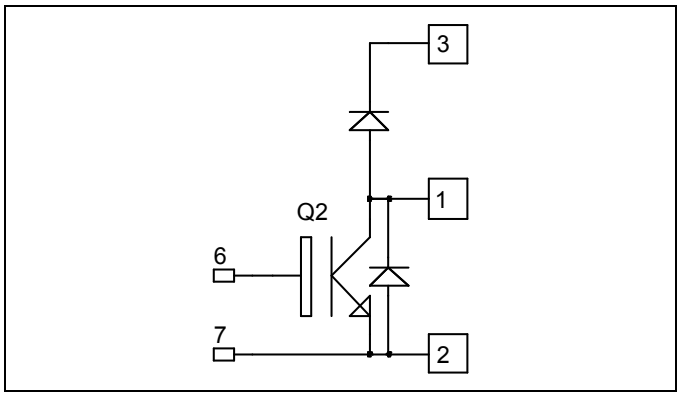
Boost chopper
Trench + Field Stop IGBT
Power Module

V_{CES} = 1200V
I_C = 100A @ Tc = 80°C

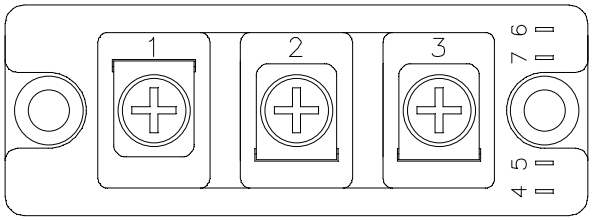


Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

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°C	150	A
		T_C = 80°C	100	
I_{CM}	Pulsed Collector Current	T_C = 25°C	200	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	520	W
RBSOA	Reverse Bias Safe Operating Area	T_j = 125°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°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°C	1.4	1.7	2.1	V
			T_j = 125°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 V_{CE} = 25V f = 1MHz			7		nF
C_{oes}	Output Capacitance				0.4		
C_{res}	Reverse Transfer Capacitance				0.33		
Q_G	Gate charge	V_{GE}=±15V, I_C=100A V_{CE}=600V			950		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = ±15V V_{Bus} = 600V I_C = 100A R_G = 7.5Ω			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} = ±15V V_{Bus} = 600V I_C = 100A R_G = 7.5Ω			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} = ±15V V_{Bus} = 600V I_C = 100A R_G = 7.5Ω	T_j = 125°C		7.5		mJ
E_{off}	Turn off Energy		T_j = 125°C		17.5		
I_{sc}	Short Circuit data	V_{GE} ≤15V ; V_{Bus} = 900V t_p ≤ 10µs ; T_j = 125°C			400		A

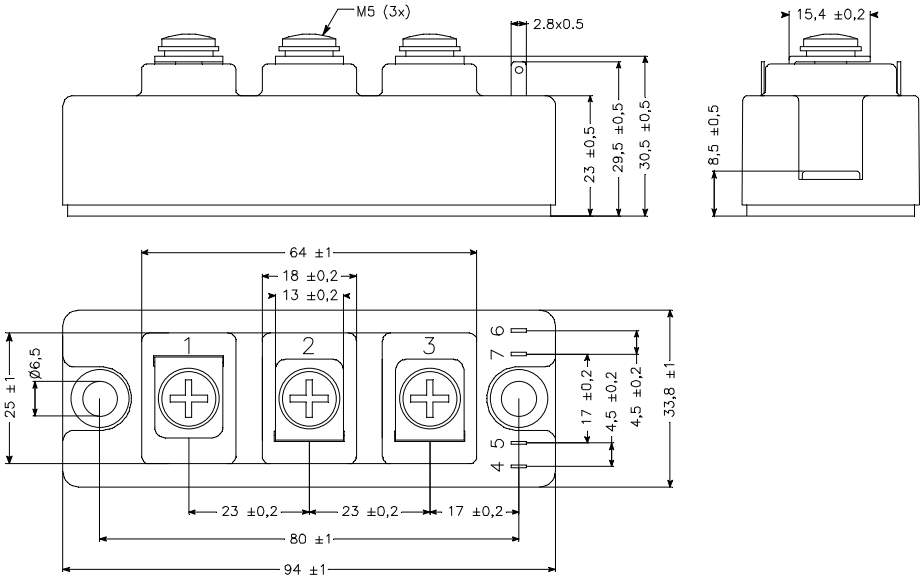
Chopper diode ratings and characteristics

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	T_j = 25°C			250	µA
			T_j = 125°C			500	
I_F	DC Forward Current		Tc = 80°C		100		A
V_F	Diode Forward Voltage	I_F = 100A V_{GE} = 0V	T_j = 25°C		1.6	2.1	V
			T_j = 125°C		1.6		
t_{rr}	Reverse Recovery Time	I_F = 100A V_R = 600V di/dt =2000A/µs	T_j = 25°C		170		ns
			T_j = 125°C		280		
Q_{rr}	Reverse Recovery Charge		T_j = 25°C		9		µC
			T_j = 125°C		18		
E_{rr}	Reverse Recovery Energy		T_j = 25°C		5		mJ
			T_j = 125°C		9		

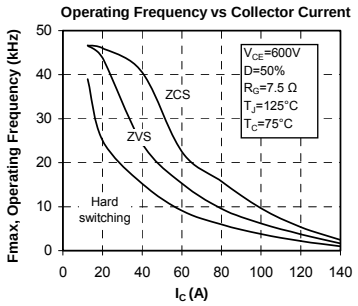
Thermal and package characteristics

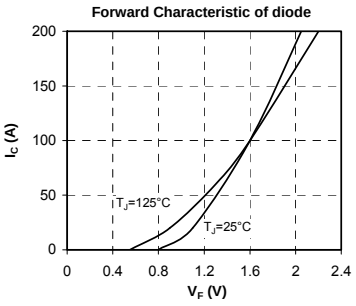
Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case Thermal Resistance		IGBT			0.24	°C/W
			Diode			0.48	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		150	°C
T_{STG}	Storage Temperature 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

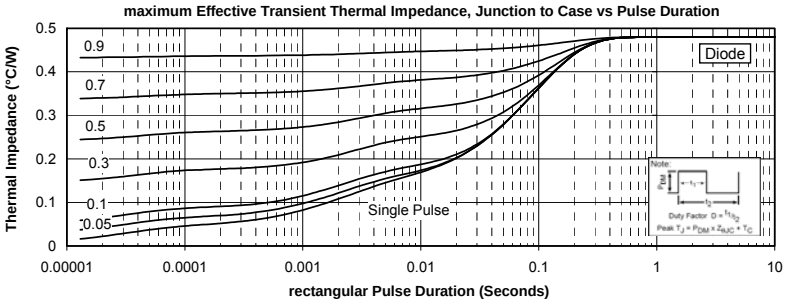
D1 Package outline (dimensions in mm)



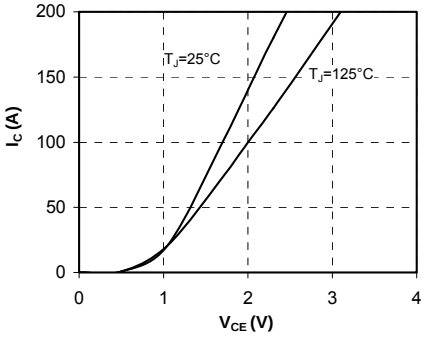
Typical Performance Curve



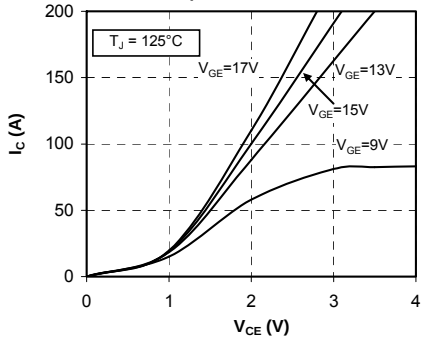




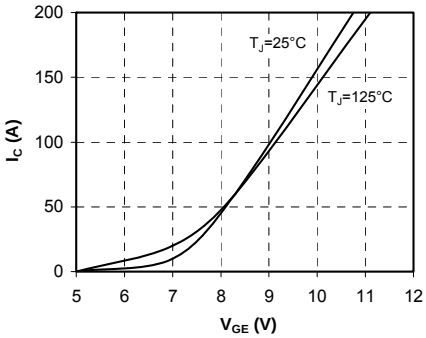
Output Characteristics (V_{GE}=15V)



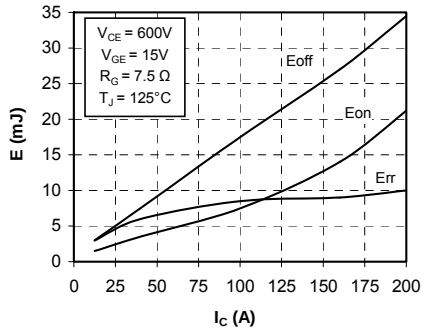
Output Characteristics



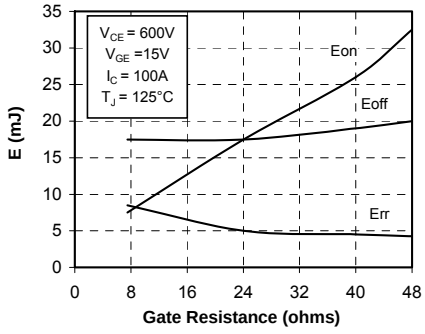
Transfert Characteristics



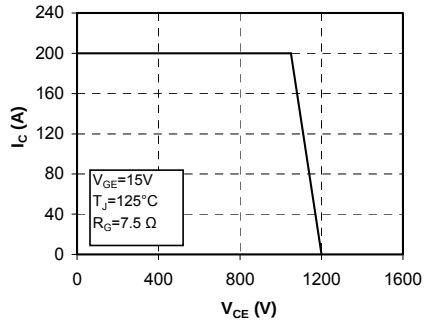
Energy losses vs Collector Current



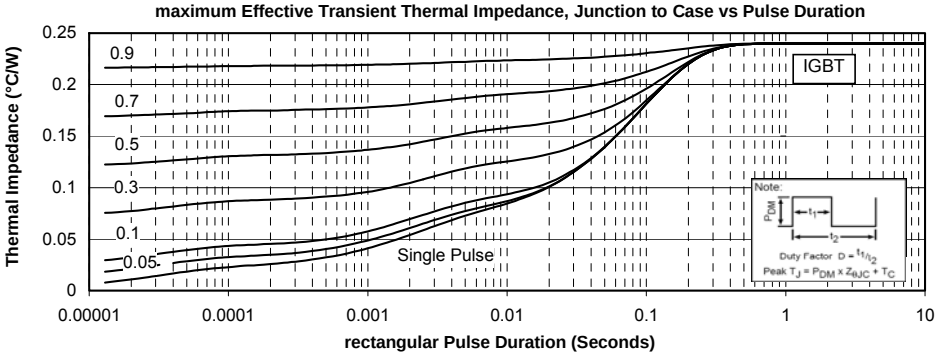
Switching Energy Losses vs Gate Resistance



Reverse Bias Safe Operating Area



maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



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.