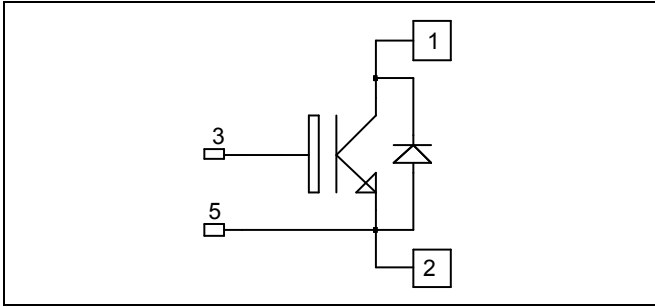


**Single switch
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 1700V$
 $I_C = 400A @ T_c = 80^\circ C$**


Application

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

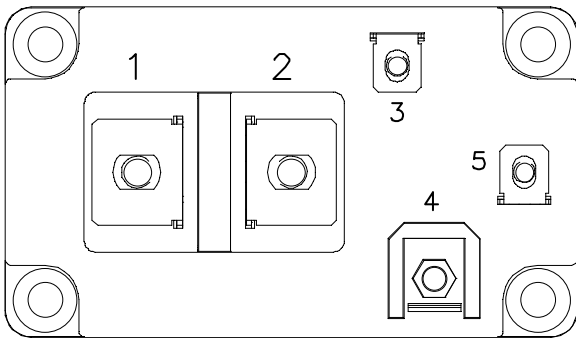
Features

- 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	1700	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	800
		$T_C = 80^\circ C$	400
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2080
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	800A@1650V

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	$V_{GE} = 0V, V_{CE} = 1700V$			5	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 400A$		2.0	2.4	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 16\text{ mA}$	5.2	5.8	6.4	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V, V_{CE} = 25V$		33		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.2		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 400A$ $V_{CE} = 900V$		4.6		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 400A$ $R_G = 3.6\Omega$		250		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			850		
T_f	Fall Time			120		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15V$ $V_{Bus} = 900V$ $I_C = 400A$ $R_G = 3.6\Omega$		300		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			1000		
T_f	Fall Time			200		
E_{on}	Turn On Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 900V$	$T_j = 125^\circ\text{C}$	135		mJ
E_{off}	Turn Off Energy	$I_C = 400A$ $R_G = 3.6\Omega$	$T_j = 125^\circ\text{C}$	125		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 1000V$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		1600		A

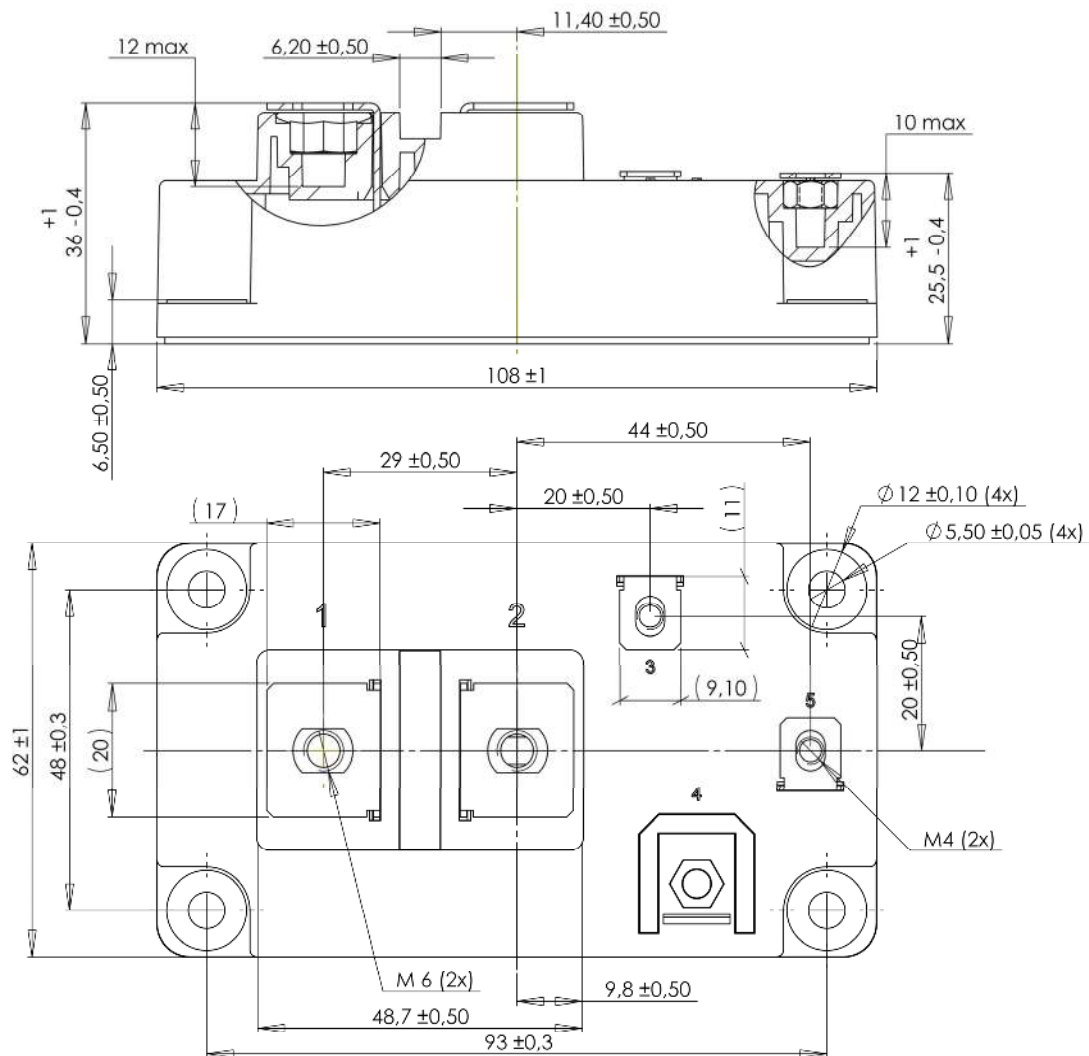
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1700			V	
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1700V$			750	μA	
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			1000		
I_F	DC forward current			400		A	
V_F	Diode Forward Voltage	$I_F = 400A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.8	2.2	V	
				1.9			
E_{rr}	Reverse Recovery Energy	$I_F = 400A$ $V_R = 900V$ $di/dt = 4200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	50		mJ	
				96			
t_{rr}	Reverse Recovery Time		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		420		ns
					525		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	100		μC	
				170			

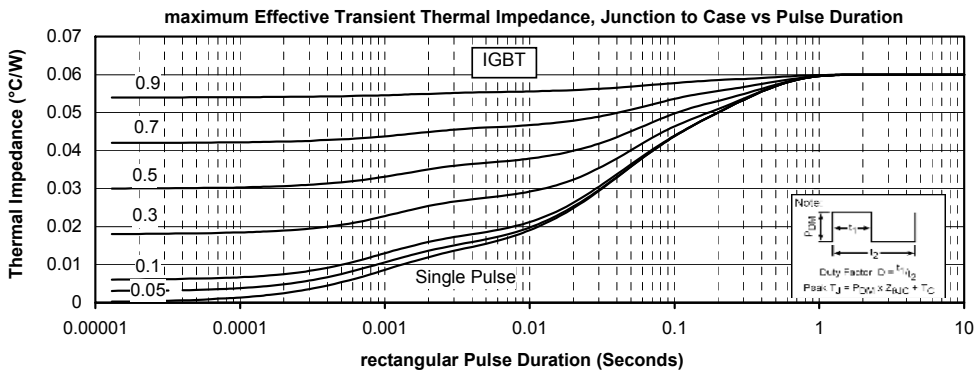
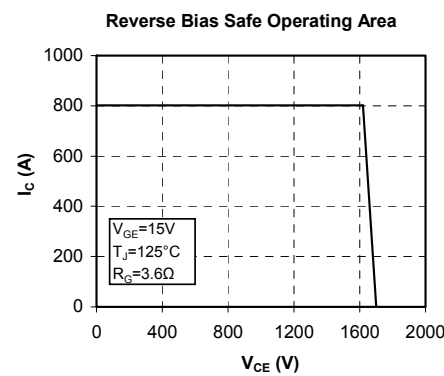
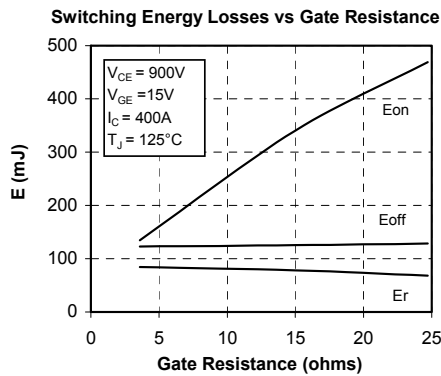
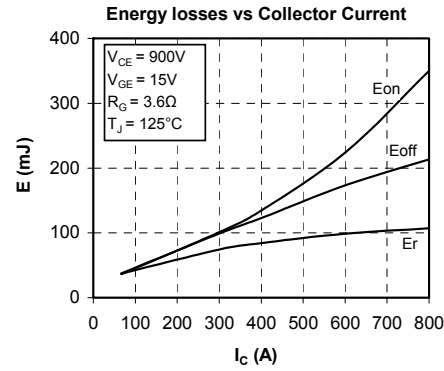
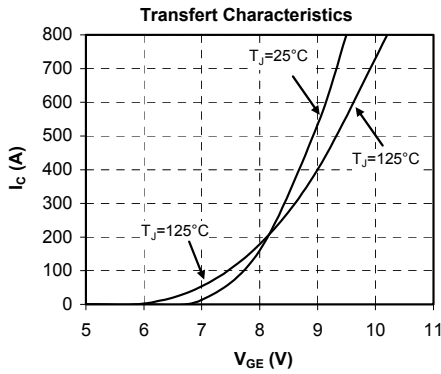
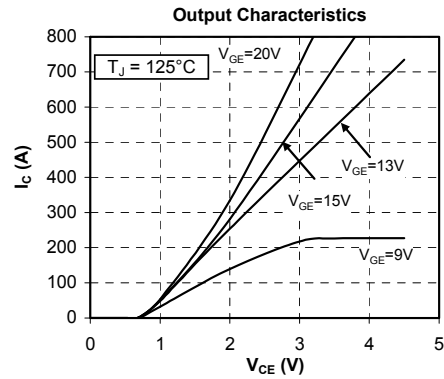
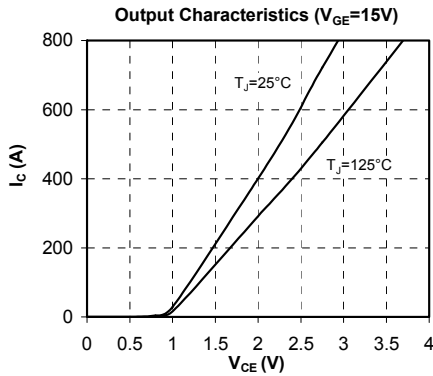
Thermal and package characteristics

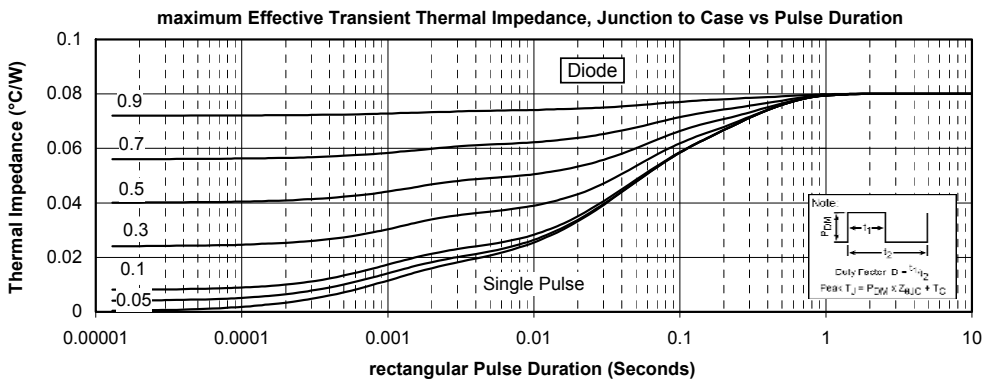
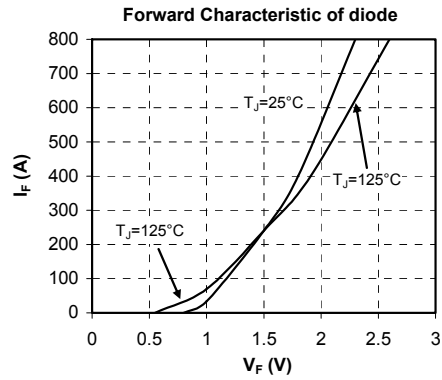
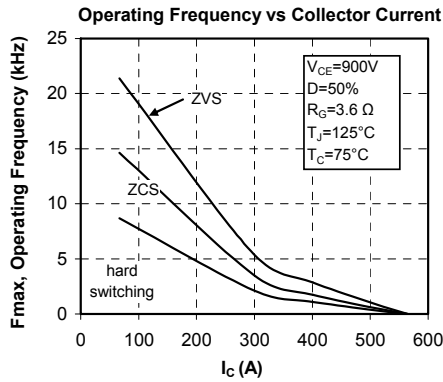
<i>Symbol</i>	<i>Characteristic</i>		<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.06	°C/W
		Diode			0.08	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	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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