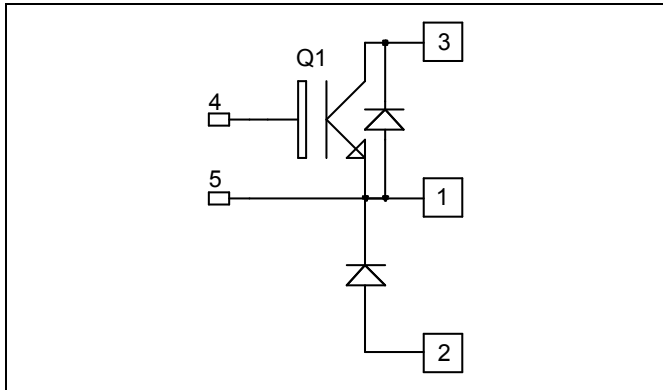


Buck Chopper Trench + Field Stop IGBT4 Power Module

$V_{CES} = 1200V$
 $I_C = 475A @ T_C = 80^\circ C$



Application

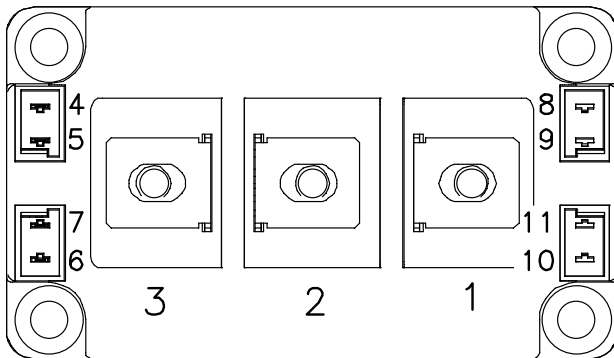
- AC and DC motor control
- Switched Mode Power Supplies

Features

- Trench + Field Stop IGBT 4 Technology
 - Low voltage drop
 - Low leakage current
 - Low switching losses
 - Soft recovery parallel diodes
 - Low diode VF
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- High level of integration
- M6 power connectors

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	$T_C = 25^\circ C$ 610	A
		$T_C = 80^\circ C$ 475	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$ 900	
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$ 2080	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$ 800A @ 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	$V_{GE} = 0V, V_{CE} = 1200V$			5	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15V$ $I_C = 400A$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.8 2.2	2.2	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 15mA$	5.0	5.8	6.5	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	$V_{GE} = 0V$		24.6		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		1.62		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		1.38		
Q_G	Gate charge	$V_{GE} = -8V / 15V ; V_{CE} = 600V$ $I_C = 400A$		2.3		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1\Omega$		200		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			400		
T_f	Fall Time			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1\Omega$		220		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			500		
T_f	Fall Time			80		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$	$T_j = 150^\circ\text{C}$	33		mJ
E_{off}	Turn-off Switching Energy	$R_G = 1\Omega$	$T_j = 150^\circ\text{C}$	42		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 900V$ $t_p \leq 10\mu s ; T_j = 150^\circ\text{C}$		1600		A

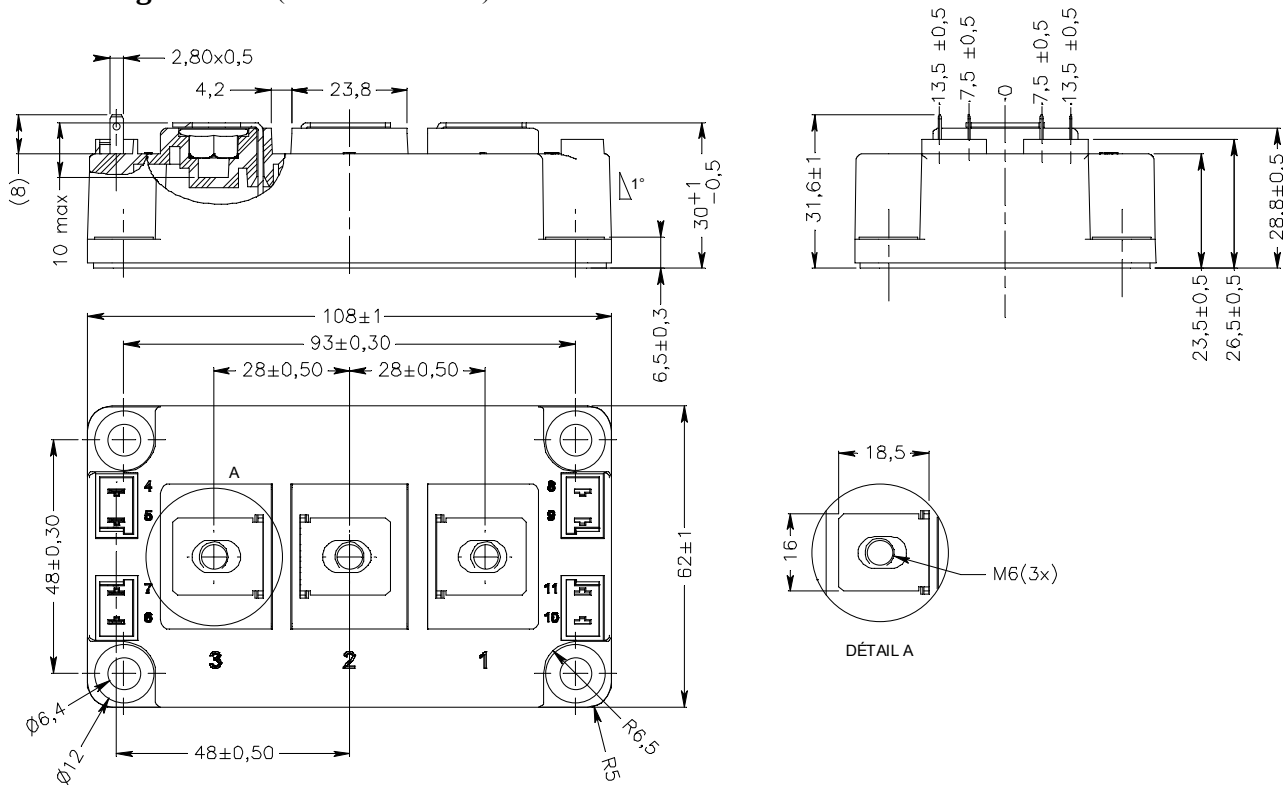
Diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$		250 2000	μA
I_F	DC Forward Current		$T_C = 80^\circ\text{C}$	400		A
V_F	Diode Forward Voltage	$I_F = 400A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.7 1.65	2.2	V
t_{rr}	Reverse Recovery Time	$I_F = 400A$ $V_R = 600V$ $di/dt = 7000A/\mu s$	$T_j = 25^\circ\text{C}$	155		ns
			$T_j = 150^\circ\text{C}$	300		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	37.2 78		μC
			$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	16 32		
E_{rr}	Reverse Recovery Energy					mJ

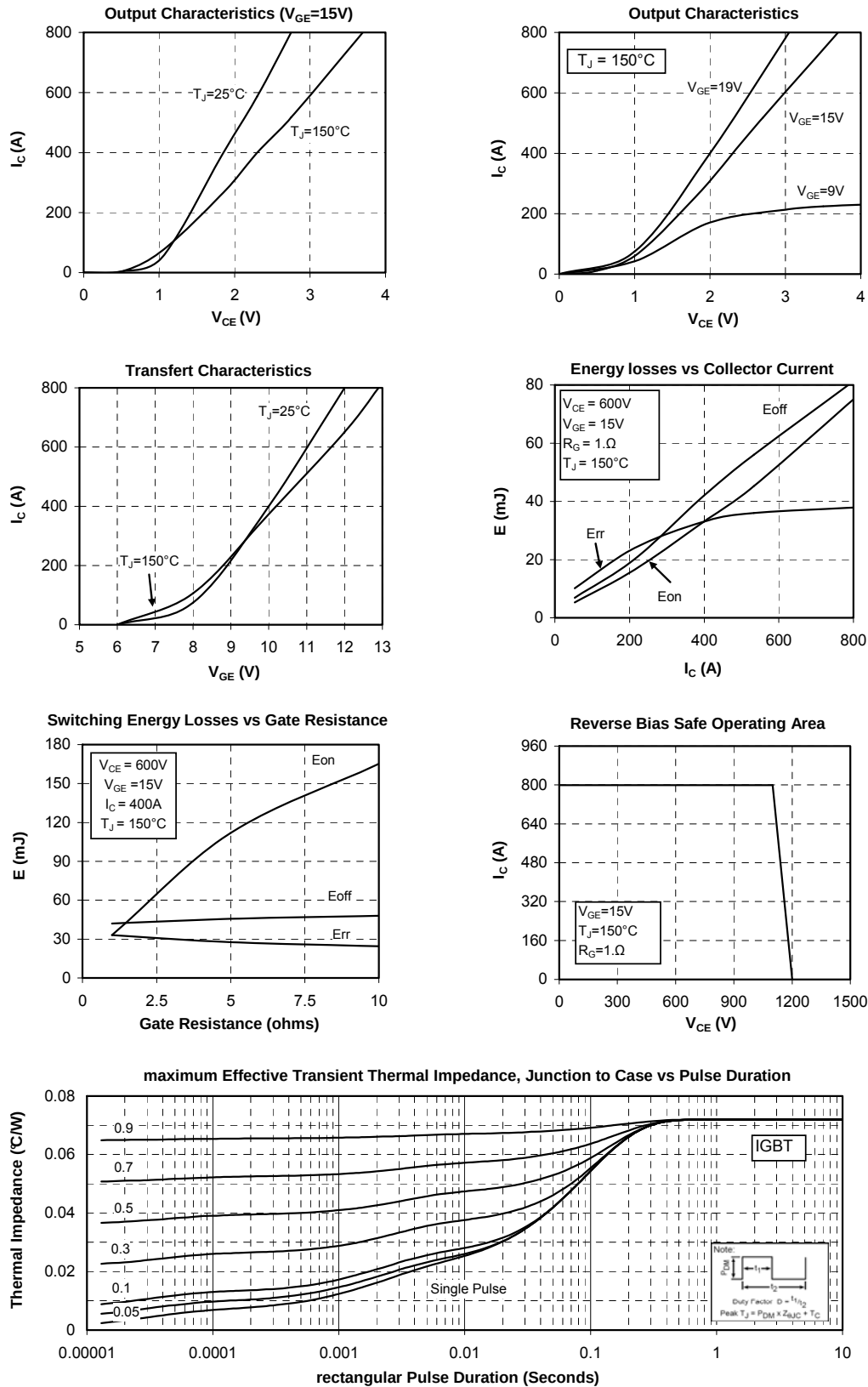
Thermal and package characteristics

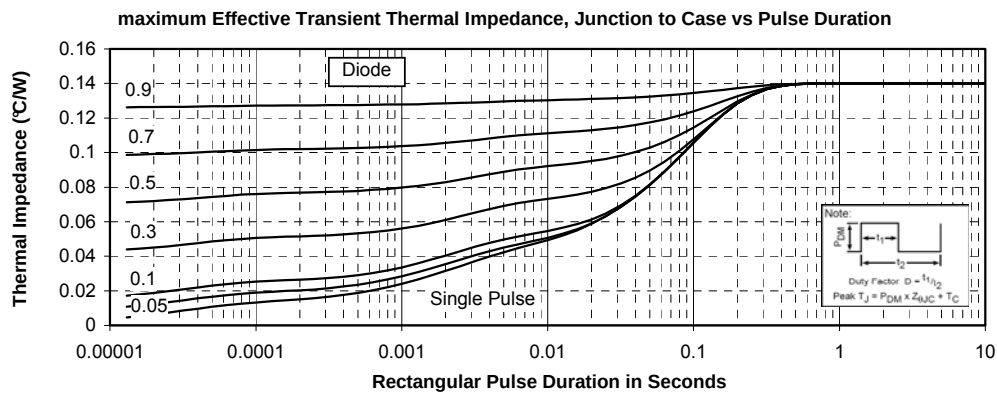
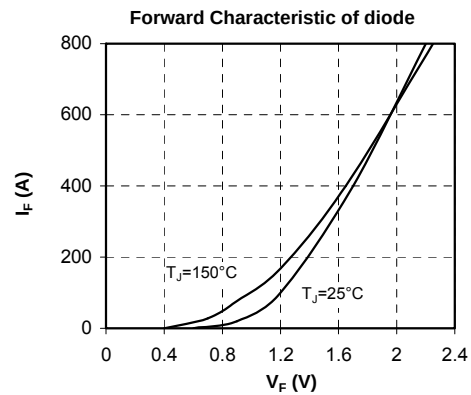
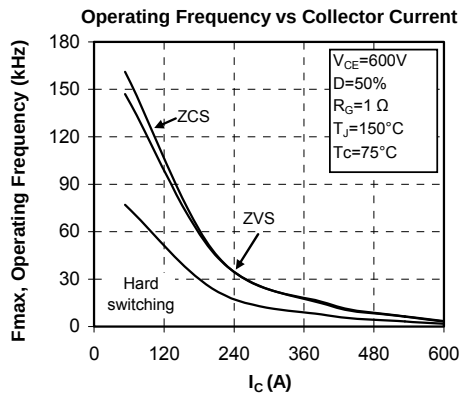
Symbol	Characteristic		Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT			0.072	°C/W
		Diode			0.14	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, $I_{isol} < 1$ mA, 50/60Hz		2500			V
T_J	Operating junction temperature range		-40		175	°C
T_{STG}	Storage Temperature Range		-40		125	
T_C	Operating Case Temperature		-40		125	
Torque	Mounting torque	For terminals	M6	3	5	N.m
		To Heatsink	M6	3	5	
Wt	Package Weight				350	g

D3 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.