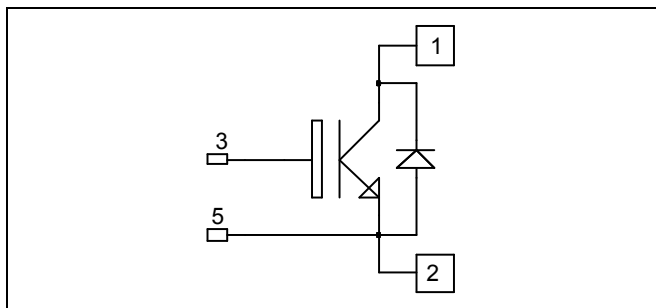


**Single switch
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 1200V$
 $I_C = 400A @ T_c = 80^\circ C$**



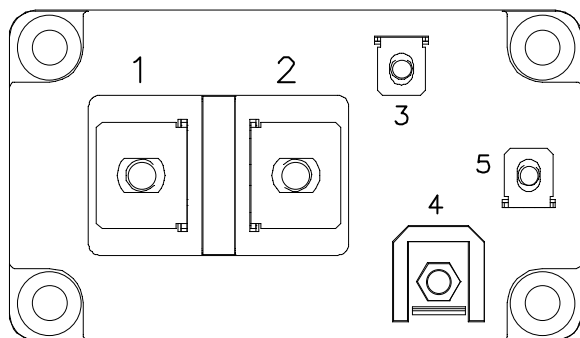
Application

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

Features

- Trench + Field Stop IGBT3 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	1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	A
		$T_C = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	1785
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	800A@1050V

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	$V_{GE} = 0V, V_{CE} = 1200V$			750	μA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 400A$	$T_j = 25^\circ\text{C}$ 1.4	$T_j = 125^\circ\text{C}$ 1.7	2.1	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 12mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		28		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		1.6		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		1.2		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 400A$ $V_{CE} = 600V$		3.7		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$		280		ns
T_r	Rise Time			90		
$T_{d(off)}$	Turn-off Delay Time			550		
T_f	Fall Time			130		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$		300		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			650		
T_f	Fall Time			180		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $T_j = 125^\circ\text{C}$		33		mJ
E_{off}	Turn off Energy	$I_C = 400A$ $R_G = 1.8\Omega$ $T_j = 125^\circ\text{C}$		59		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu s; T_j = 125^\circ\text{C}$		1600		A

Reverse diode ratings and characteristics

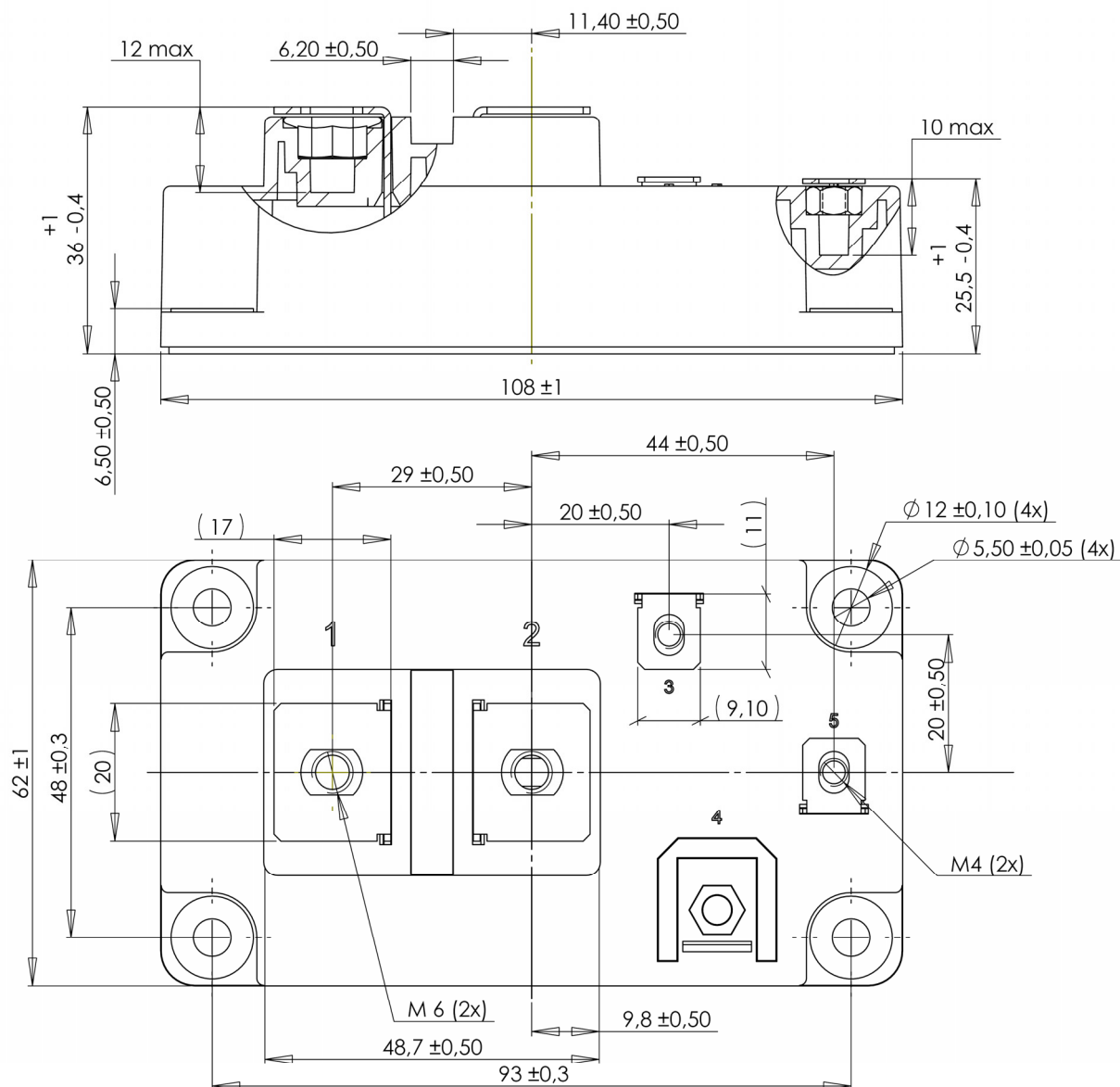
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$			750	μA
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			1000	
I_F	DC Forward Current	$T_c = 80^\circ\text{C}$		400		A
V_F	Diode Forward Voltage	$I_F = 400A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ 1.6	$T_j = 125^\circ\text{C}$ 1.6	2.1	V
t_{rr}	Reverse Recovery Time	$I_F = 400A$ $V_R = 600V$ $di/dt = 4000A/\mu s$	$T_j = 25^\circ\text{C}$	250		ns
			$T_j = 125^\circ\text{C}$	350		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	40		μC
			$T_j = 125^\circ\text{C}$	75		
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	18		mJ
			$T_j = 125^\circ\text{C}$	34		



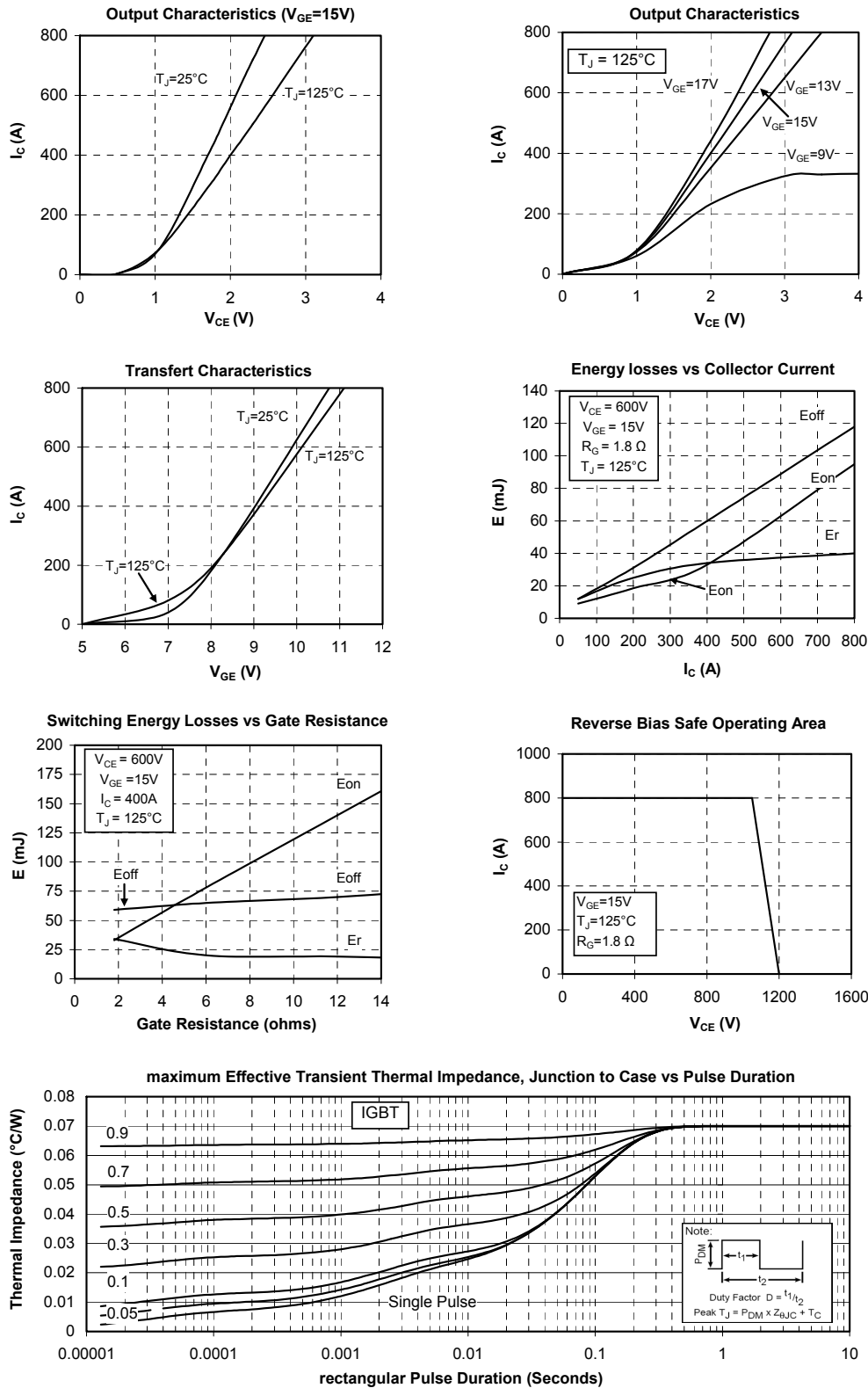
<i>Symbol</i>	<i>Characteristic</i>
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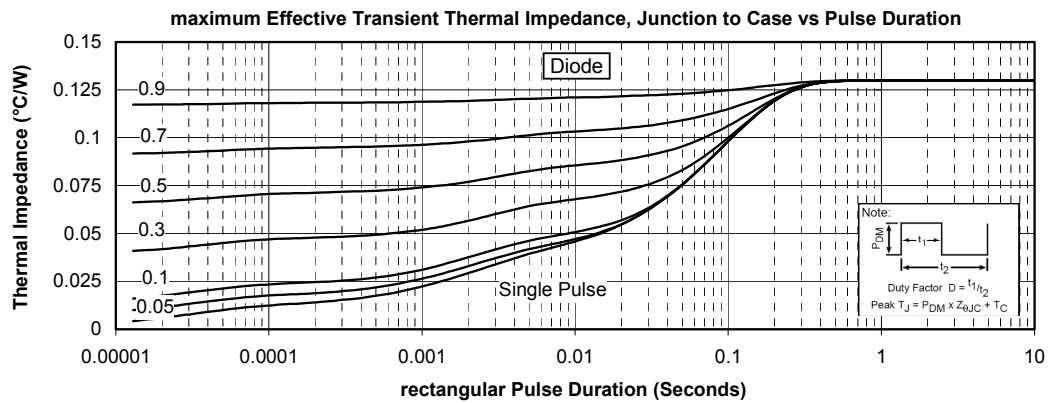
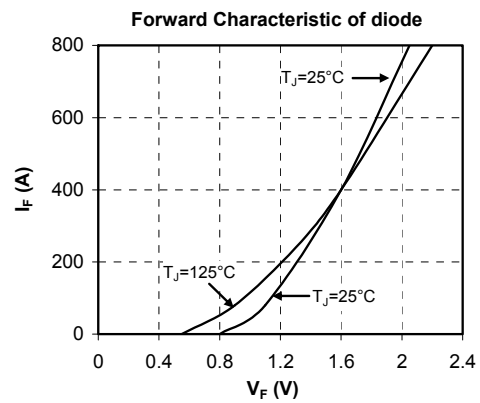
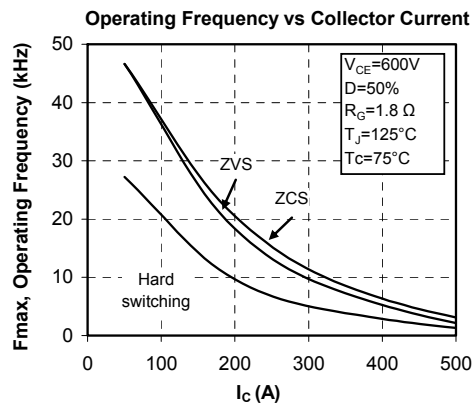
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.07	°C/W
		Diode			0.13	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
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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