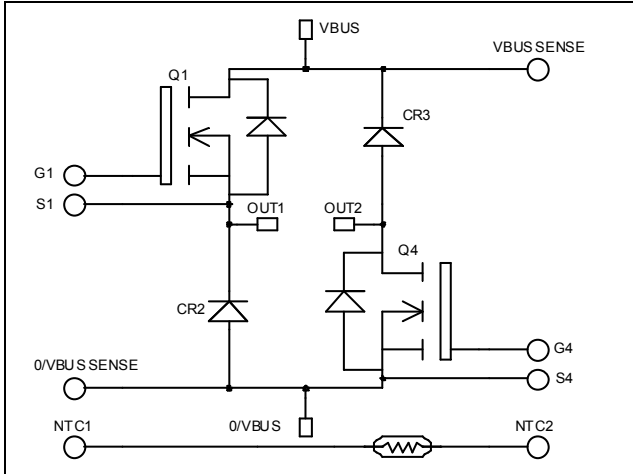


***Asymmetrical - Bridge
MOSFET Power Module***

**$V_{DSS} = 500V$
 $R_{DSon} = 65m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 51A \text{ @ } T_c = 25^\circ C$**



Application

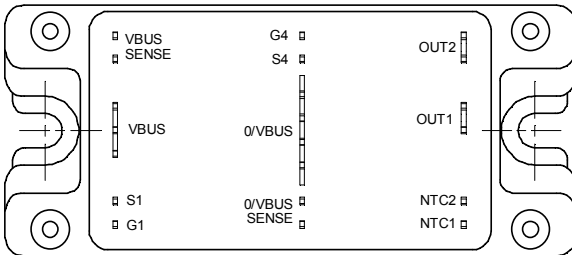
- Welding converters
- Switched Mode Power Supplies
- Switched Reluctance Motor Drives

Features

- Power MOS 7[®] 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



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	500	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	51
		$T_c = 80^\circ C$	38
I_{DM}	Pulsed Drain current	204	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	65	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	390
I_{AR}	Avalanche current (repetitive and non repetitive)	51	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.

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain - Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	500			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 500V$			100	μA
		$V_{GS} = 0V, V_{DS} = 400V$			500	
$R_{DS(on)}$	Drain - Source on Resistance	$V_{GS} = 10V, I_D = 25.5A$			65	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5mA$	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	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$		7000		pF
C_{oss}	Output Capacitance			1400		
C_{rss}	Reverse Transfer Capacitance			90		
Q_g	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 250V$ $I_D = 51A$		140		nC
Q_{gs}	Gate - Source Charge			40		
Q_{gd}	Gate - Drain Charge			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 51A$ $R_G = 3\Omega$		21		ns
T_r	Rise Time			38		
$T_{d(off)}$	Turn-off Delay Time			75		
T_f	Fall Time			93		
E_{on}	Turn-on Switching Energy ①	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 51A, R_G = 3\Omega$		1035		μJ
E_{off}	Turn-off Switching Energy ②			845		
E_{on}	Turn-on Switching Energy ①	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 51A, R_G = 3\Omega$		1556		μJ
E_{off}	Turn-off Switching Energy ②			1013		

Diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle $T_c = 70^\circ\text{C}$		60		A
V_F	Diode Forward Voltage	$I_F = 60A$		1.6	1.8	V
		$I_F = 120A$		1.9		
		$I_F = 60A$	$T_j = 125^\circ\text{C}$		1.4	
t_{rr}	Reverse Recovery Time	$I_F = 60A$ $V_R = 400V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$		130	ns
			$T_j = 125^\circ\text{C}$		170	
Q_{rr}	Reverse Recovery Charge	$I_F = 60A$ $V_R = 400V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$		220	nC
			$T_j = 125^\circ\text{C}$		920	

① E_{on} includes diode reverse recovery.

② In accordance with JEDEC standard JESD24-1.

Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case	Transistor		0.32	°C/W
		Diode		0.9	
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		4.7 N.m
Wt	Package Weight			160	g

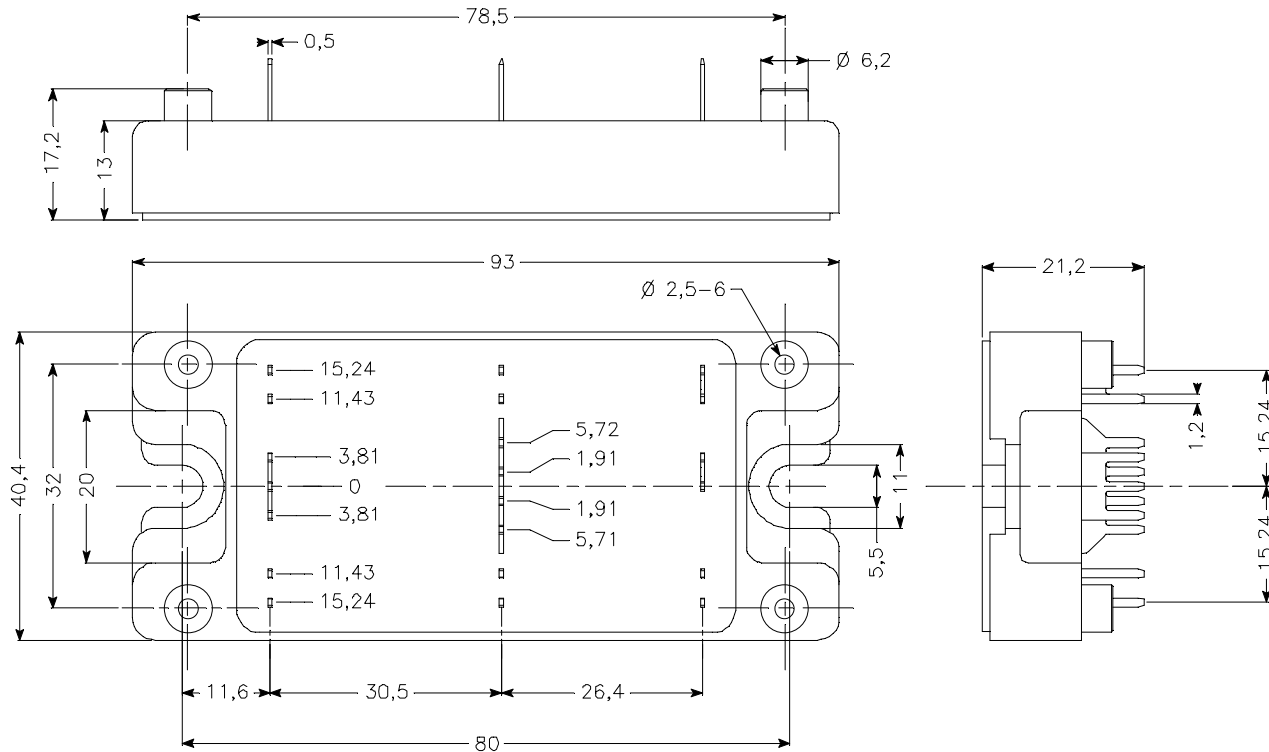
Temperature sensor NTC

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		68		kΩ
B _{25/85}	T ₂₅ = 298.16 K		4080		K

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

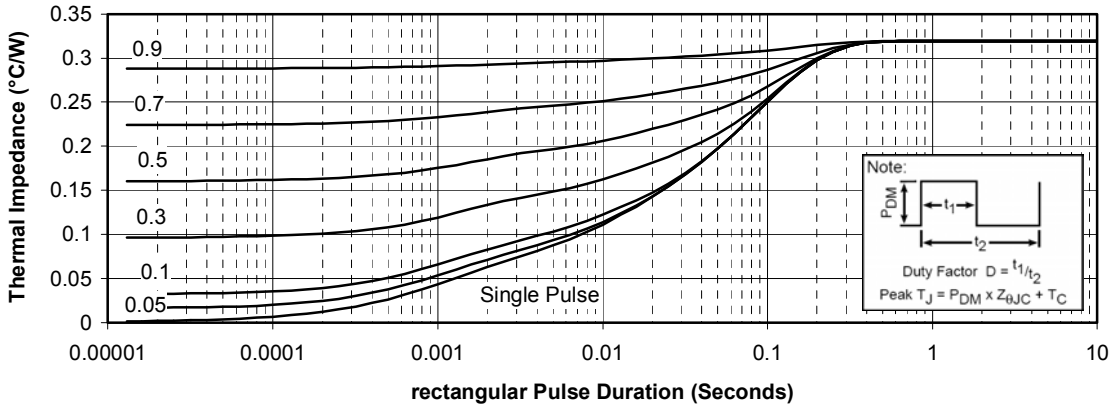
T: Thermistor temperature
R_T: Thermistor value at T

Package outline

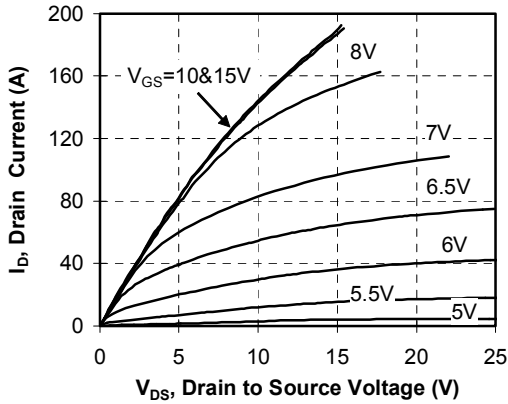


Typical Performance Curve

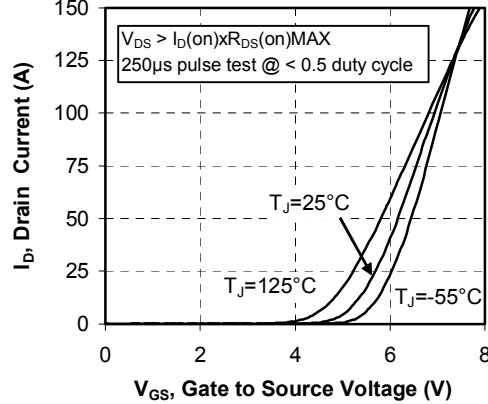
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



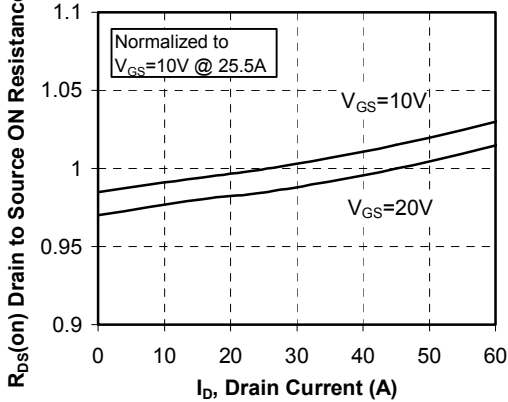
Low Voltage Output Characteristics



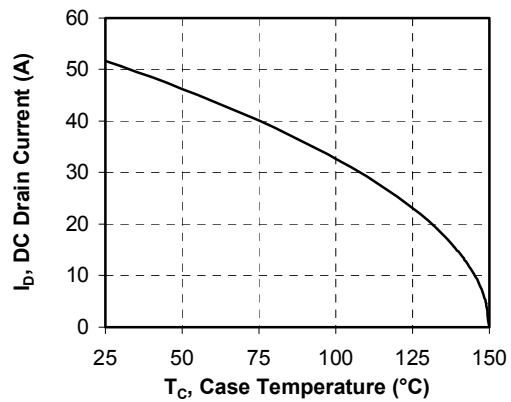
Transfer Characteristics

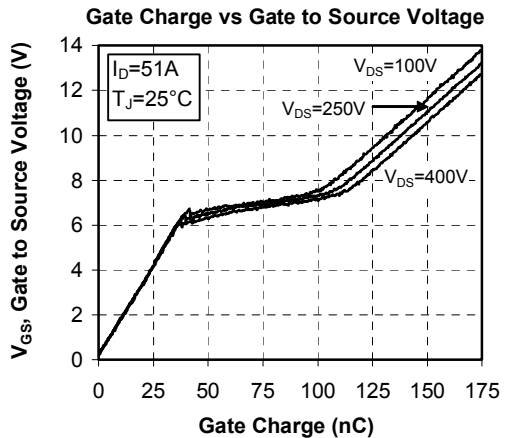
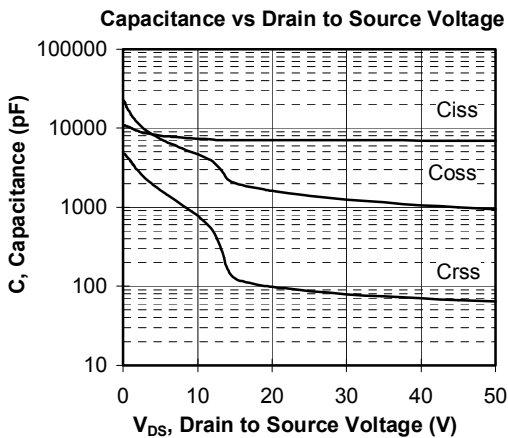
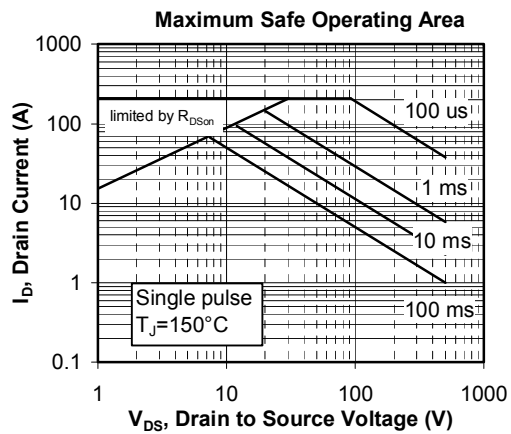
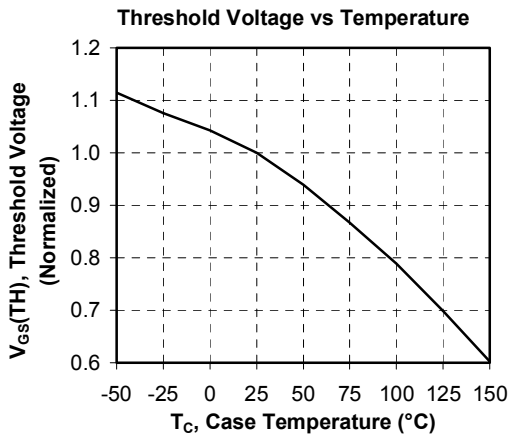
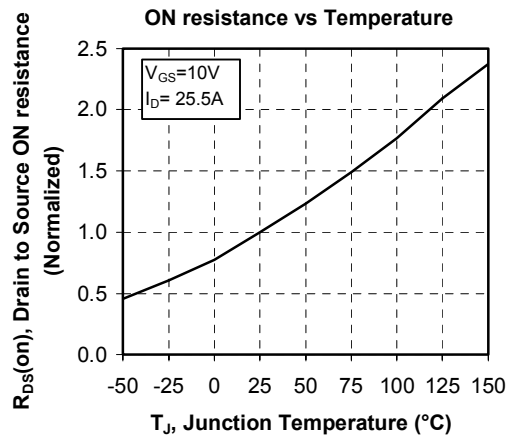
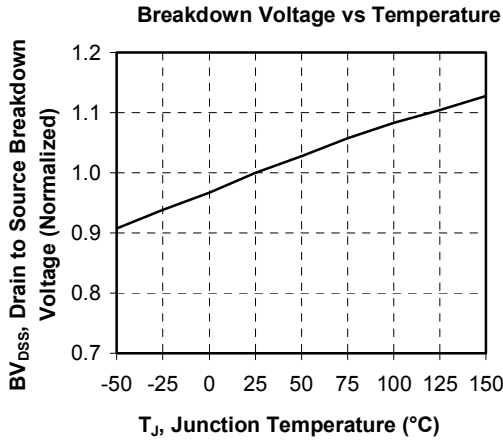


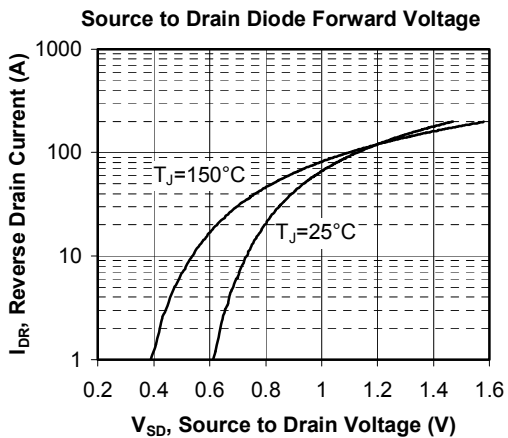
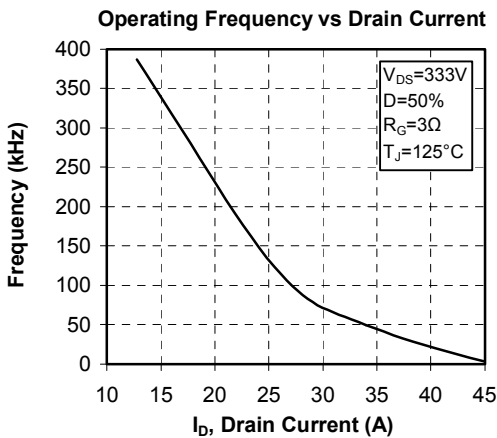
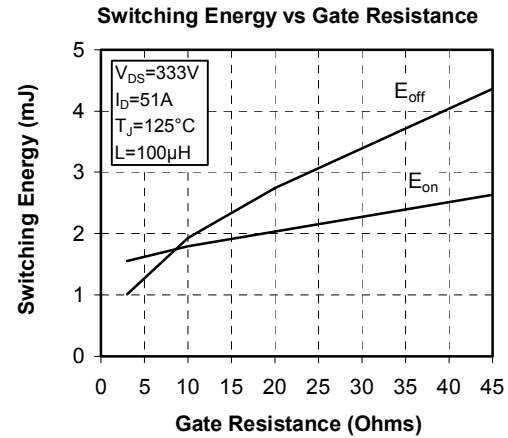
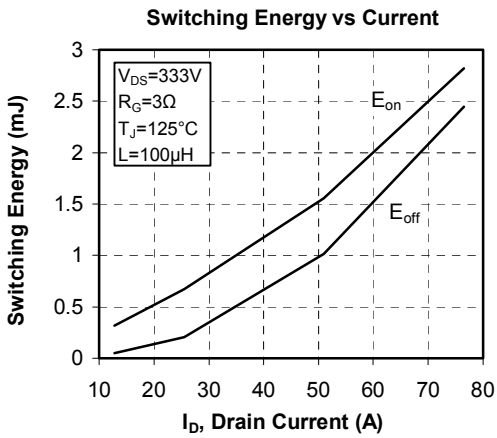
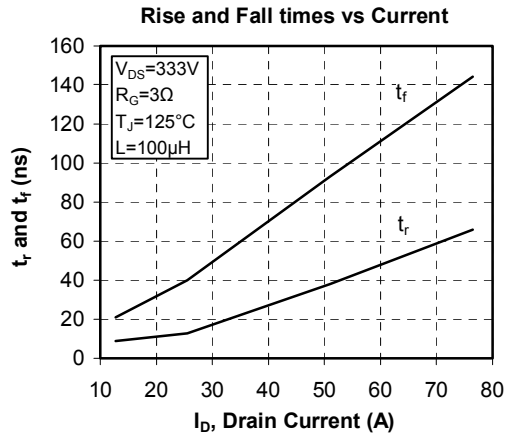
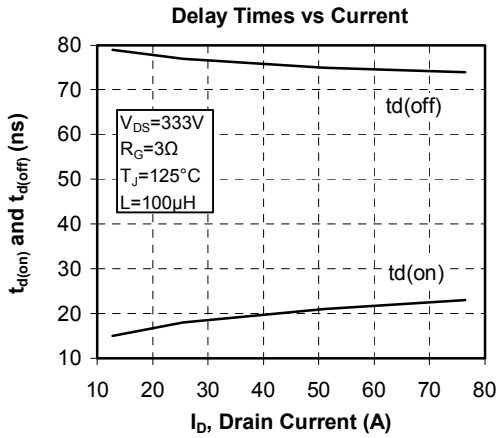
RDS(on) vs Drain Current



DC Drain Current vs Case Temperature







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