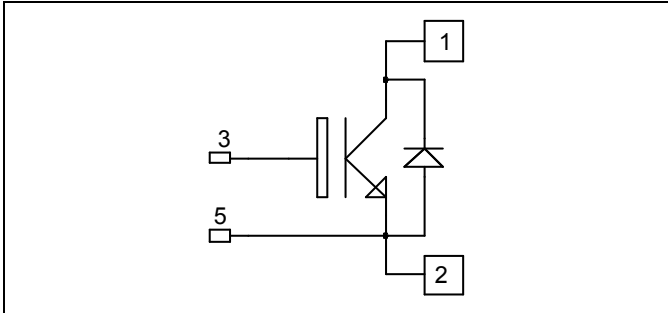


**Single switch
Trench + Field Stop IGBT4
Power Module**

**$V_{CES} = 1200V$
 $I_C = 700A @ T_c = 80^\circ C$**



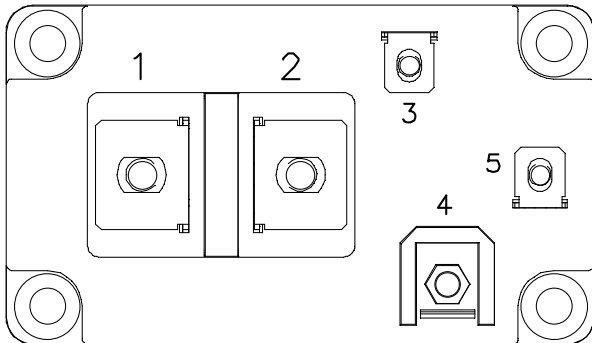
Application

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

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
- 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	1200	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	910
		$T_C = 80^\circ C$	700
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	1800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	3000
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	1200A@1150V

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	$V_{GE} = 0V$; $V_{CE} = 1200V$			4	mA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$		1.8	2.2	V
		$I_C = 600A$	$T_j = 25^\circ\text{C}$			
				2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 24\text{ mA}$	5	5.8	6.5	V

Dynamic Characteristics

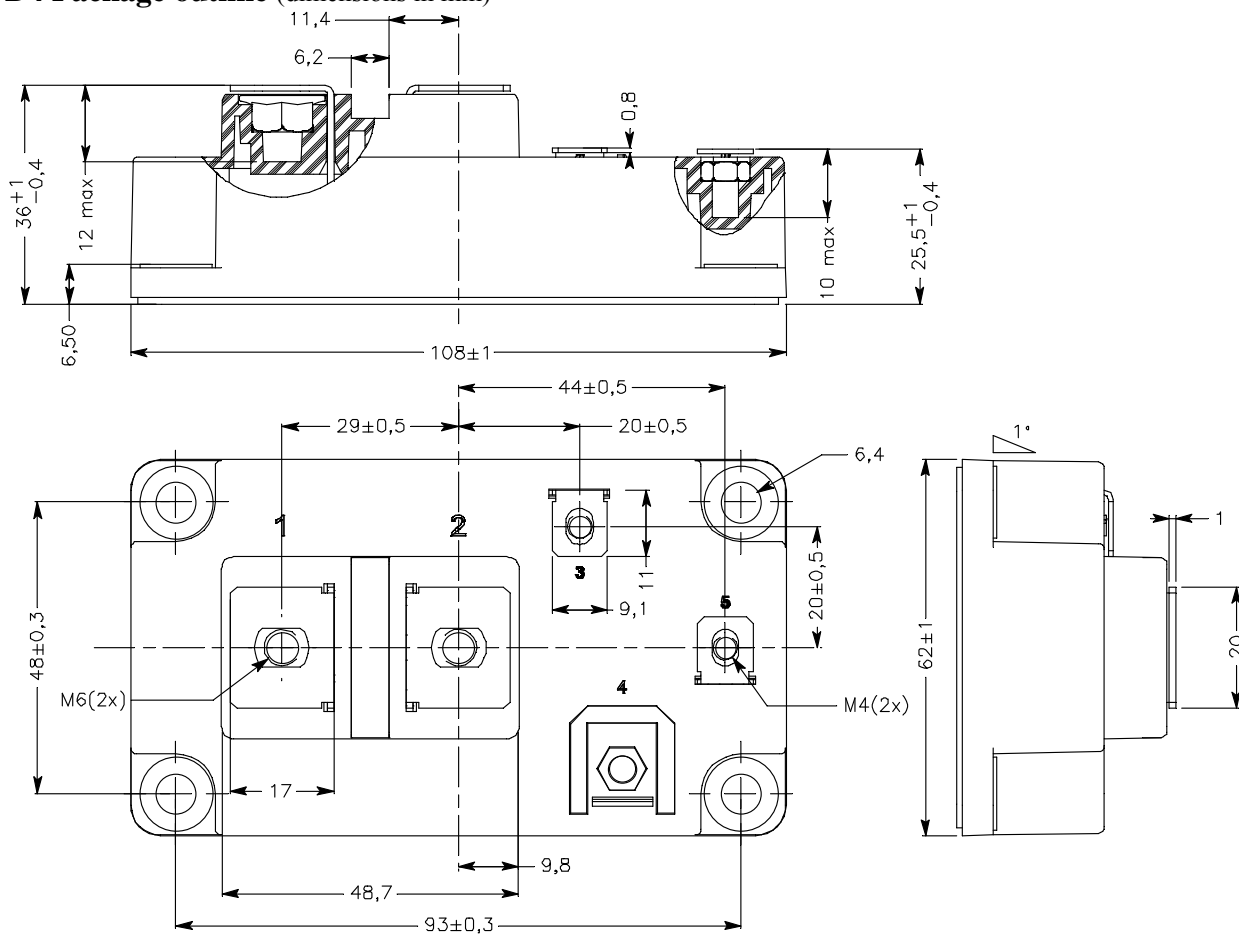
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1\text{MHz}$		37.2		nF
C_{oes}	Output Capacitance			2.3		
C_{res}	Reverse Transfer Capacitance			2.04		
Q_G	Gate charge	$V_{GE} = -8V / 15V$; $V_{CE} = 600V$ $I_C = 600A$		3.4		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 600A$ $R_G = 1.8\Omega$		160		ns
T_r	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			340		
T_f	Fall Time			80		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 600A$ $R_G = 1.8\Omega$		170		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			450		
T_f	Fall Time			170		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 600A$	$T_j = 150^\circ\text{C}$	66		mJ
E_{off}	Turn-off Switching Energy	$R_G = 1.8\Omega$	$T_j = 150^\circ\text{C}$	66		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15V$; $V_{Bus} = 900V$ $t_p \leq 10\mu\text{s}$; $T_j = 150^\circ\text{C}$		2400		A

Diode ratings and characteristics

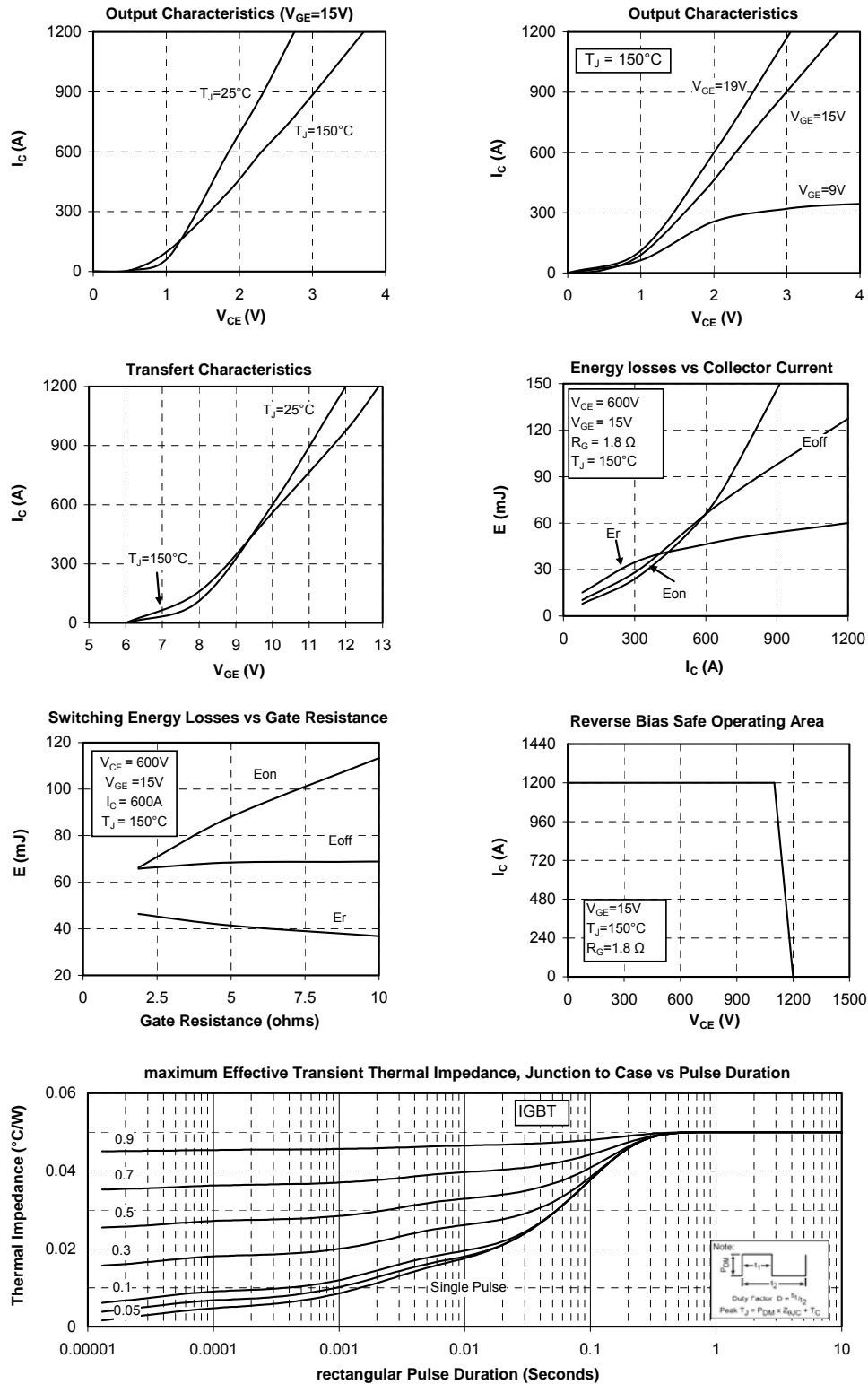
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$		250	μA
			$T_j = 150^\circ\text{C}$		2000	
I_F	DC Forward Current			600		A
V_F	Diode Forward Voltage	$I_F = 600A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$	1.7	2.2	V
			$T_j = 150^\circ\text{C}$	1.65		
t_{rr}	Reverse Recovery Time	$I_F = 600A$ $V_R = 600V$ $di/dt = 7000A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	155		ns
			$T_j = 150^\circ\text{C}$	300		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	53		μC
			$T_j = 150^\circ\text{C}$	110		
E_{rr}	Reverse Recovery Energy	$T_j = 25^\circ\text{C}$	23.5		mJ	
		$T_j = 150^\circ\text{C}$	46			

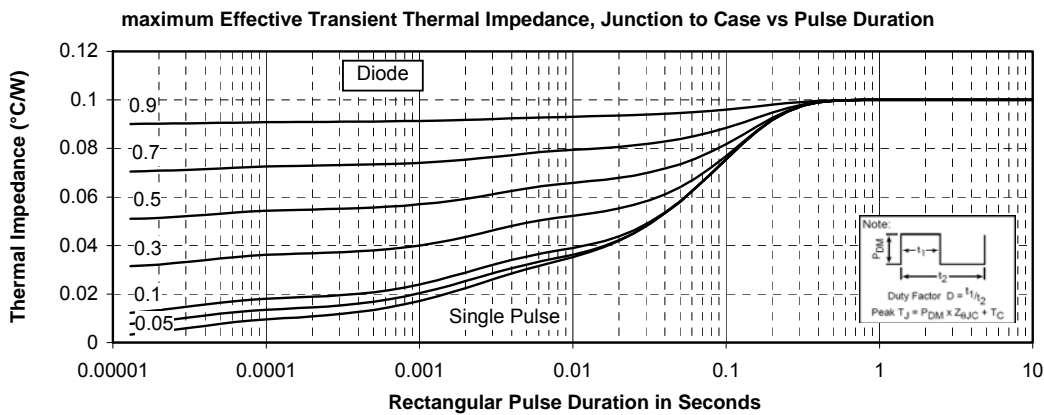
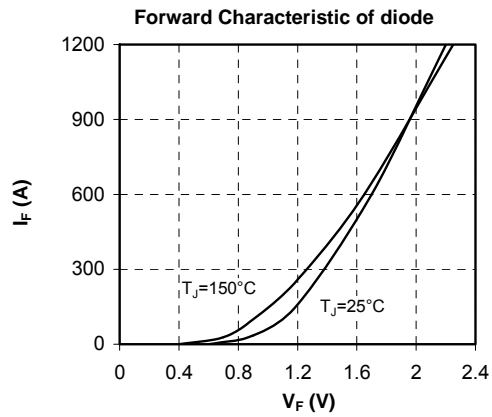
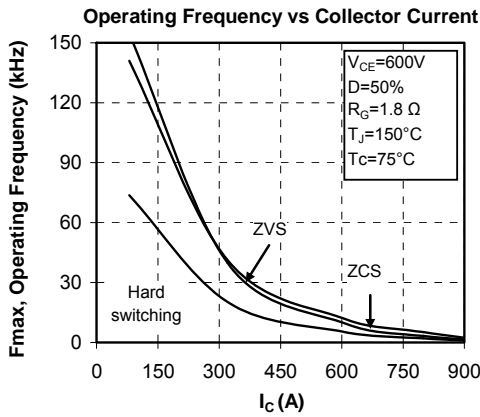
Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.05	°C/W
		Diode		0.1	
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	M6	3	5	N.m
		M4	1	2	
Wt	Package Weight			350	g

D4 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.