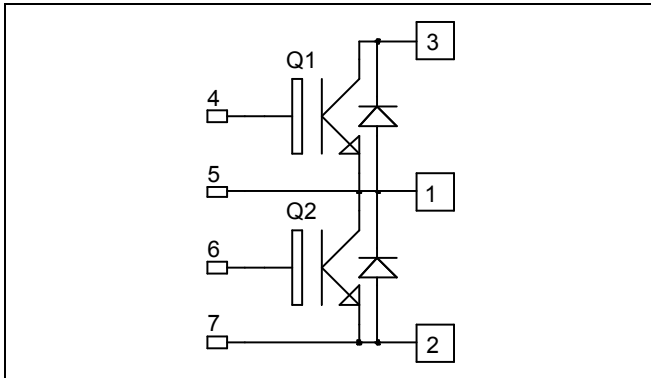


**Phase Leg
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 1200V$
 $I_C = 100A @ T_c = 80^\circ C$**


Application

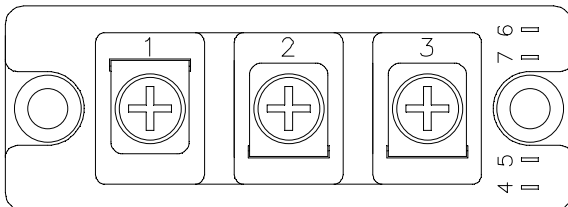
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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
- High level of integration
- M5 power connectors

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- RoHS Compliant


Absolute maximum ratings

Symbol	Parameter		Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage		1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	150	A
		$T_c = 80^\circ C$	100	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	200	
V_{GE}	Gate - Emitter Voltage		± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	520	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	200A@1100V	

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	$V_{GE} = 0V, V_{CE} = 1200V$			3	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ\text{C}$ 1.4	1.7	2.1	V
			$T_j = 125^\circ\text{C}$ 2.0			
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 4mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			300	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		7		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		0.4		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		0.33		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 100A$ $V_{CE} = 600V$		950		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 7.5\Omega$		250		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) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 7.5\Omega$		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	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$	$T_j = 125^\circ\text{C}$	7.5		mJ
E_{off}	Turn off Energy	$I_C = 100A$ $R_G = 7.5\Omega$	$T_j = 125^\circ\text{C}$	17.5		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_b \leq 10\mu s; T_j = 125^\circ\text{C}$		400		A

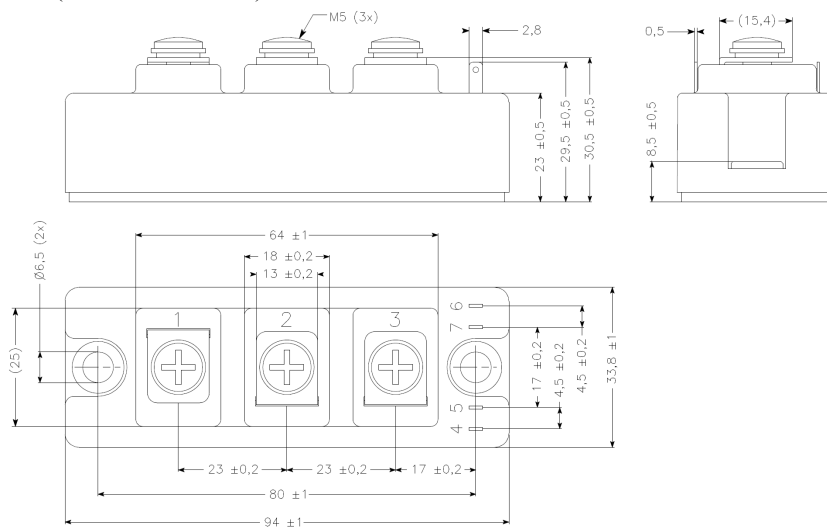
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$			250	μA
					500	
I_F	DC Forward Current			100		A
V_F	Diode Forward Voltage	$I_F = 100A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ 1.6	1.6	2.1	V
			$T_j = 125^\circ\text{C}$ 1.6			
t_{rr}	Reverse Recovery Time	$I_F = 100A$ $V_R = 600V$ $di/dt = 2000A/\mu s$	$T_j = 25^\circ\text{C}$	170		ns
			$T_j = 125^\circ\text{C}$	280		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	9		μC
			$T_j = 125^\circ\text{C}$	18		
E_{rr}	Reverse Recovery Energy	$T_j = 25^\circ\text{C}$	5		mJ	
		$T_j = 125^\circ\text{C}$	9			

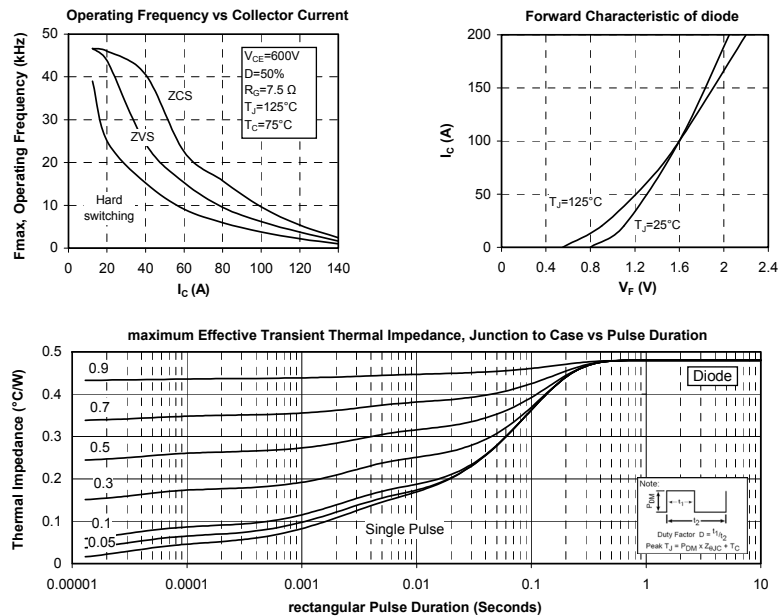
Thermal and package characteristics

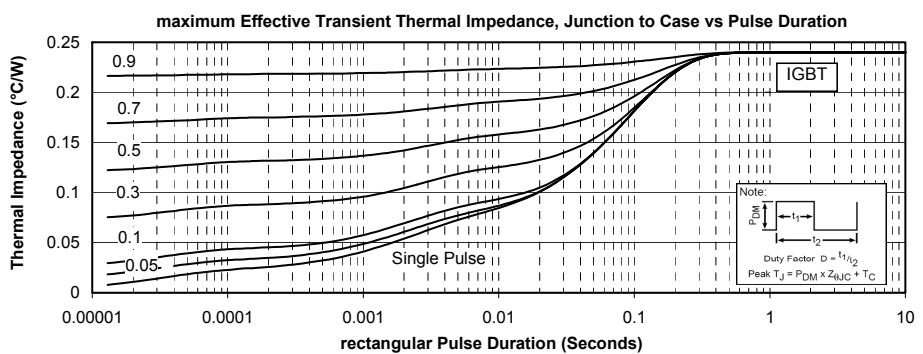
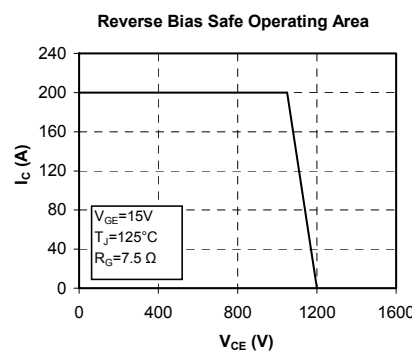
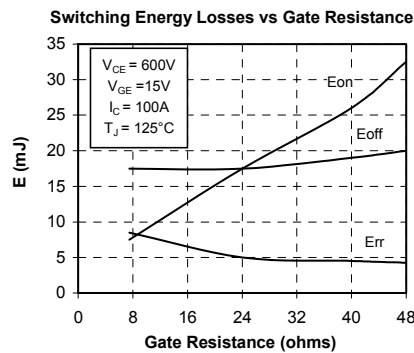
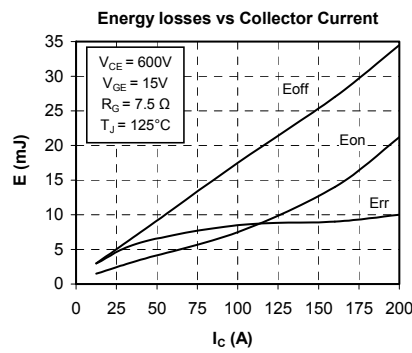
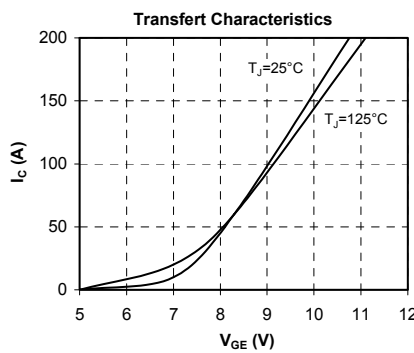
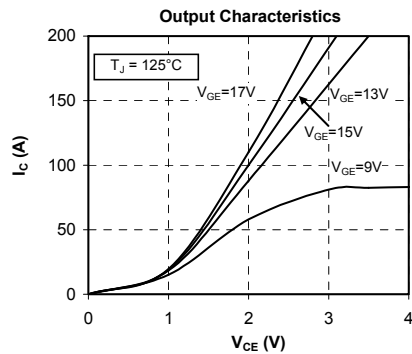
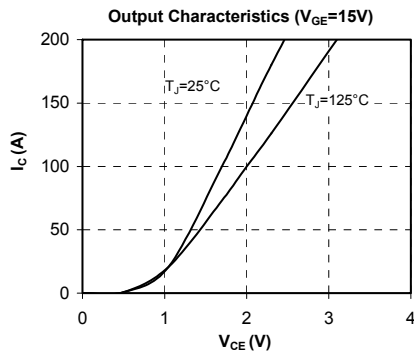
Symbol	Characteristic	Min	Typ	Max	Unit	
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.24	°C/W	
		Diode		0.48		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V	
T _J	Operating junction temperature range	-40		150	°C	
T _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		125		
Torque	Mounting torque	For terminals	M5	2	3.5	N.m
		To Heatsink	M6	3	5	
Wt	Package Weight			180	g	

D1 Package outline (dimensions in mm)



Typical Performance Curve





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