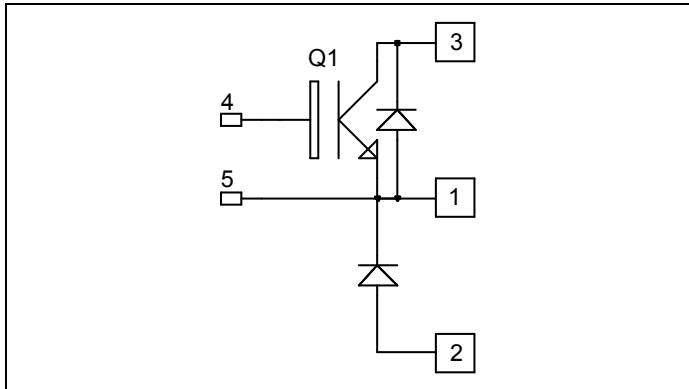


**Buck chopper
Trench + Field Stop IGBT
Power Module**

**$V_{CES} = 1200V$
 $I_C = 150A @ T_c = 80^\circ C$**



Application

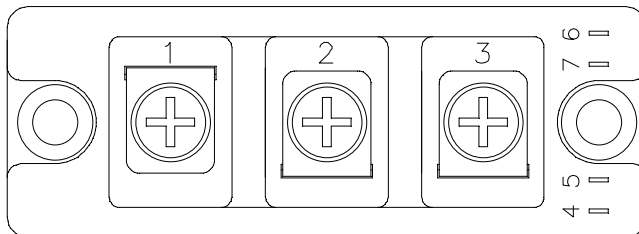
- AC and DC motor control
- Switched Mode Power Supplies

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
- 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	$T_c = 25^\circ C$ $T_c = 80^\circ C$	A
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	300A @ 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	$V_{GE} = 0\text{V}$, $V_{CE} = 1200\text{V}$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 150\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.7 2.0	2.1	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 6\text{mA}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$		10.8		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		0.56		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.5		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}$, $I_C = 150\text{A}$ $V_{CE} = 600\text{V}$		1.4		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 150\text{A}$ $R_G = 4.7\Omega$		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) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 150\text{A}$ $R_G = 4.7\Omega$		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	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 150\text{A}$ $R_G = 4.7\Omega$	$T_j = 125^\circ\text{C}$	11		mJ
E_{off}	Turn off Energy		$T_j = 125^\circ\text{C}$	26		
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}$; $V_{Bus} = 900\text{V}$ $t_p \leq 10\mu\text{s}$; $T_j = 125^\circ\text{C}$		600		A

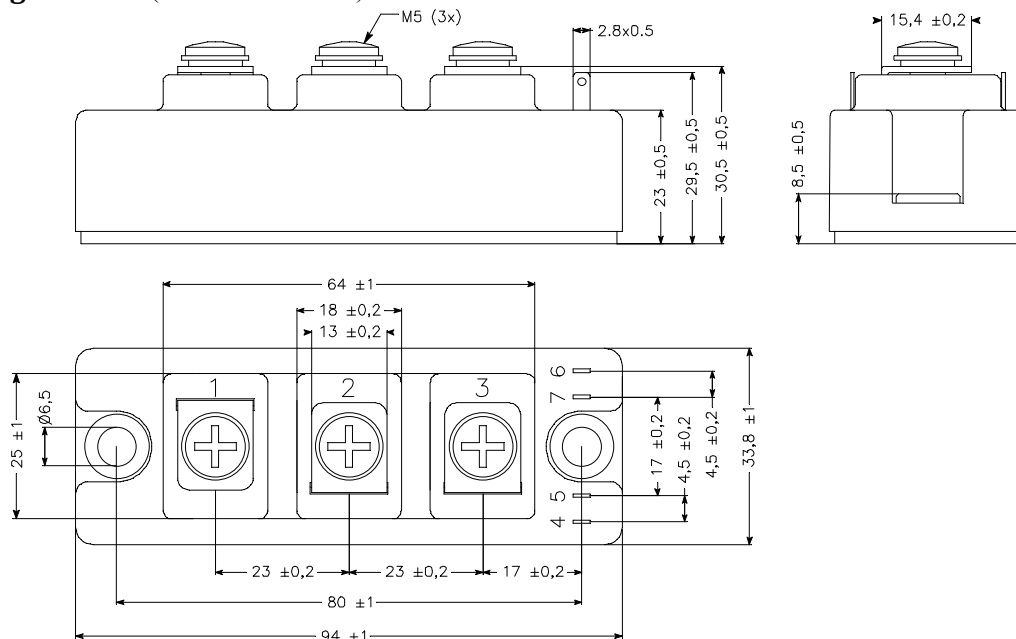
Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		250 500	μA
I_F	DC Forward current		$T_c = 80^\circ\text{C}$	150		A
V_F	Diode Forward Voltage	$I_F = 150\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.6 1.6	2.1	V
t_{rr}	Reverse Recovery Time	$I_F = 150\text{A}$ $V_R = 600\text{V}$ $di/dt = 3000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	250 350		ns
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	15 29		
E_{rr}	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	7 12		mJ

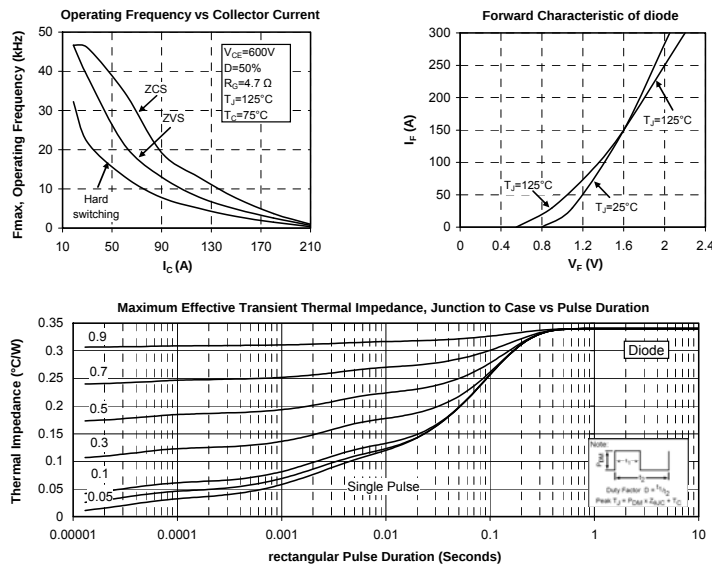
Thermal and package characteristics

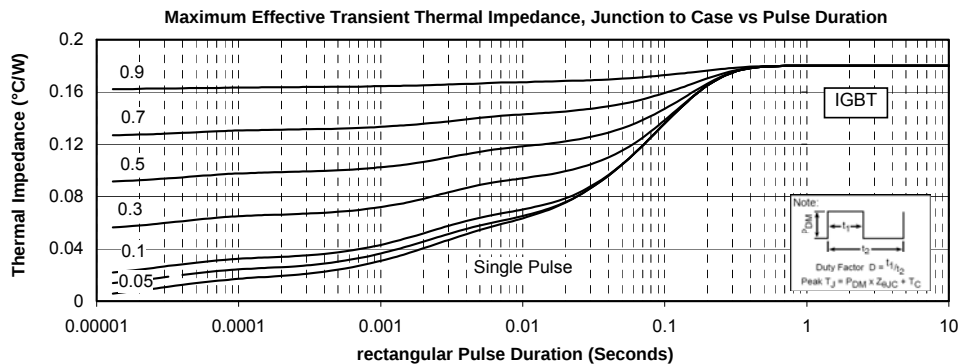
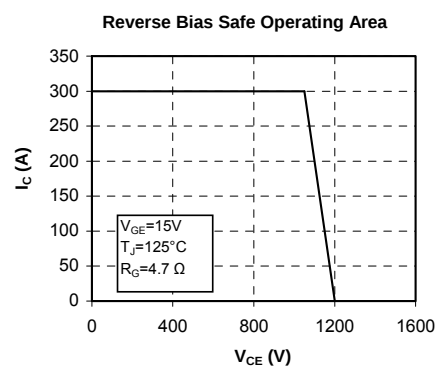
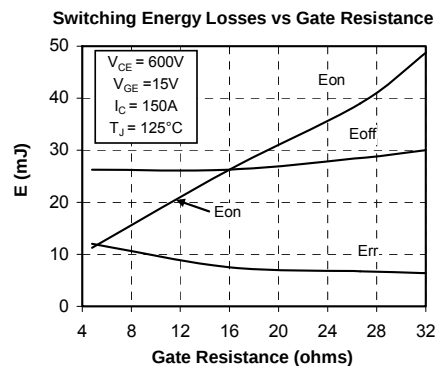
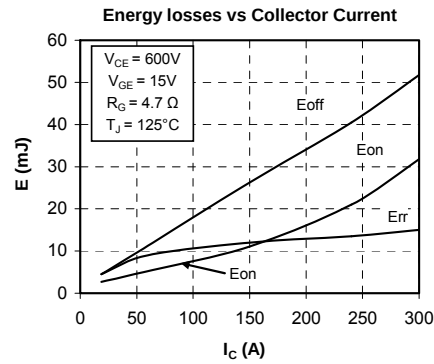
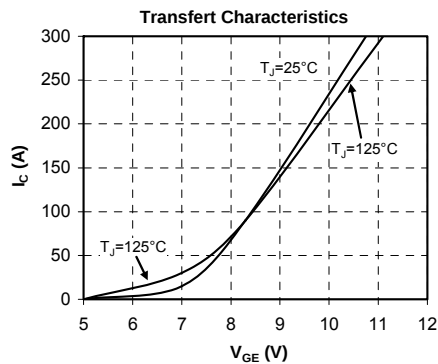
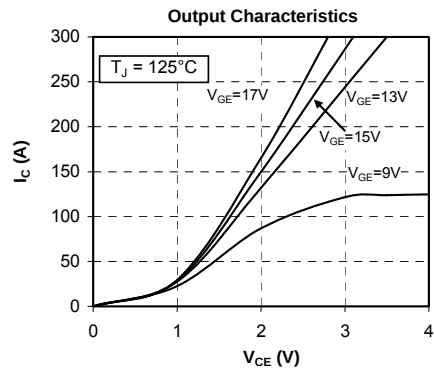
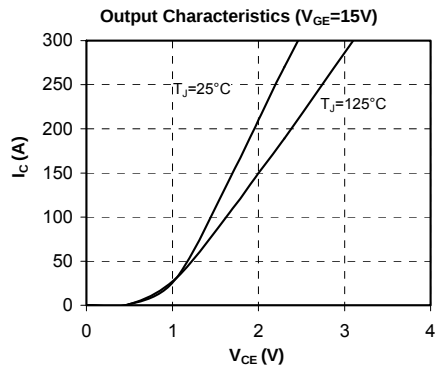
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.18	°C/W
		Diode		0.34	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	4000			V
T_J	Operating junction temperature range	-40		150	°C
T_{STG}	Storage Temperature Range	-40		125	
T_C	Operating Case Temperature	-40		125	
Torque	Mounting torque	For terminals	M5	2	N.m
		To Heatsink	M6	3	
Wt	Package Weight			180	g

D1 Package outline (dimensions in mm)



Typical Performance Curve





Microsemi reserves the right to change, without notice, the specifications and information contained herein

Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 7,352,045 5,283,201 5,801,417 5,648,283 7,196,634 6,664,594 7,157,886 6,939,743 7,342,262 and foreign patents. U.S. and Foreign patents pending. All Rights Reserved.