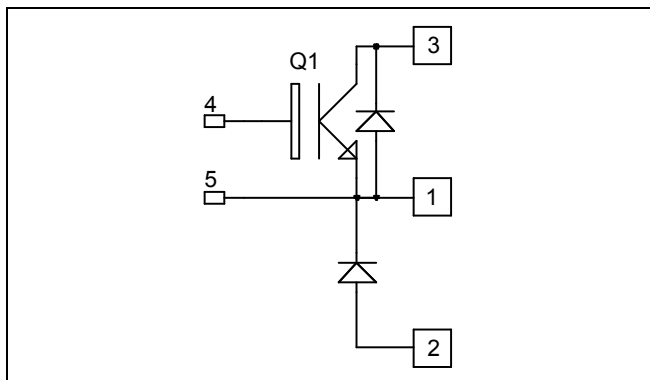


***Buck Chopper
Trench + Field Stop IGBT4
Power Module***

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



Application

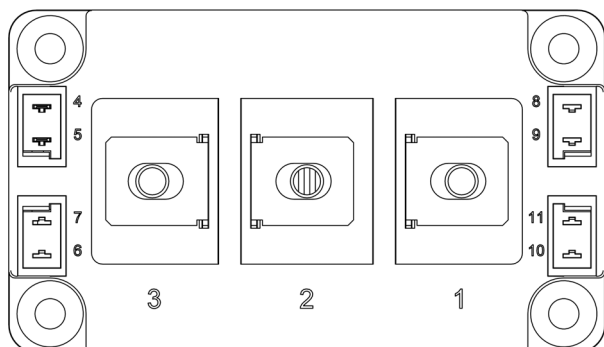
- AC and DC motor control
- Switched Mode Power Supplies

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
		$T_C = 80^\circ C$	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
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	$V_{GE} = 15V$ $I_C = 400A$		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	$V_{GE} = V_{CE}, I_C = 15mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

Dynamic Characteristics

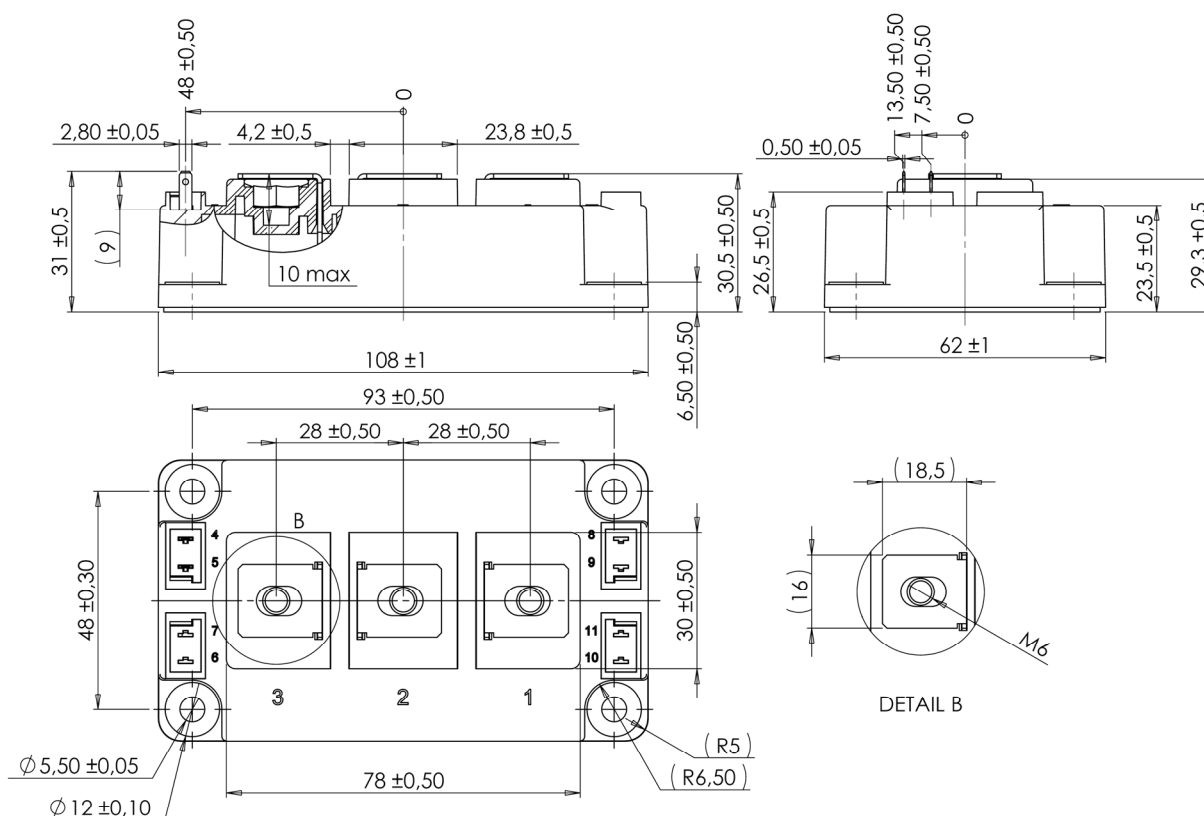
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		24.6		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		1.62		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		1.38		
Q_G	Gate charge	$V_{GE} = -8V / 15V ; V_{CE} = 600V$ $I_C = 400A$		2.3		μC
$T_{d(on)}$	Turn-on 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

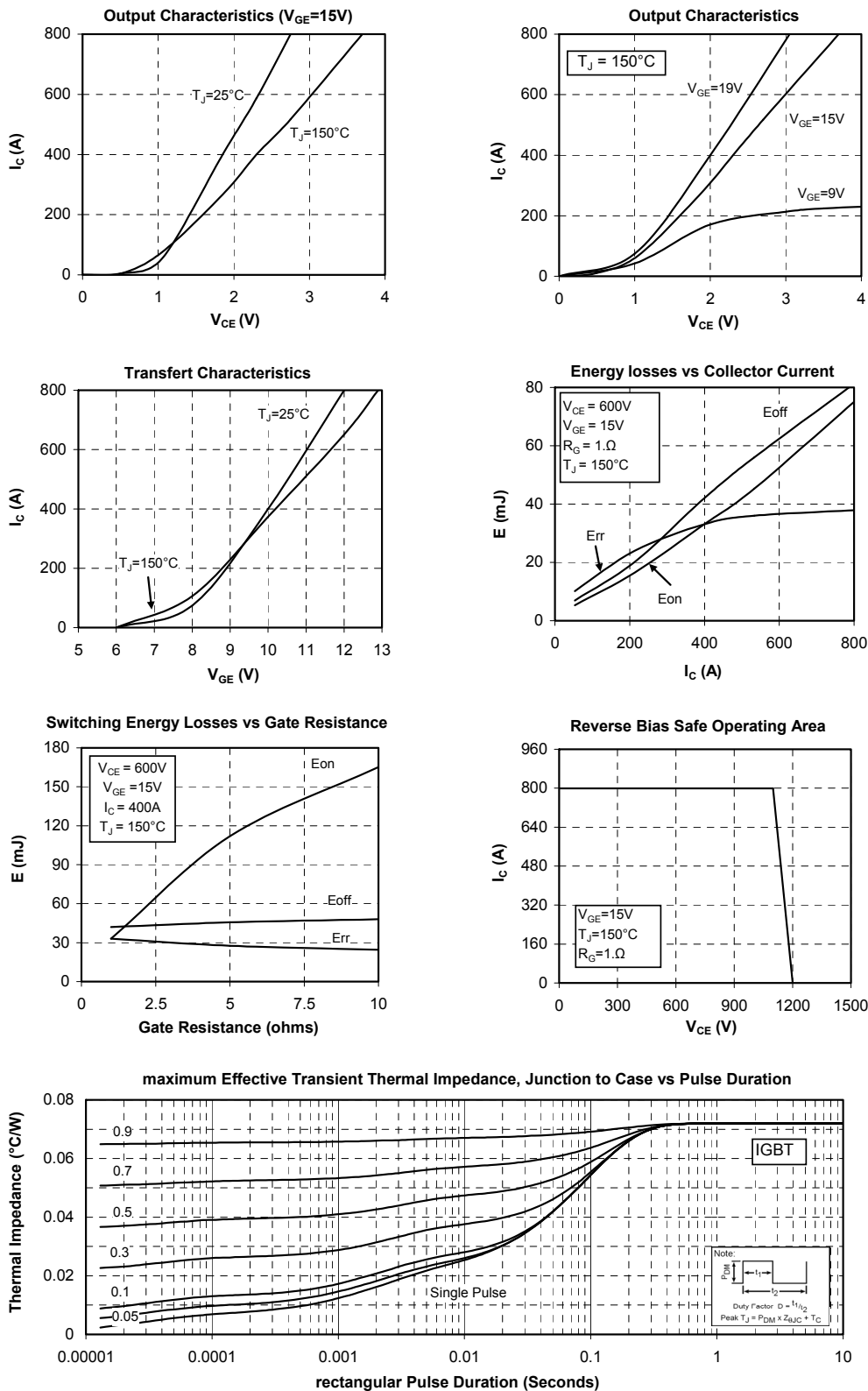
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$			250 2000	μA
		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$				
I_F	DC Forward Current			400		A
V_F	Diode Forward Voltage	$I_F = 400A$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

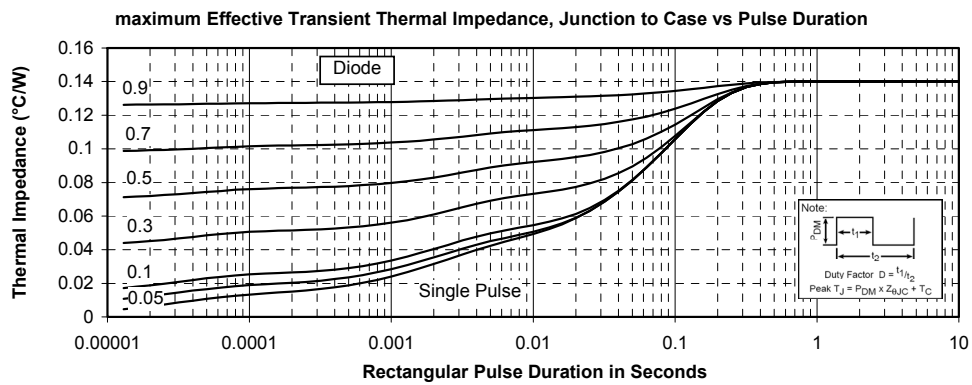
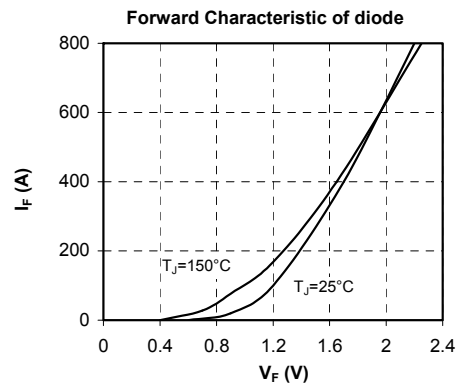
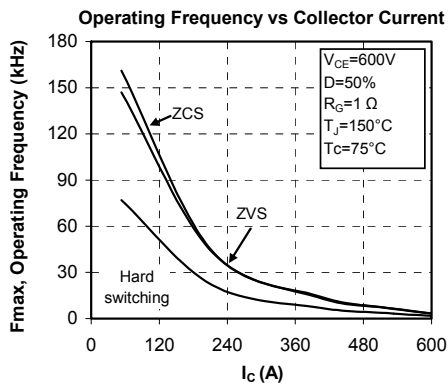
Thermal and package characteristics

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, 50/60Hz		4000			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





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