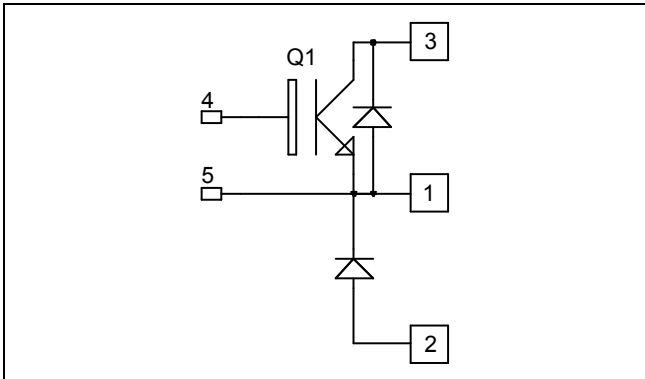


**Buck chopper
Trench + Field Stop IGBT4
Power Module**

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



Application

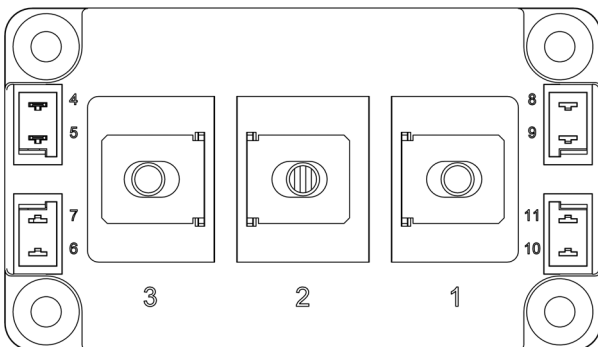
- AC and DC motor control
- Switched Mode Power Supplies

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	$T_C = 25^\circ C$	840
		$T_C = 80^\circ C$	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 @ 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	$V_{GE} = 15V$ $I_C = 600A$		1.8 2.2	2.2	V
		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$				
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 11mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			800	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		37.2		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		2.3		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		2		
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) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 600A$ $R_G = 0.8\Omega$		200		ns
T_r	Rise Time			40		
$T_{d(off)}$	Turn-off Delay Time			380		
T_f	Fall Time			70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 600A$ $R_G = 0.8\Omega$		220		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			450		
T_f	Fall Time			80		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 600A$	$T_j = 150^\circ\text{C}$		54	mJ
E_{off}	Turn-off Switching Energy	$R_G = 0.8\Omega$	$T_j = 150^\circ\text{C}$		58	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

Chopper 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	$V_R = 1200V$			250 2000	μA	
		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$					
I_F	DC Forward Current			600		A	
		$T_C = 80^\circ\text{C}$					
V_F	Diode Forward Voltage	$I_F = 600A$ $V_{GE} = 0V$		1.7 1.65	2.2	V	
		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$					
t_{rr}	Reverse Recovery Time	$I_F = 600A$ $V_R = 600V$ $di/dt = 7000A/\mu\text{s}$		155 300		ns	
			$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$				
Q_{rr}	Reverse Recovery Charge				53 110		μC
			$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$				
E_{rr}	Reverse Recovery Energy				23 46		mJ
		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$					

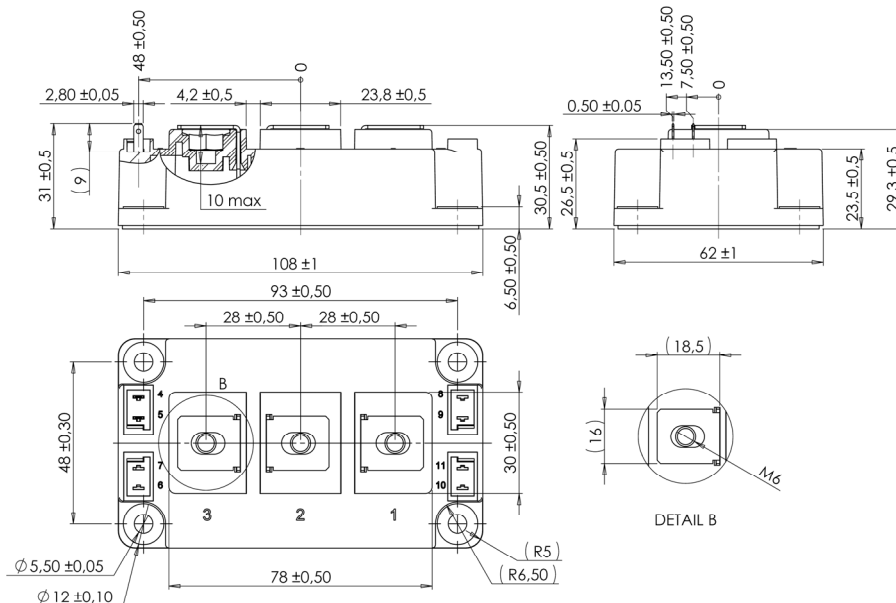
IGBT Parallel protection diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ C$		100	μA
			$T_j = 150^\circ C$		500	
I_F	DC Forward Current			75		A
V_F	Diode Forward Voltage	$I_F = 75A$ $V_{GE} = 0V$	$T_j = 25^\circ C$	1.7	2.2	V
			$T_j = 150^\circ C$	1.65		
t_{rr}	Reverse Recovery Time	$I_F = 75A$ $V_R = 600V$ $di/dt = 1900A/\mu s$	$T_j = 25^\circ C$	155		ns
			$T_j = 150^\circ C$	300		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$	7.3		μC
			$T_j = 150^\circ C$	15.2		
E_{rr}	Reverse Recovery Energy	$T_j = 25^\circ C$	2.6		mJ	
		$T_j = 150^\circ C$	5.5			

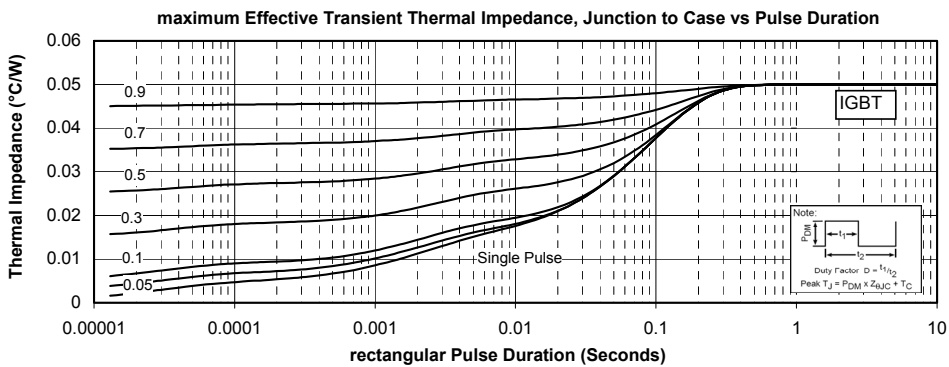
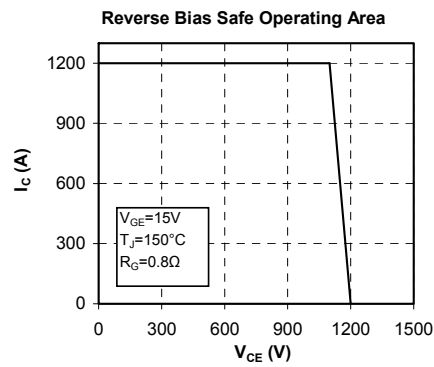
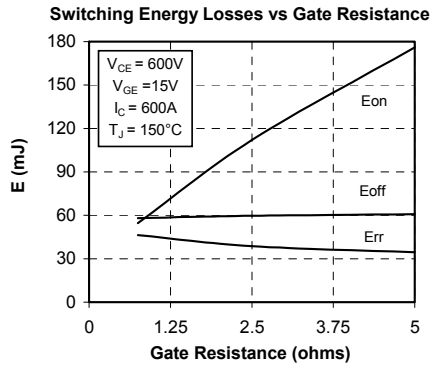
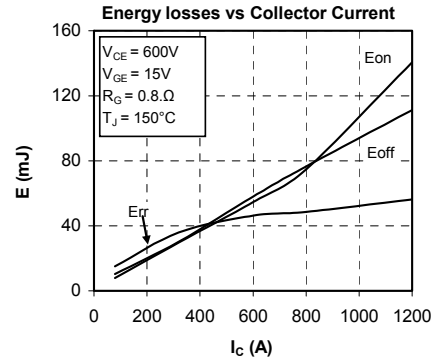
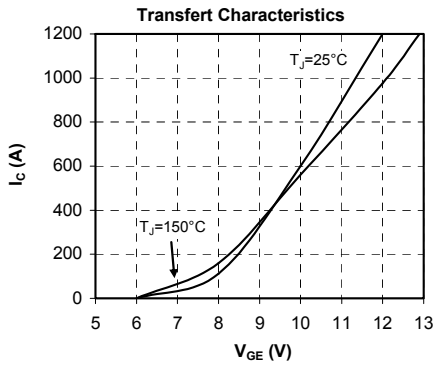
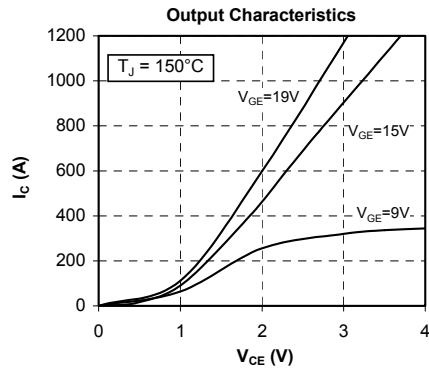
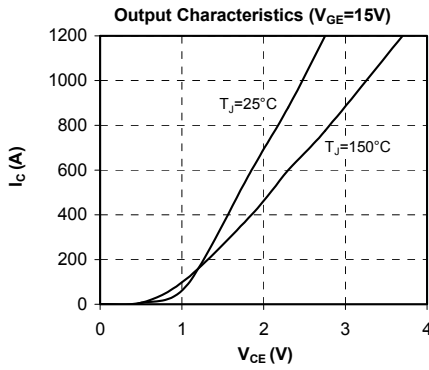
Thermal and package characteristics

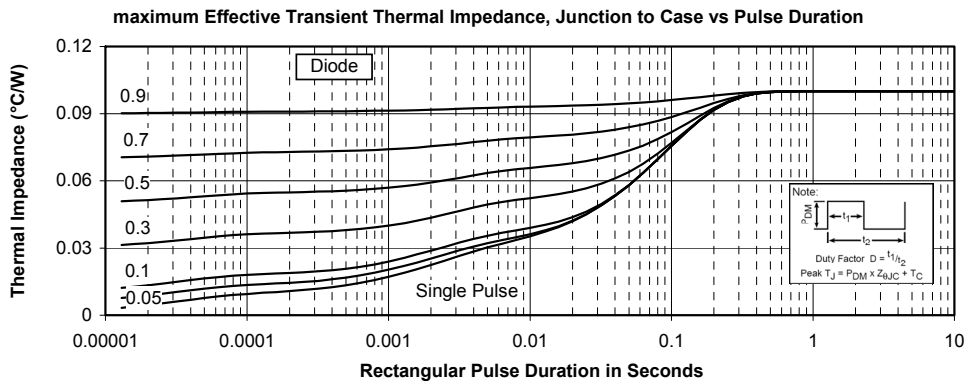
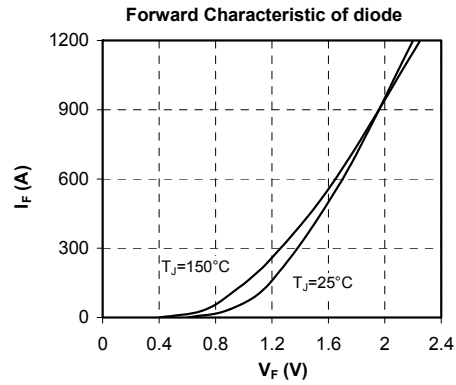
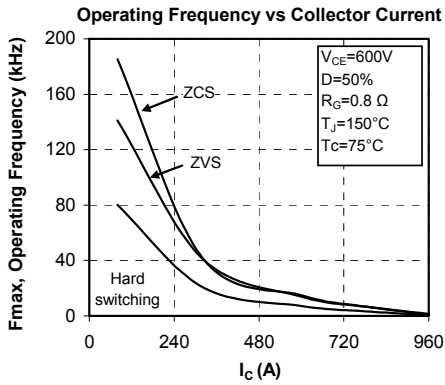
Symbol	Characteristic	Min	Typ	Max	Unit	
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.05	$^\circ C/W$	
		Chopper diode		0.10		
		IGBT parallel diode		0.62		
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t = 1$ min, 50/60Hz	4000			V	
T_J	Operating junction temperature range	-40		175	$^\circ C$	
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





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