

阅读申明

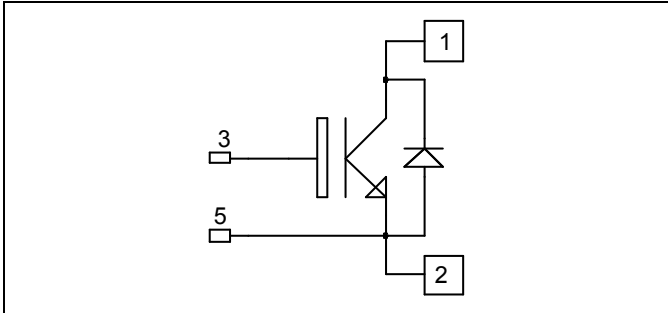
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**Single switch
Trench + Field Stop IGBT
Power Module**

**$V_{CES} = 600V$
 $I_C = 600A @ T_c = 80^\circ C$**



Application

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

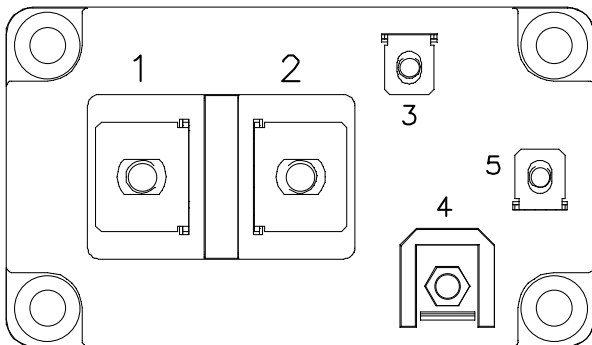
Features

- Trench + Field Stop IGBT Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated

- Kelvin emitter for easy drive
- M6 connectors for power
- M4 connectors for signal
- High level of integration

Benefits

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CEsat}
- RoHS Compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	760
		$T_C = 80^\circ C$	580
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1600
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	1200A@550V

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_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$			1	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 600\text{A}$	$T_j = 25^\circ\text{C}$	1.5	1.9	V
			$T_j = 125^\circ\text{C}$	1.7		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 10\text{mA}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}, V_{CE} = 0\text{V}$			2400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		37		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		2.3		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.1		
Q_G	Gate charge	$V_{GE} = -8/+15\text{V}, I_C = 600\text{A}$ $V_{CE} = 300\text{V}$		4.4		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		250		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		70		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$		550		
T_f	Fall Time	$R_G = 1.5\Omega$		70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C)		270		ns
T_r	Rise Time	$V_{GE} = \pm 15\text{V}$		80		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 300\text{V}$ $I_C = 600\text{A}$		650		
T_f	Fall Time	$R_G = 1.5\Omega$		80		
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$	$T_j = 150^\circ\text{C}$	7.5		mJ
E_{off}	Turn off Energy	$I_C = 600\text{A}$ $R_G = 1.5\Omega$	$T_j = 150^\circ\text{C}$	30		
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 360\text{V}$ $t_p = 6\mu\text{s}; T_j = 150^\circ\text{C}$		3000		A

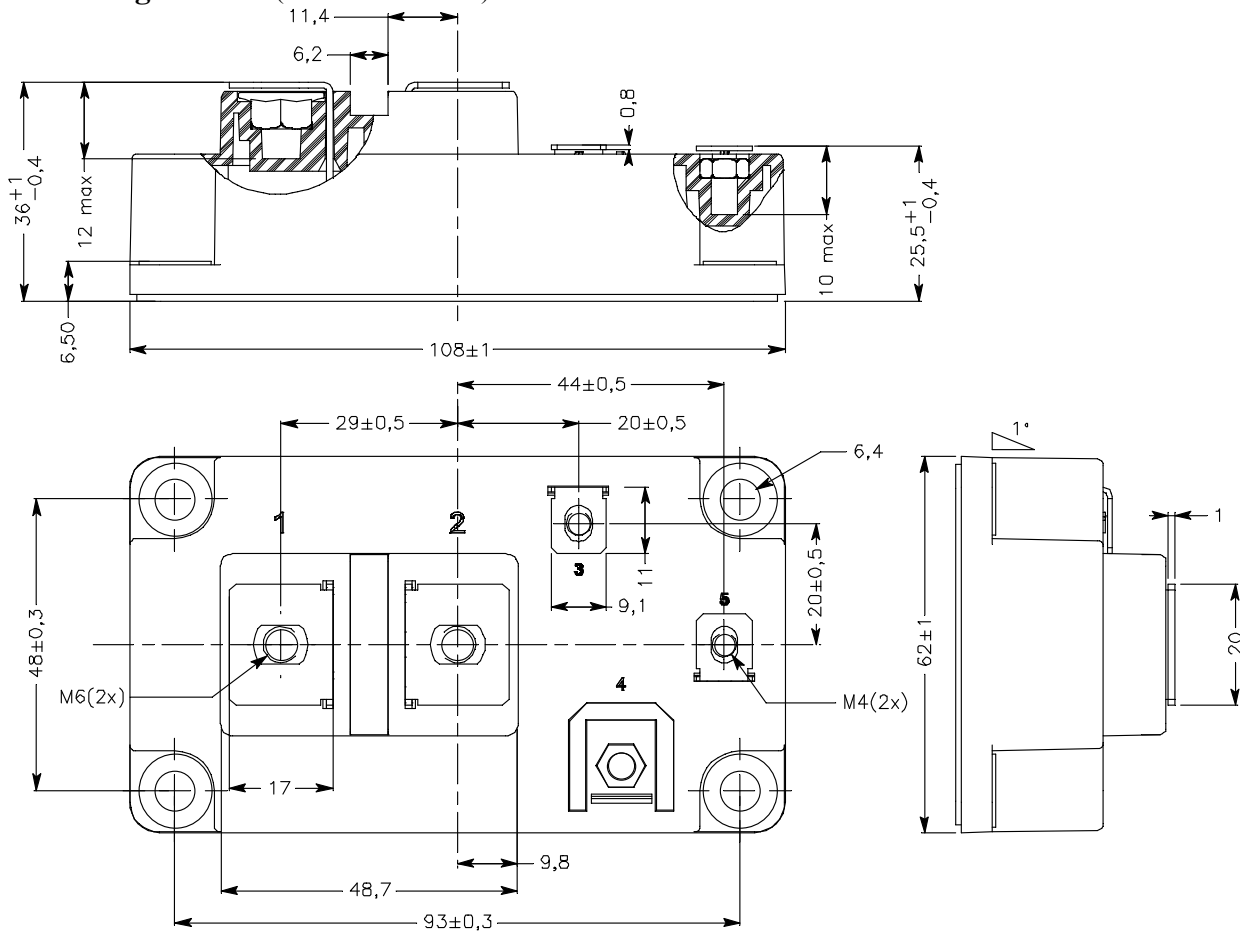
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 150^\circ\text{C}$		1000	
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$	600		A
V_F	Diode Forward Voltage	$I_F = 600\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.6	2.1	V
			$T_j = 150^\circ\text{C}$	1.5		
t_{rr}	Reverse Recovery Time		$T_j = 25^\circ\text{C}$	150		ns
			$T_j = 150^\circ\text{C}$	250		
Q_{rr}	Reverse Recovery Charge	$I_F = 600\text{A}$ $V_R = 300\text{V}$ $di/dt = 8600\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	27		μC
			$T_j = 150^\circ\text{C}$	60		
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	6.4		mJ
			$T_j = 150^\circ\text{C}$	14		

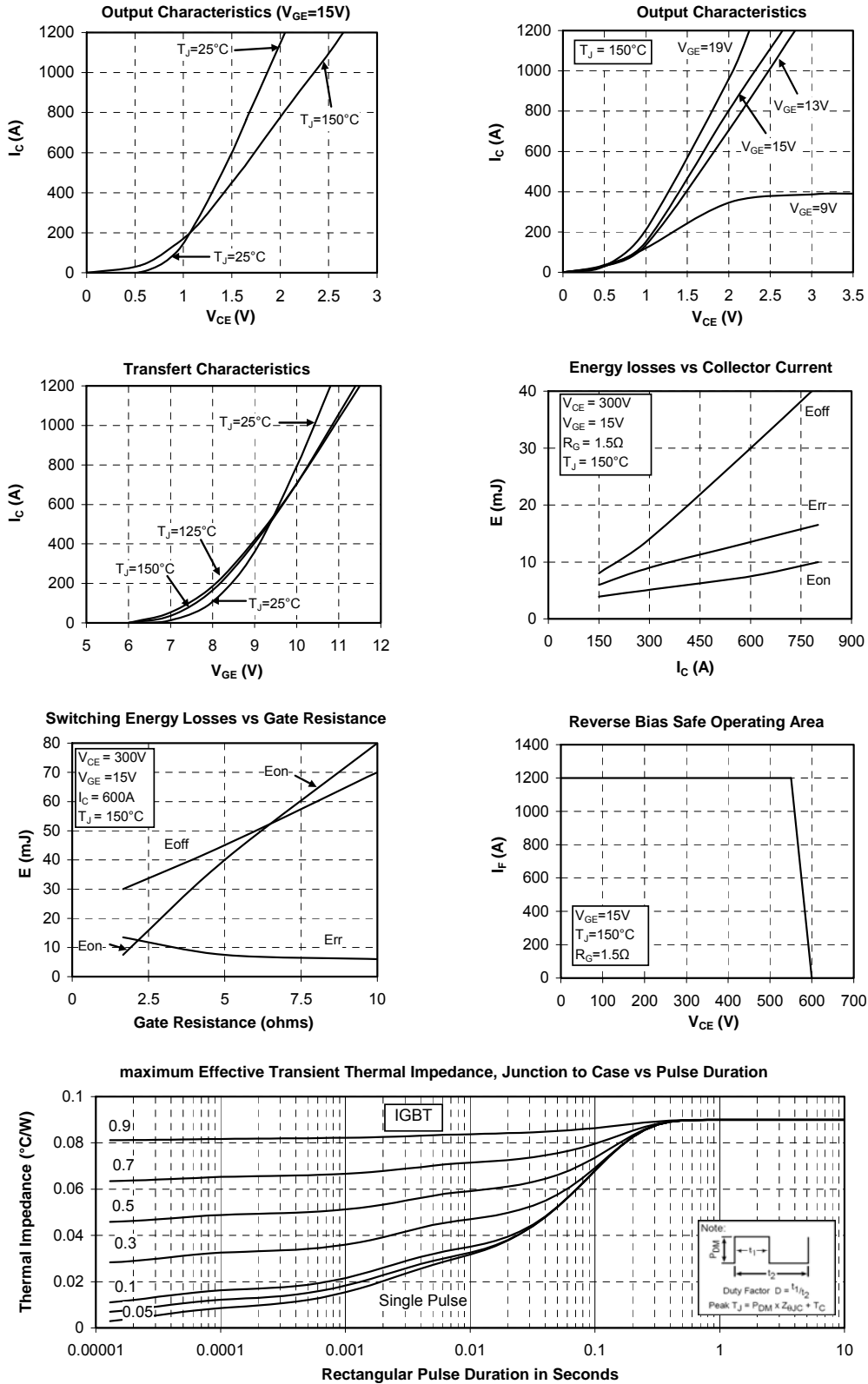
Thermal and package characteristics

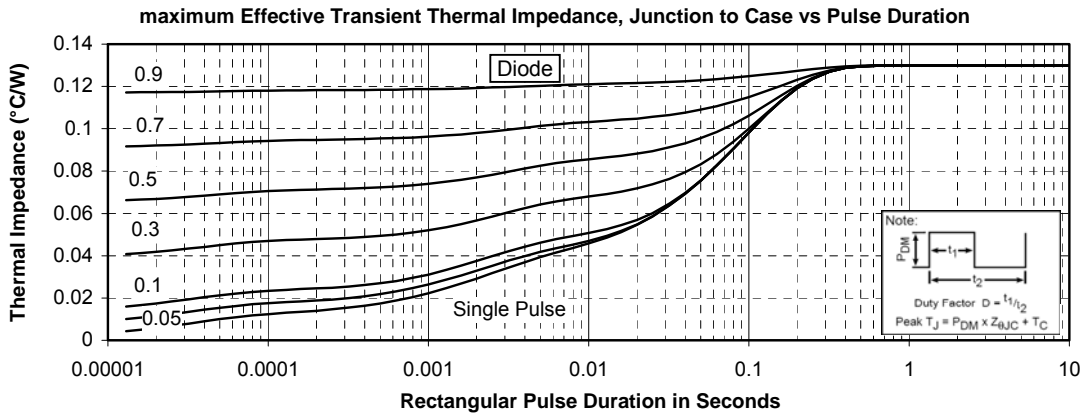
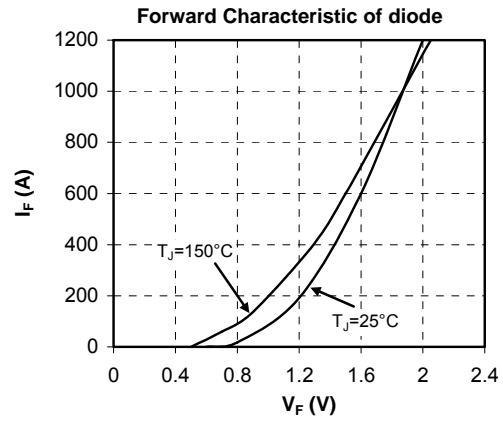
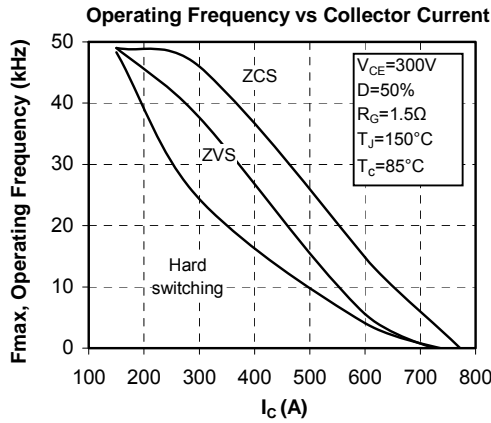
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.09	°C/W
		Diode		0.13	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	2500			V
T_J	Operating junction temperature range	-40		175	°C
T_{STG}	Storage Temperature Range	-40		125	
T_C	Operating Case Temperature	-40		125	
Torque	Mounting torque	M6	3	5	N.m
		M4	1	2	
Wt	Package Weight			350	g

D4 Package outline (dimensions in mm)



Typical Performance Curve





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