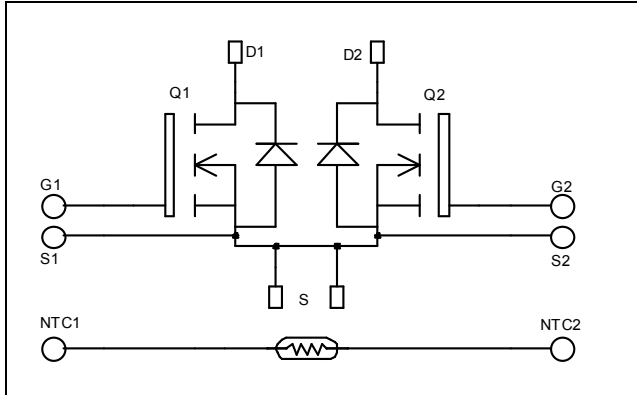


Dual common source MOSFET Power Module

$V_{DSS} = 100V$

$R_{DSon} = 4.5m\Omega \text{ typ @ } T_j = 25^\circ C$

$I_D = 278A \text{ @ } T_c = 25^\circ C$



Application

- AC Switches
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

Features

- Power MOS V[®] 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
 - 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	100	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$ 278 $T_c = 80^\circ C$ 207	A
I_{DM}	Pulsed Drain current	1100	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	5	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$ 780	W
I_{AR}	Avalanche current (repetitive and non repetitive)	100	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3000	

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	$V_{GS} = 0V, V_{DS} = 100V$ $T_j = 25^\circ\text{C}$			200	μA
		$V_{GS} = 0V, V_{DS} = 80V$ $T_j = 125^\circ\text{C}$			1000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 125A$		4.5	5	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5\text{mA}$	2		4	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 200	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		20		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		8		
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		2.9		
Q_g	Total gate Charge	$V_{GS} = 10V$		700		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 50V$		120		
Q_{gd}	Gate – Drain Charge	$I_D = 250A$		360		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 66V$ $I_D = 250A$ $R_G = 2.5\Omega$		80		ns
T_r	Rise Time			165		
$T_{d(off)}$	Turn-off Delay Time			280		
T_f	Fall Time			135		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 250A, R_G = 2.5\Omega$		1.1		mJ
E_{off}	Turn-off Switching Energy			1.2		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 66V$ $I_D = 250A, R_G = 2.5\Omega$		1.22		mJ
E_{off}	Turn-off Switching Energy			1.28		

Source - Drain diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^\circ\text{C}$			278	A
		$T_c = 80^\circ\text{C}$			207	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -250A$			1.3	V
dv/dt	Peak Diode Recovery ❶				5	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -250A$ $V_R = 66V$ $T_j = 25^\circ\text{C}$		270		ns
Q_{rr}	Reverse Recovery Charge	$di/dt = 200A/\mu\text{s}$ $T_j = 25^\circ\text{C}$		5.8		μC

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

$I_S \leq -278A$ $di/dt \leq 200A/\mu\text{s}$ $V_R \leq V_{DSS}$ $T_j \leq 150^\circ\text{C}$

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance					0.16	°C/W
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			4000			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

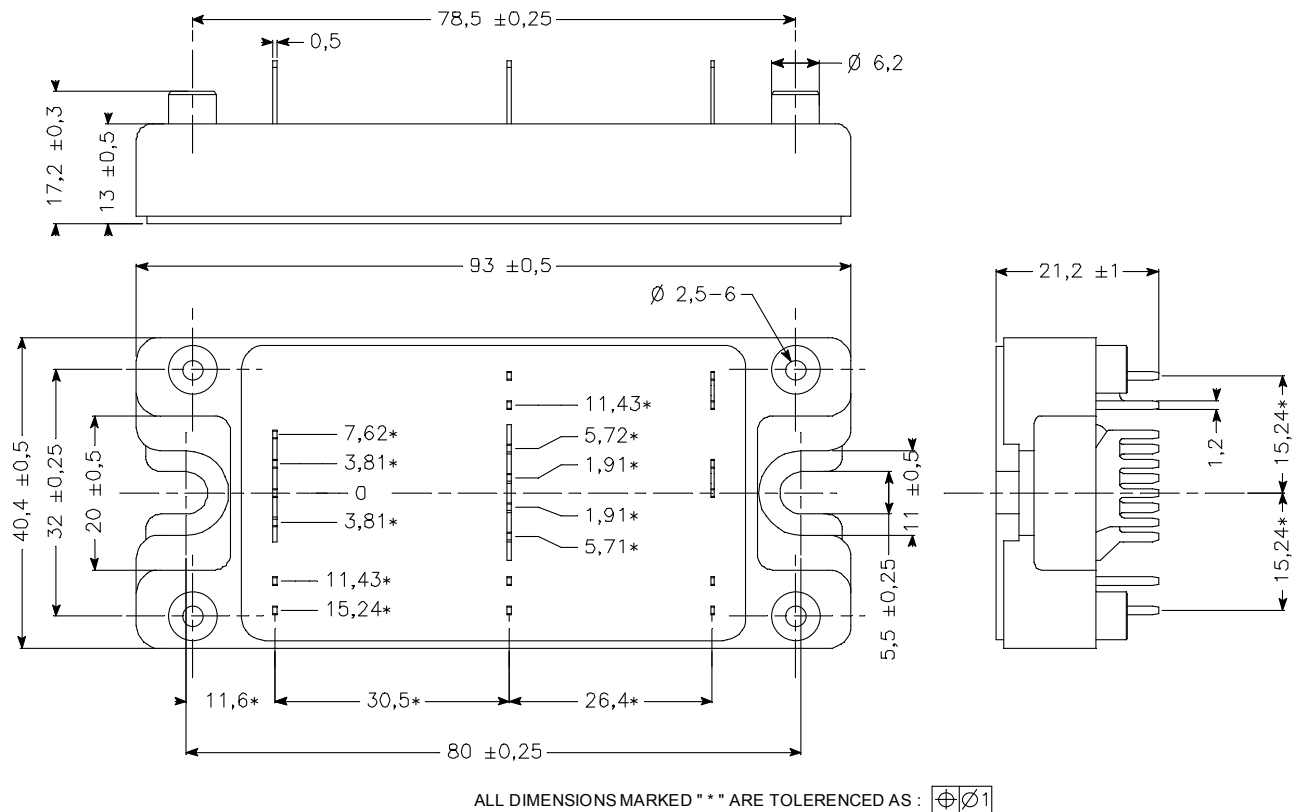
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C		50		kΩ
$\Delta R_{25}/R_{25}$			5		%
$B_{25/85}$	$T_{25} = 298.15$ K		3952		K
$\Delta B/B$	$T_C = 100^\circ\text{C}$		4		%

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

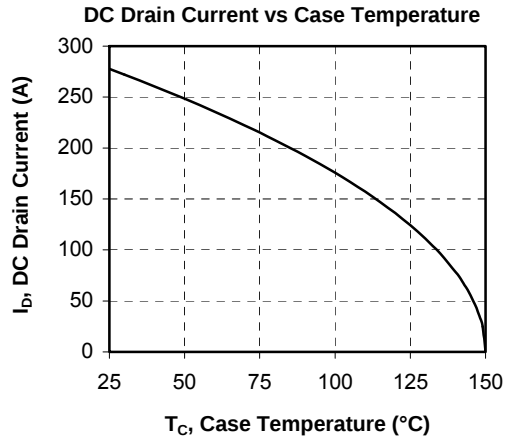
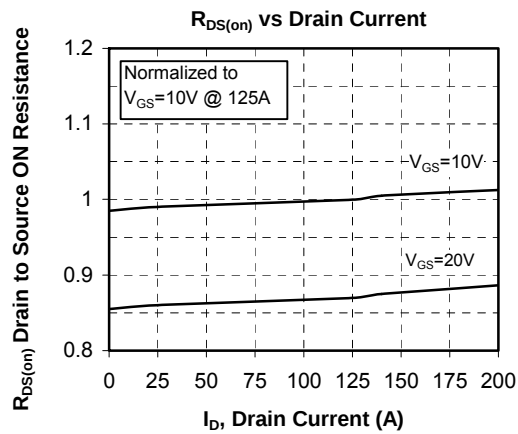
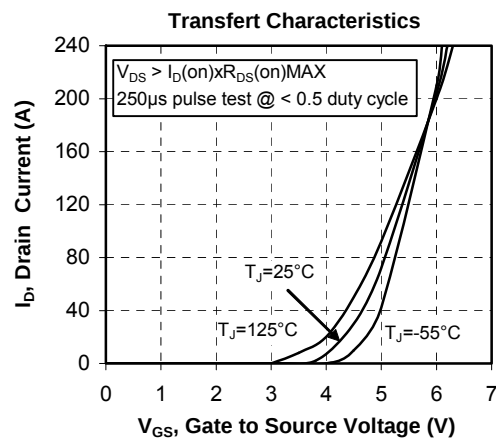
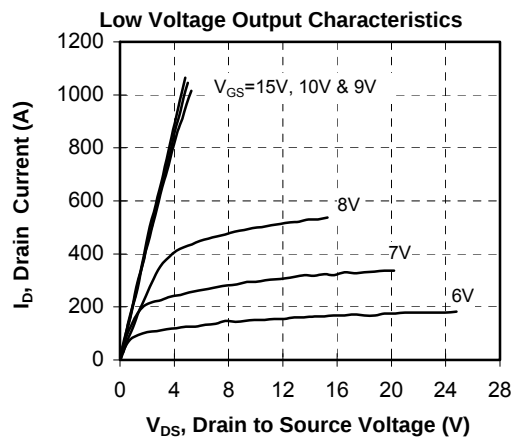
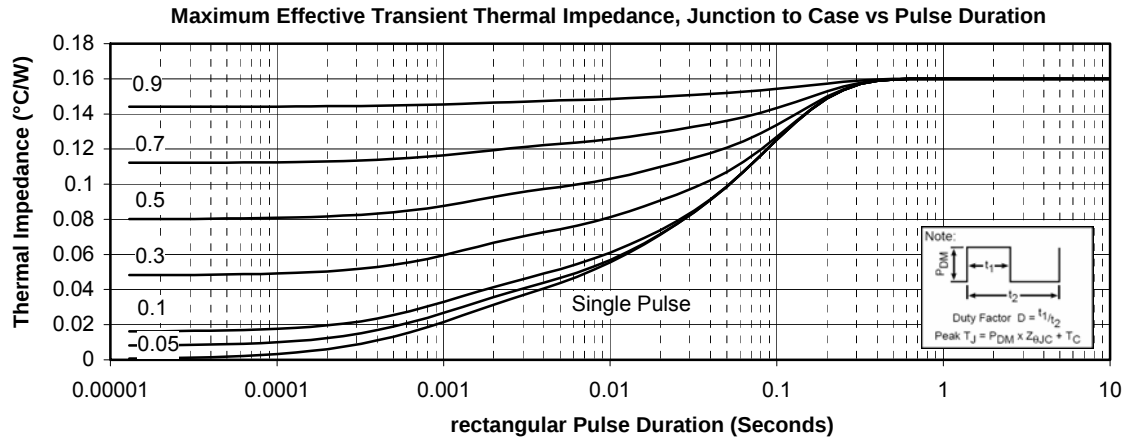
T : Thermistor temperature
 R_T : Thermistor value at T

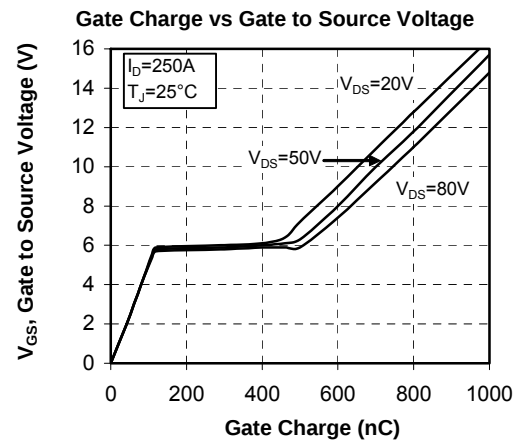
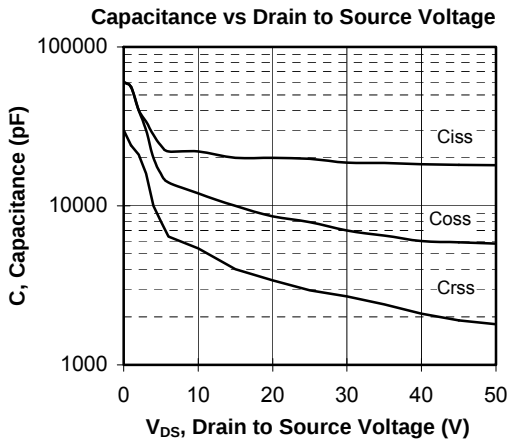
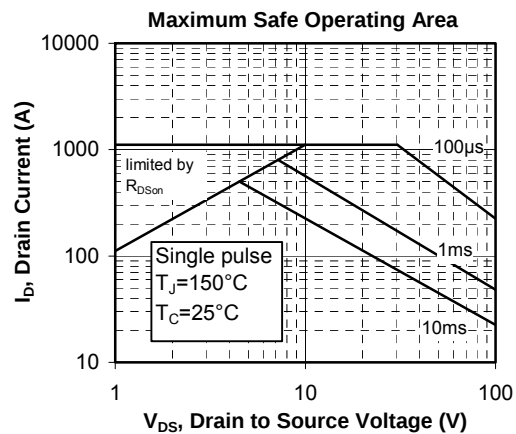
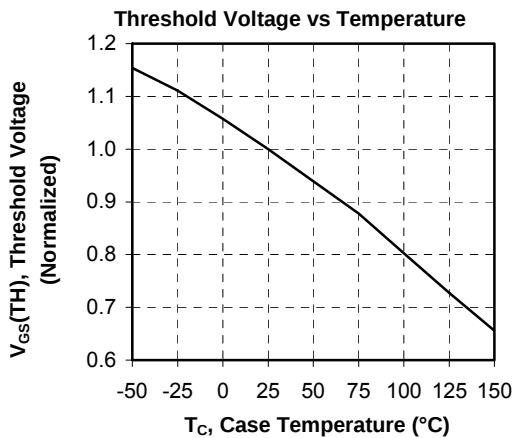
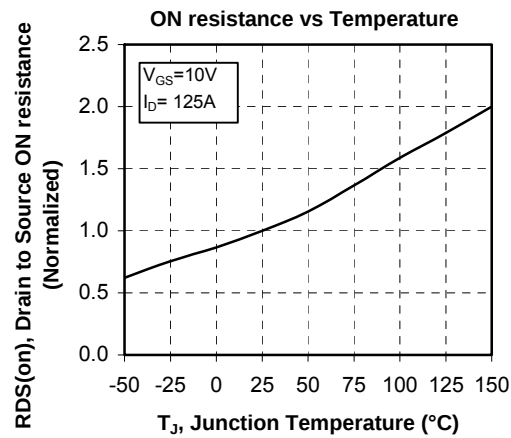
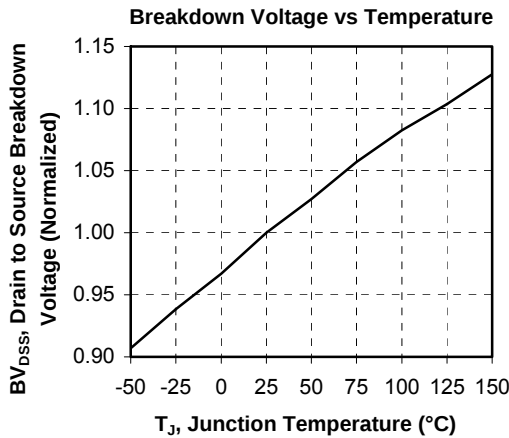
SP4 Package outline (dimensions in mm)

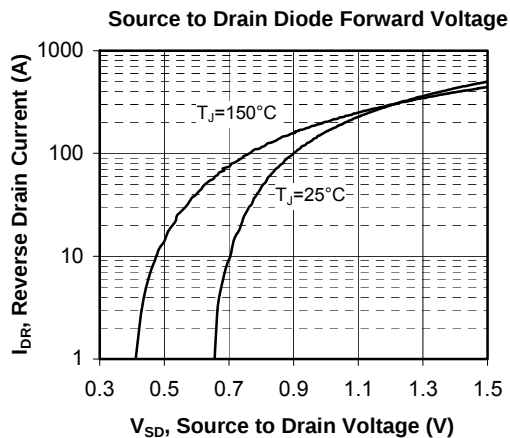
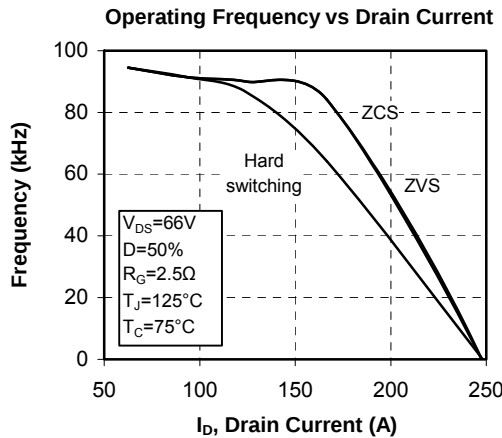
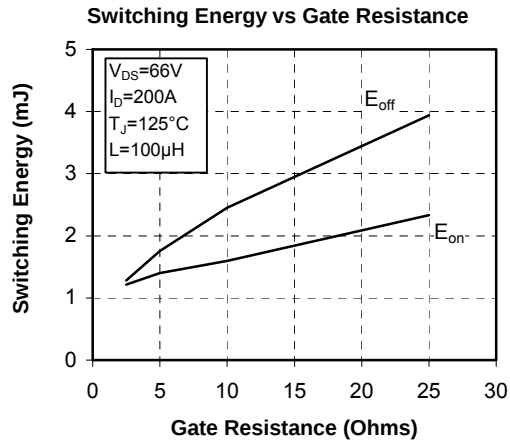
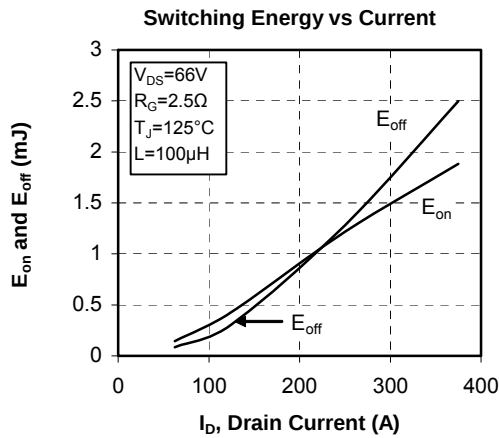
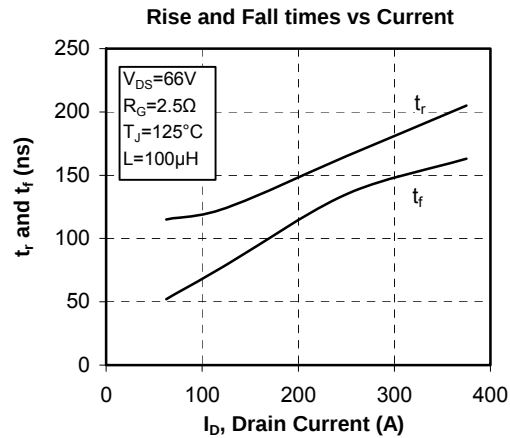
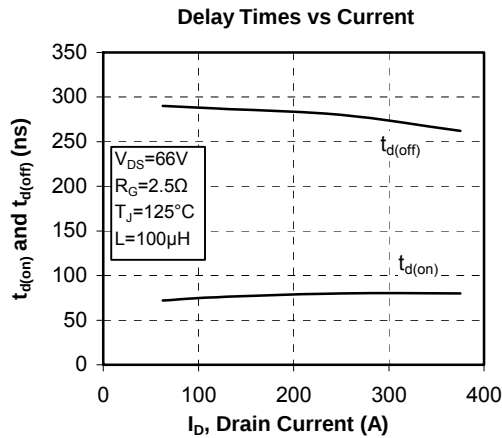


See application note APT0501 - Mounting Instructions for SP4 Power Modules on www.microsemi.com

Typical Performance Curve







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