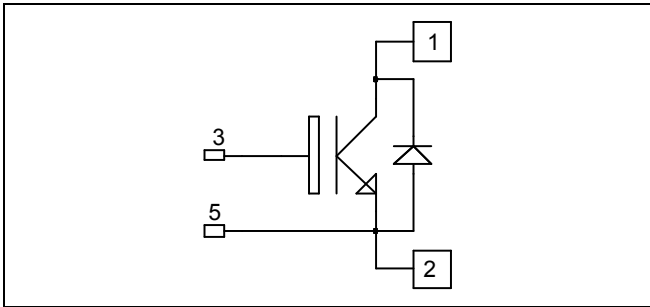


**Single switch
Trench + Field Stop IGBT4
Power Module**

**$V_{CES} = 1200V$
 $I_C = 475A @ T_c = 80^\circ C$**

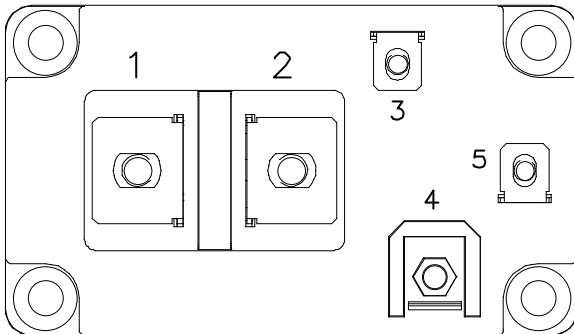


Application

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

Features

- Trench + Field Stop IGBT 4 Technology
 - Low voltage drop
 - Low leakage current
 - Low switching losses
 - Soft recovery parallel diodes
 - Low diode VF
 - 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	1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	610
		$T_C = 80^\circ C$	475
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	1200
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2082
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	800A@1150V

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	$V_{GE} = 0V$; $V_{CE} = 1200V$			4	mA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 400A$		1.8 2.2	2.2	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 10\text{ mA}$	5	5.8	6.5	V

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		24.6		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		1.62		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.38		
Q_G	Gate charge	$V_{GE} = -8V / 15V$; $V_{CE} = 600V$ $I_C = 400A$		2.3		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$		160		ns
T_r	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			340		
T_f	Fall Time			80		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$		170		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			450		
T_f	Fall Time			170		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$		44		mJ
E_{off}	Turn-off Switching Energy	$R_G = 1.8\Omega$		44		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15V$; $V_{Bus} = 900V$ $t_p \leq 10\mu\text{s}$; $T_j = 150^\circ\text{C}$		1600		A

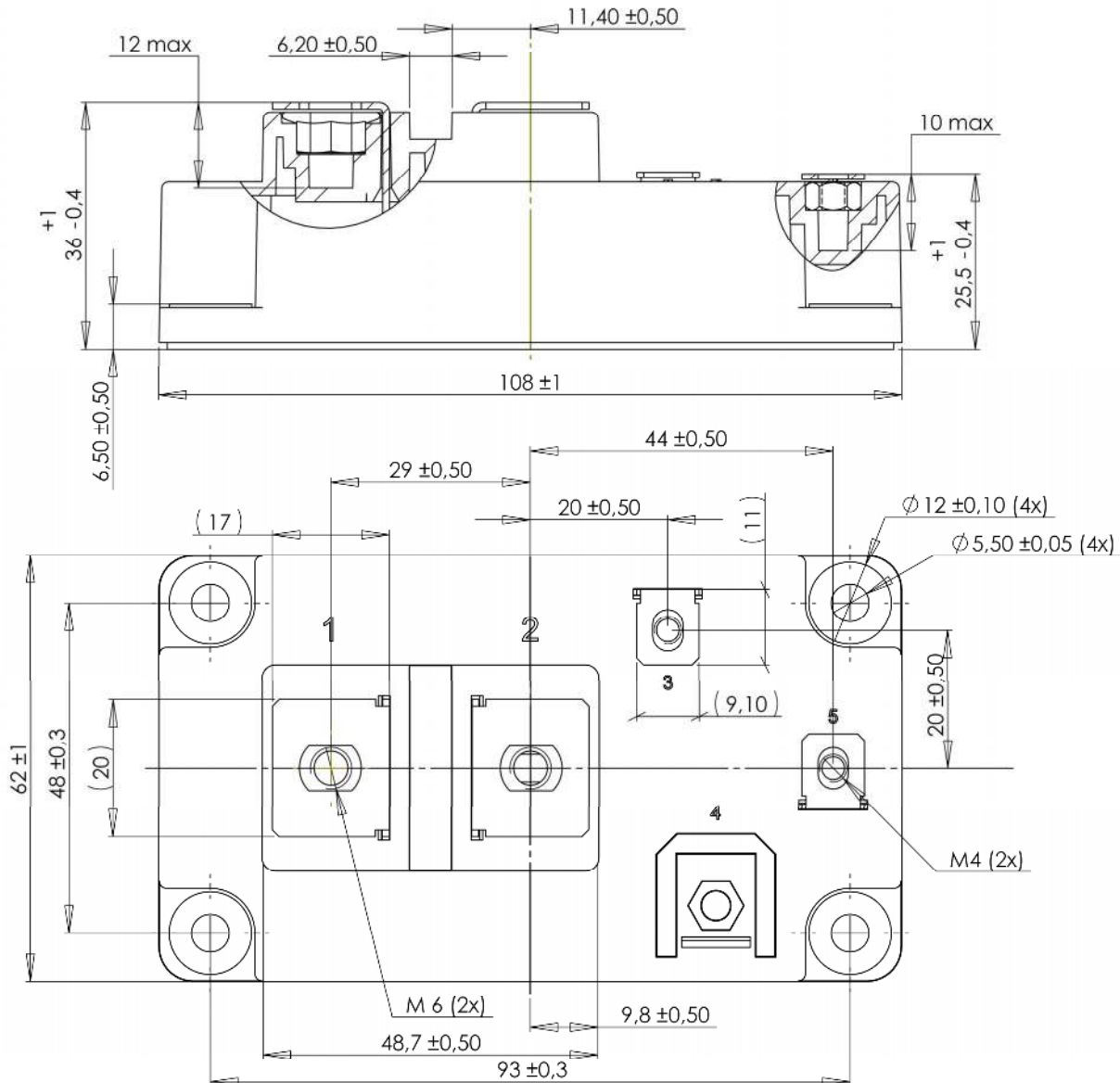
Diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$			250 2000	μA
I_F	DC Forward Current			400		A
V_F	Diode Forward Voltage	$I_F = 400A$ $V_{GE} = 0V$		1.7 1.65	2.2	V
t_{rr}	Reverse Recovery Time	$I_F = 400A$ $V_R = 600V$ $di/dt = 7000A/\mu\text{s}$		155 300		ns
Q_{rr}	Reverse Recovery Charge			37.2 78		μC
E_{rr}	Reverse Recovery Energy			16 32		mJ

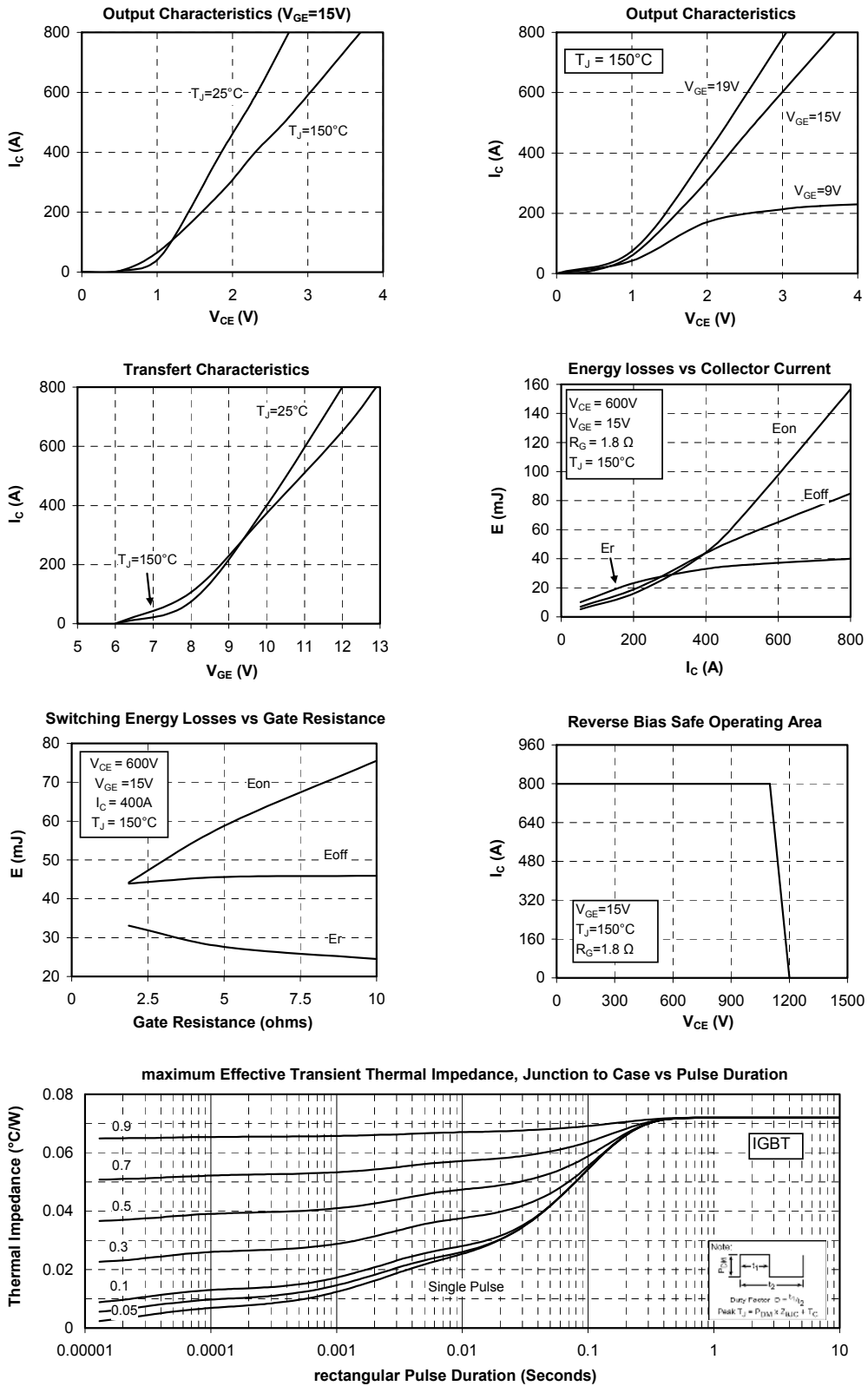
Thermal and package characteristics

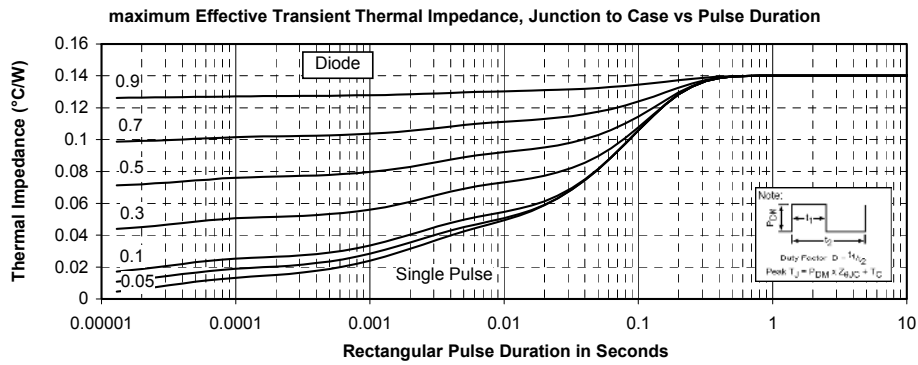
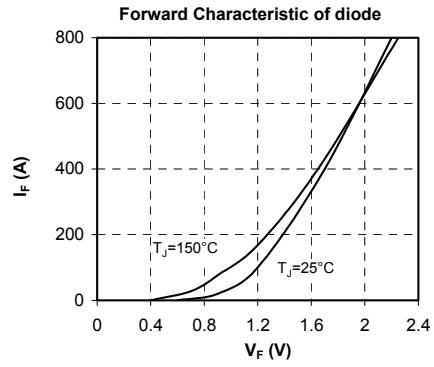
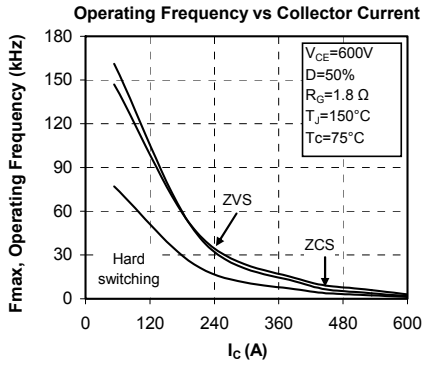
Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.072	°C/W
		Diode		0.14	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V
T _J	Operating junction temperature range	-40		175	°C
T _{STG}	Storage Temperature Range	-40		125	
T _C	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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