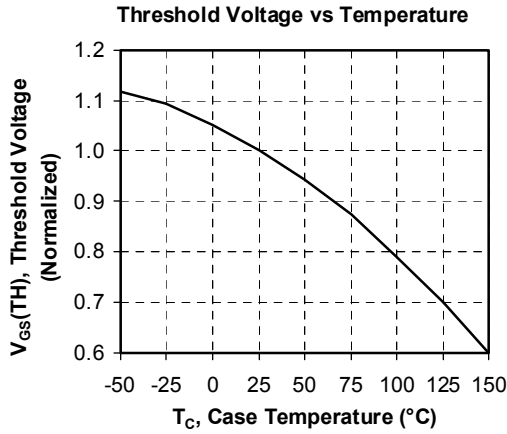
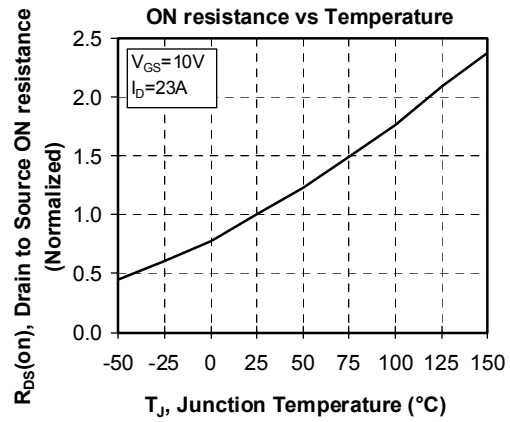
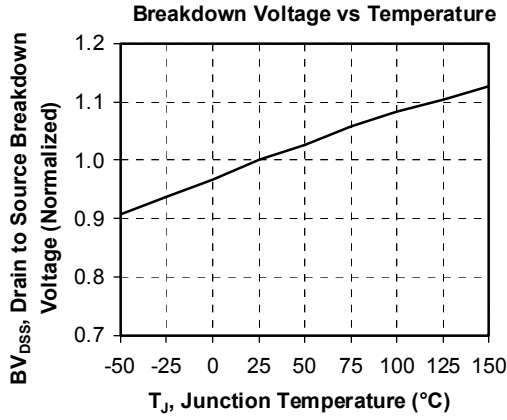


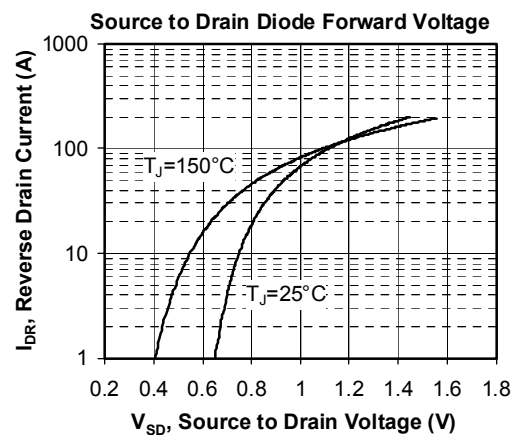
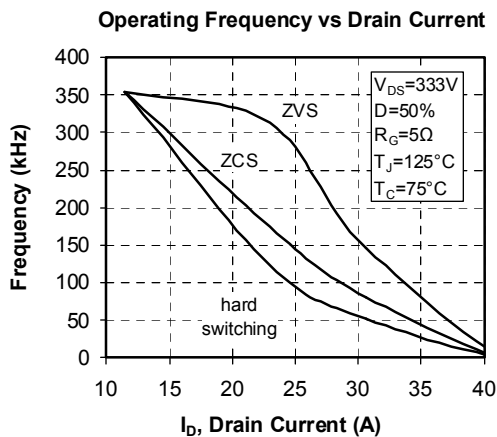
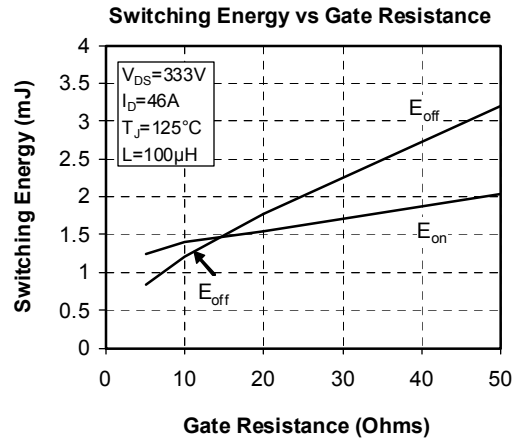
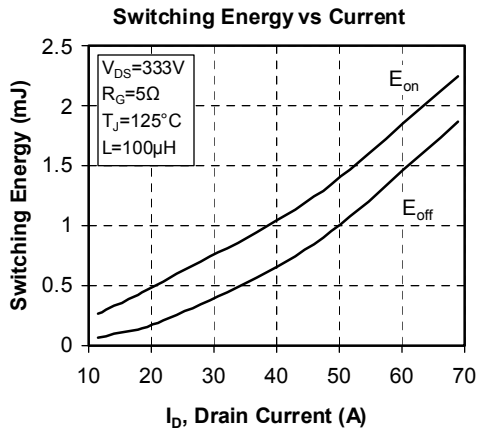
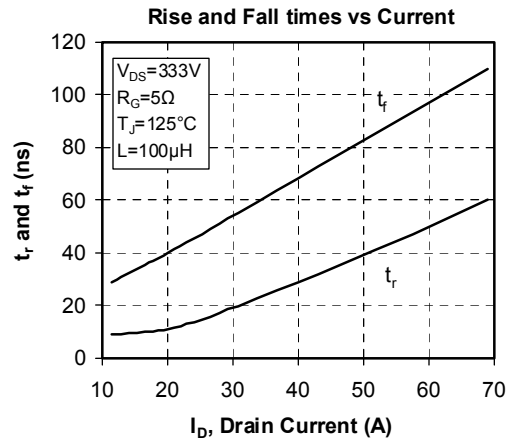
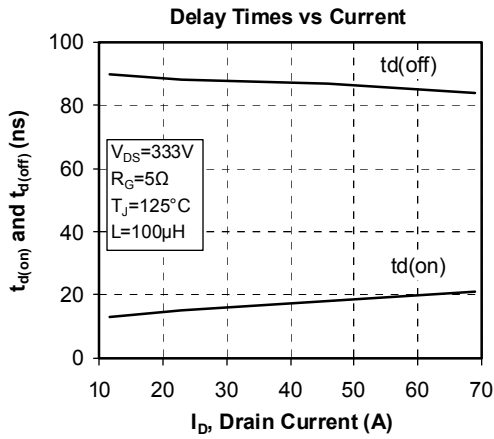
ALL DIMENSIONS MARKED "*" ARE TOLERENCED AS: $\pm 0,1$

See application note APT0501 - Mounting Instructions for SP4 Power Modules on www.microsemi.com

Typical Performance Curve







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