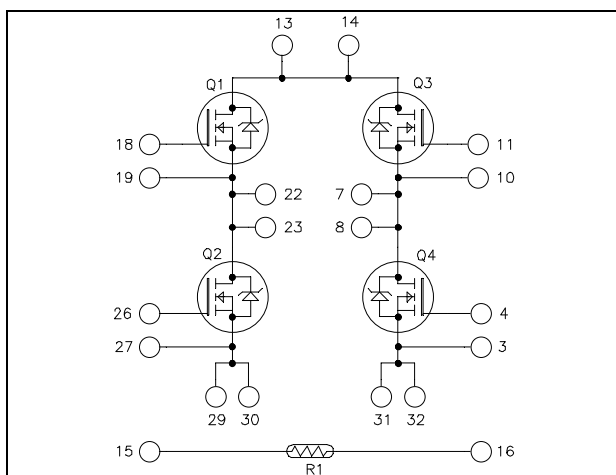


Full - Bridge Super Junction MOSFET Power Module

$$V_{DSS} = 800V$$

$$R_{DSon} = 290m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 15A \text{ @ } T_c = 25^\circ C$$



Application

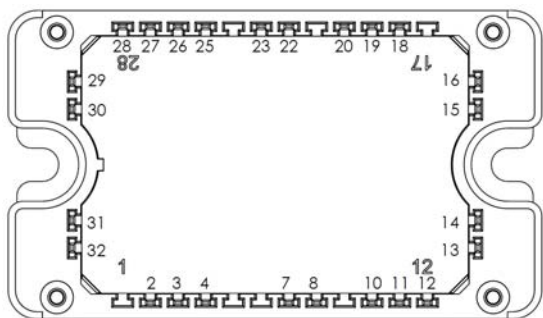
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

Features

- **Super junction MOSFET**
 - Ultra low R_{DSon}
 - Low Miller capacitance
 - Ultra 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 phase leg 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 super junction MOSFET)

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	800	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	60	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	290	m Ω
P_D	Power Dissipation	$T_c = 25^\circ C$	W
I_{AR}	Avalanche current (repetitive and non repetitive)	17	A
E_{AR}	Repetitive Avalanche Energy	0.5	mJ
E_{AS}	Single Pulse Avalanche Energy	670	

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

Electrical Characteristics (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 800V$			25	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 7.5A$			290	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 1mA$	2.1	3	3.9	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA

Dynamic Characteristics (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		2254		pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		1046		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		54		
Q_g	Total gate Charge	$V_{GS} = 10V$		90		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 400V$		11		
Q_{gd}	Gate – Drain Charge	$I_D = 15A$		45		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @125°C $V_{GS} = 15V$ $V_{Bus} = 533V$ $I_D = 15A$ $R_G = 5\Omega$		10		ns
T_r	Rise Time			13		
$T_{d(off)}$	Turn-off Delay Time			83		
T_f	Fall Time			35		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 15A, R_G = 5\Omega$		243		μJ
E_{off}	Turn-off Switching Energy			139		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 533V$ $I_D = 15A, R_G = 5\Omega$		425		μJ
E_{off}	Turn-off Switching Energy			171		
R_{thJC}	Junction to Case Thermal Resistance				0.80	$^{\circ}C/W$

Source - Drain diode ratings and characteristics (per super junction MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_S	Continuous Source current (Body diode)	$T_c = 25^{\circ}C$		15		A
		$T_c = 80^{\circ}C$		11		
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V, I_S = -15A$			1.2	V
dv/dt	Peak Diode Recovery ❶				6	V/ns
t_{rr}	Reverse Recovery Time	$I_S = -15A ; V_R = 400V$		550		ns
Q_{rr}	Reverse Recovery Charge	$di_s/dt = 100A/\mu s$		15		μC

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

$I_S \leq -15A$ $di/dt \leq 100A/\mu s$ $V_R \leq V_{DSS}$ $T_j \leq 150^{\circ}C$

Thermal and package characteristics

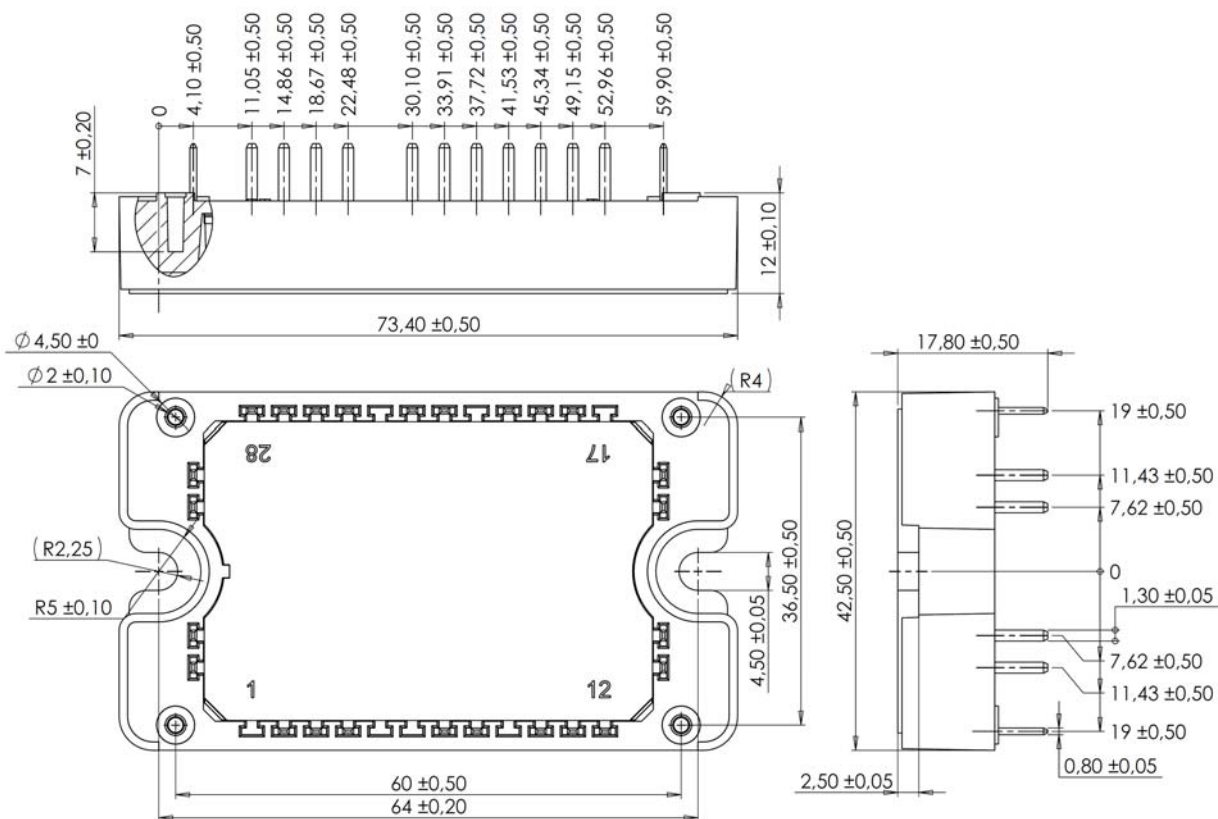
Symbol	Characteristic			Min	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000		V
T _J	Operating junction temperature range			-40	150	°C
T _{JOP}	Recommended junction temperature under switching conditions			-40	T _{Jmax} -25	
T _{STG}	Storage Temperature Range			-40	125	
T _C	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 for more information).

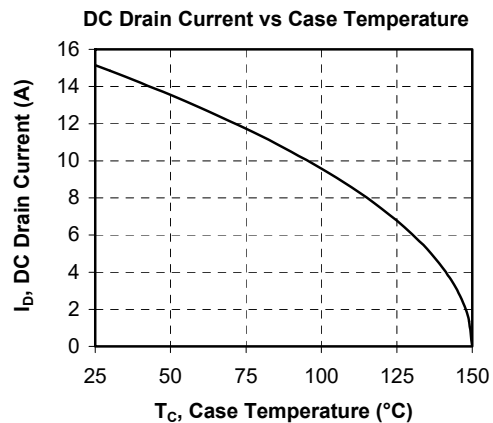
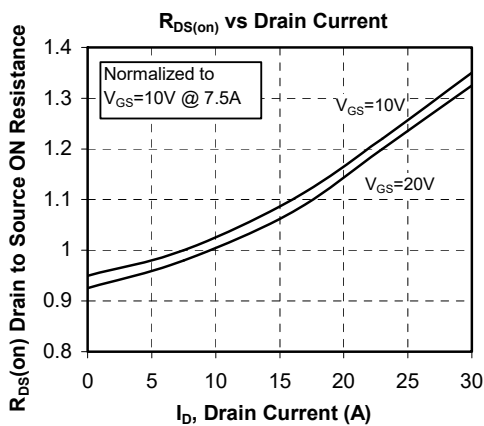
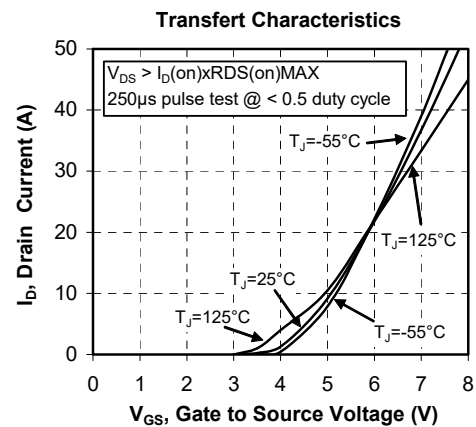
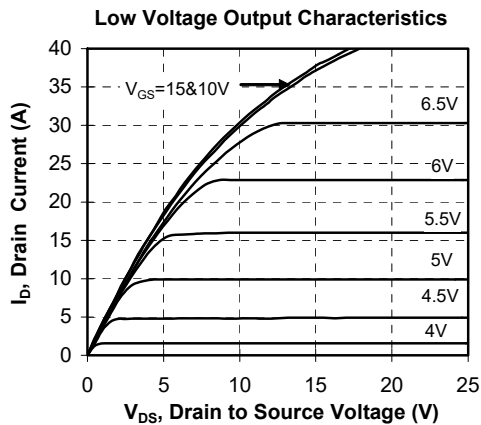
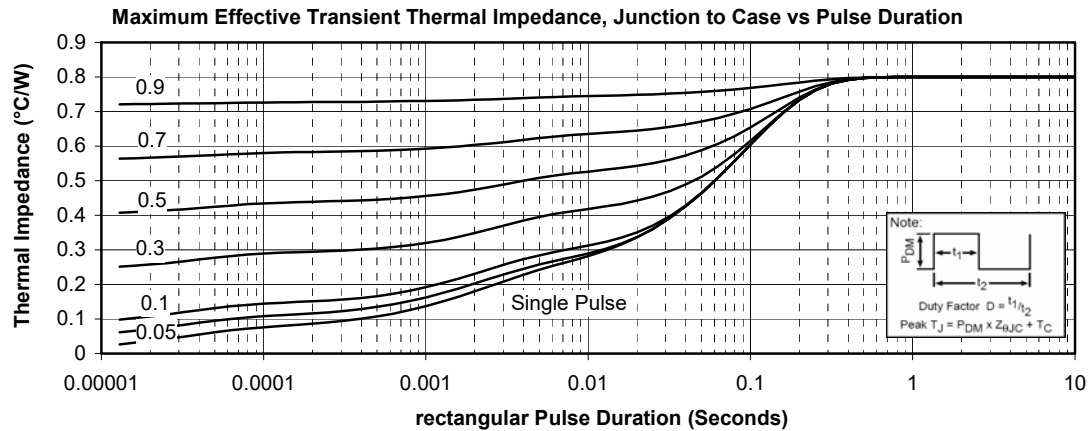
Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

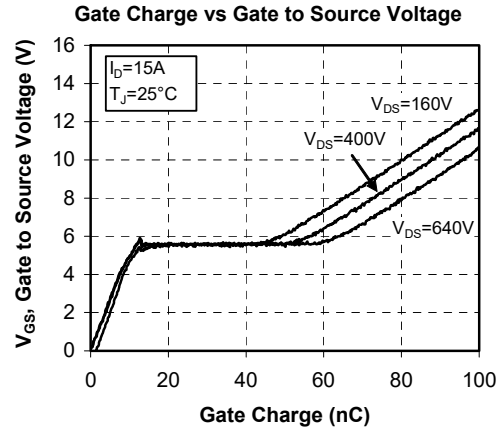
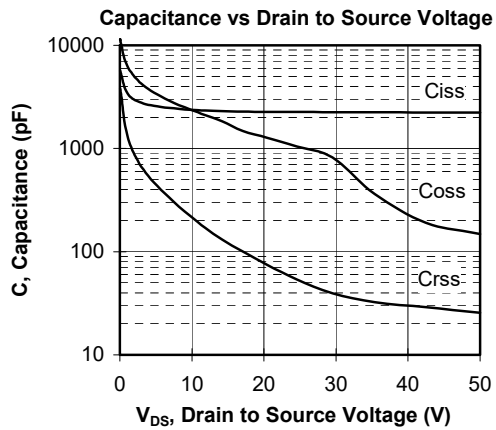
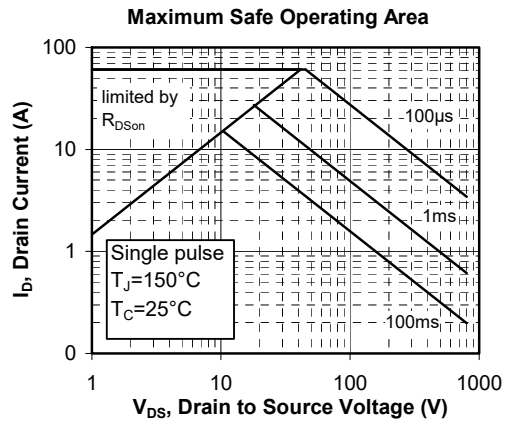
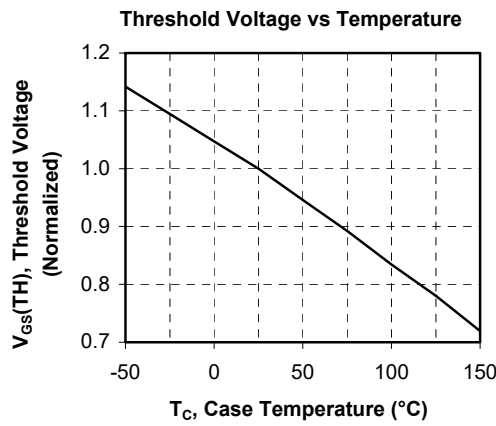
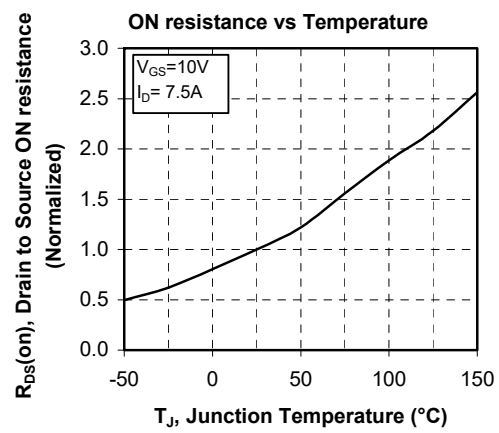
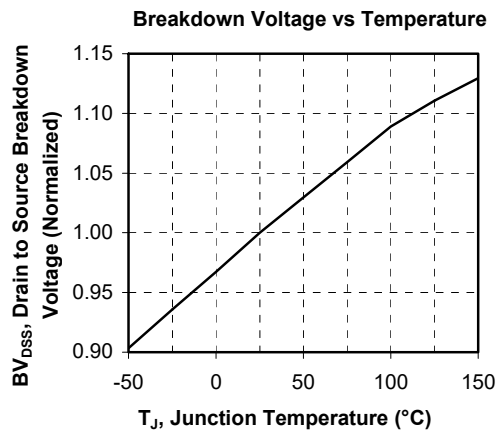
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

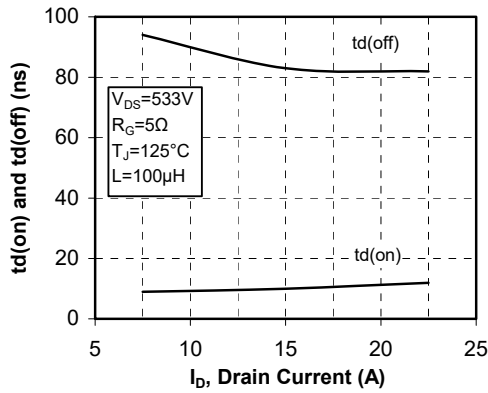
Package outline (dimensions in mm)


Typical performance Curve

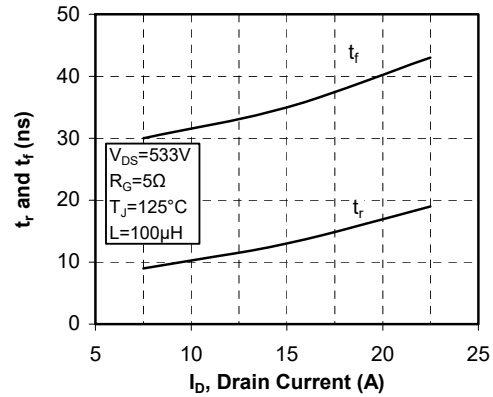




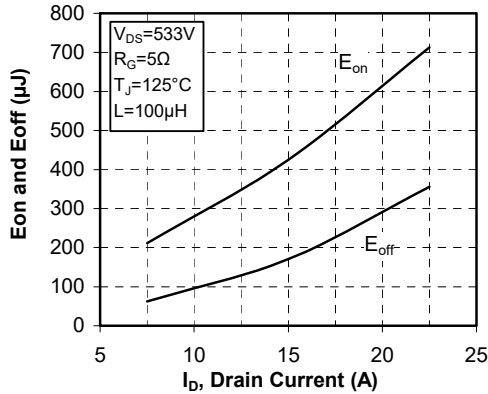
Delay Times vs Current



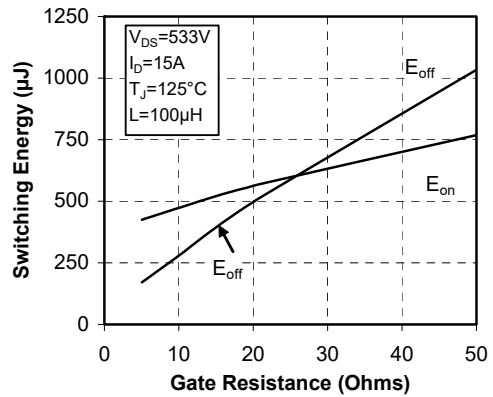
Rise and Fall times vs Current



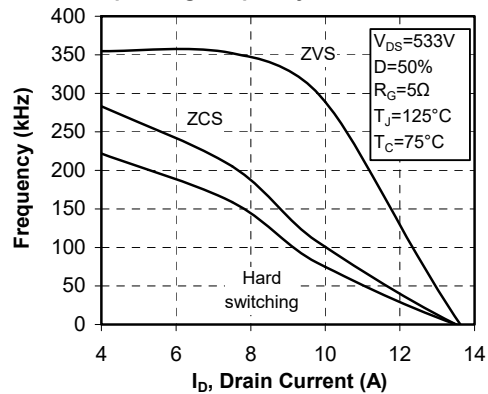
Switching Energy vs Current



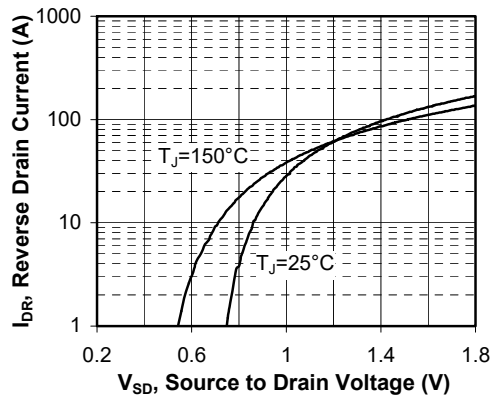
Switching Energy vs Gate Resistance



Operating Frequency vs Drain Current



Source to Drain Diode Forward Voltage



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