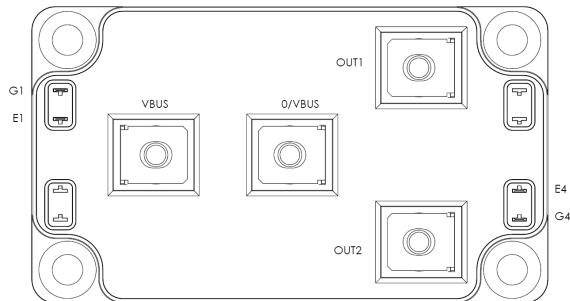
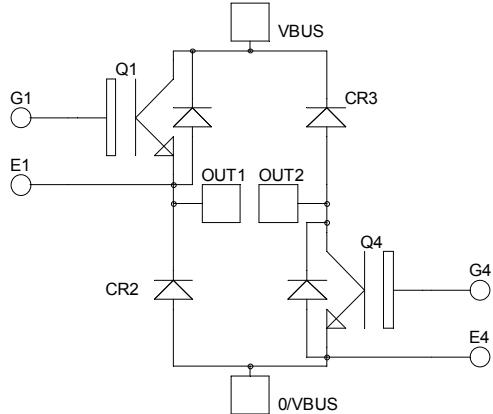


**Asymmetrical - Bridge
Trench + Field Stop IGBT3
Power Module**
 $V_{CES} = 600V$
 $I_C = 200A @ T_c = 80^\circ C$

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	400
V_{GE}	Gate – Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	625
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	400A @ 550V

Application

- Welding converters
- Switched Mode Power Supplies
- Switched Reluctance Motor Drives

Features

- Trench + Field Stop IGBT3 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
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- 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 TC of V_{CEsat}
- Low profile
- RoHS Compliant

 **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	$V_{GE} = 0\text{V}$, $V_{CE} = 600\text{V}$				250	μA
$V_{CE(\text{sat})}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$		1.5	1.9	V
		$I_C = 200\text{A}$	$T_j = 150^\circ\text{C}$		1.7		
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 2\text{ mA}$		5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$				400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		12.3			nF	
C_{oes}	Output Capacitance			0.8				
C_{res}	Reverse Transfer Capacitance			0.4				
$T_{d(on)}$	Turn-on Delay Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 2\Omega$	Inductive Switching (25°C)	115			ns	
T_r	Rise Time			45				
$T_{d(off)}$	Turn-off Delay Time			225				
T_f	Fall Time			55				
$T_{d(on)}$	Turn-on Delay Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 2\Omega$	Inductive Switching (150°C)	130			ns	
T_r	Rise Time			50				
$T_{d(off)}$	Turn-off Delay Time			300				
T_f	Fall Time			70				
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 2\Omega$	$T_j = 25^\circ\text{C}$	1			mJ	
			$T_j = 150^\circ\text{C}$	1.8				
E_{off}	Turn off Energy		$T_j = 25^\circ\text{C}$	5.7			mJ	
			$T_j = 150^\circ\text{C}$	7				

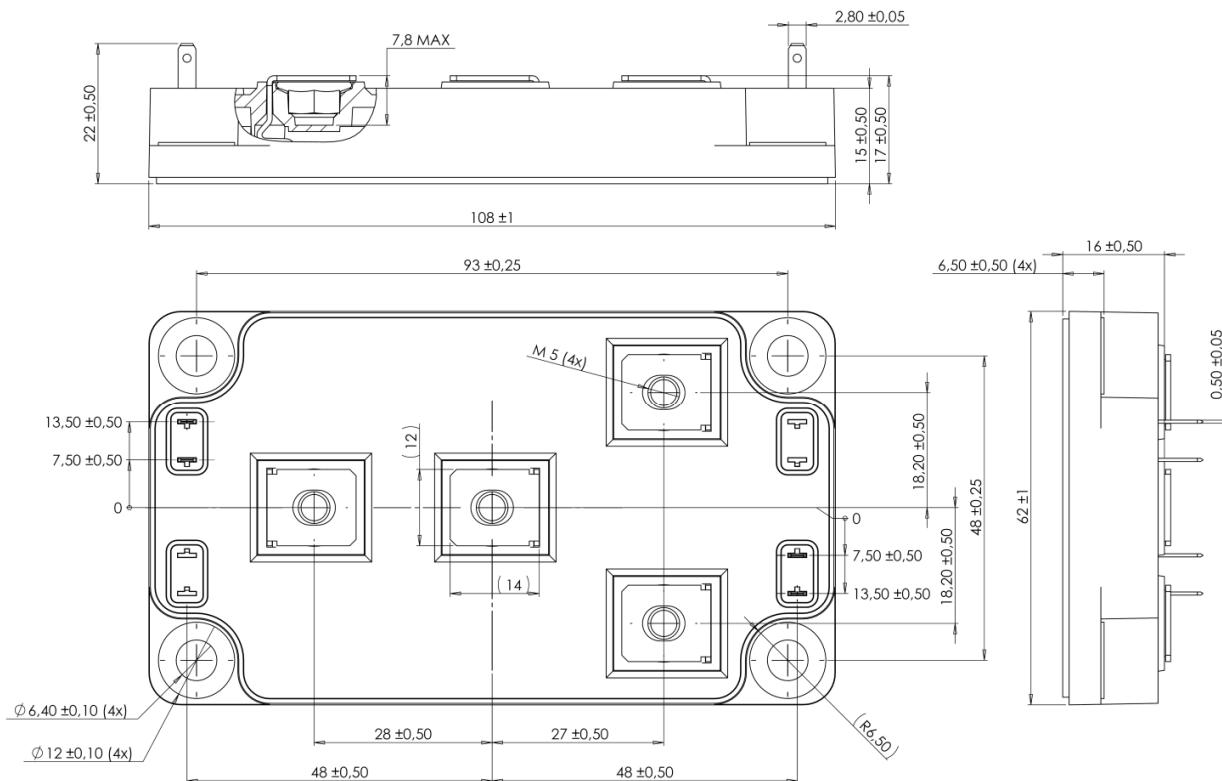
Diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			600			V	
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$			250	μA	
			$T_j = 150^\circ\text{C}$			500		
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$		200		A	
V_F	Diode Forward Voltage	$I_F = 200\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$		1.6	2	V	
			$T_j = 150^\circ\text{C}$		1.5			
t_{rr}	Reverse Recovery Time	$I_F = 200\text{A}$ $V_R = 300\text{V}$ $di/dt = 2200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		130		ns	
			$T_j = 150^\circ\text{C}$		225			
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		9		μC	
			$T_j = 150^\circ\text{C}$		19			
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$		2.3		mJ	
			$T_j = 150^\circ\text{C}$		4.7			

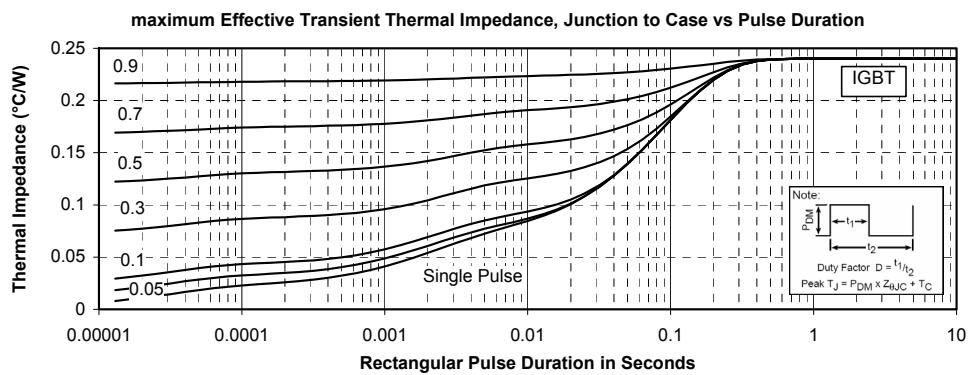
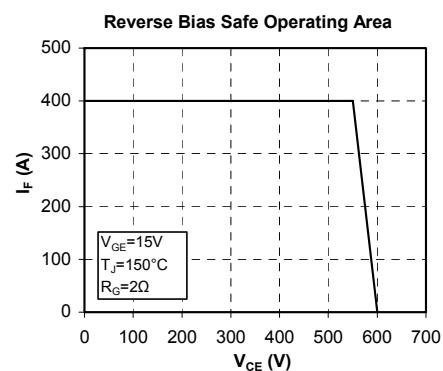
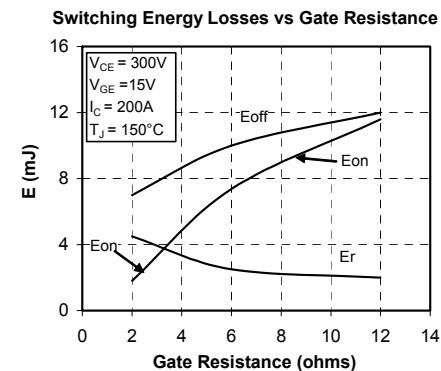
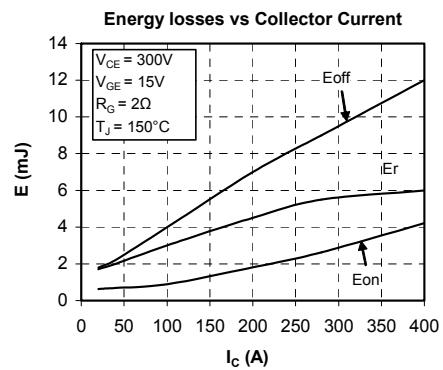
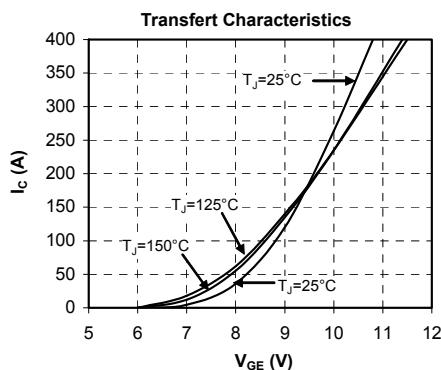
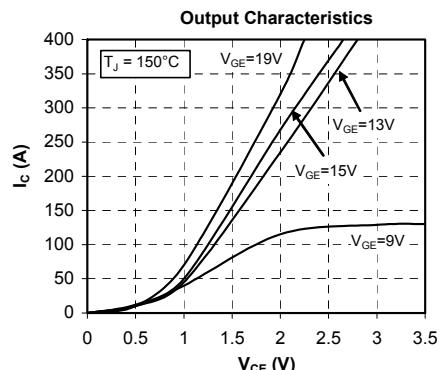
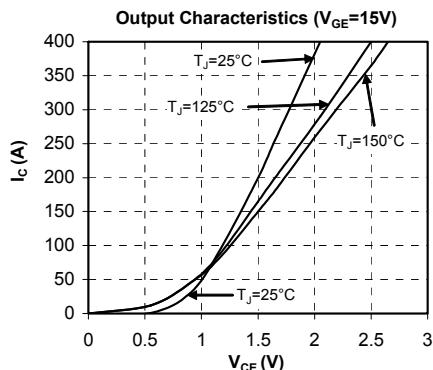
Thermal and package characteristics

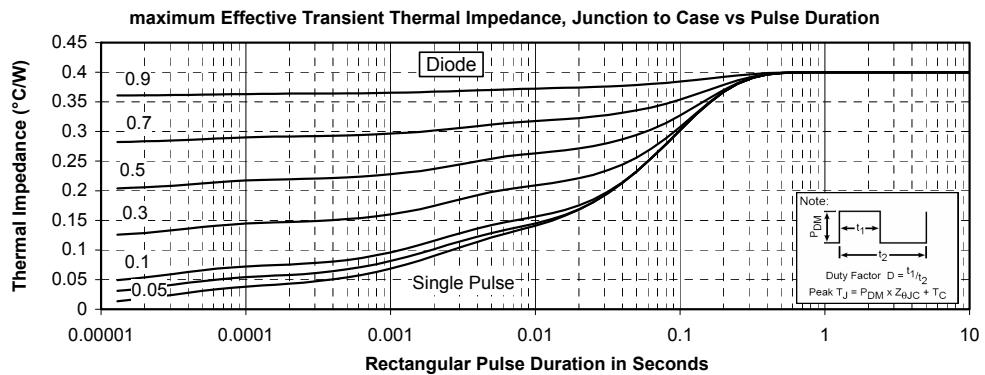
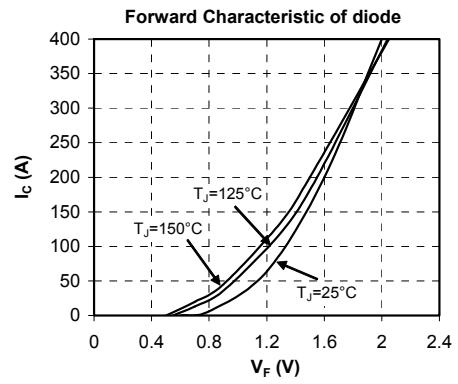
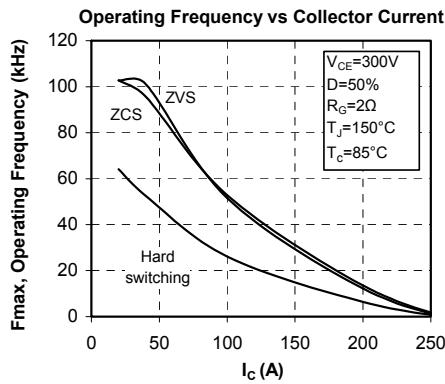
Symbol	Characteristic		Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT			0.24	°C/W
		Diode			0.4	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T_J	Operating junction temperature range		-40		175	
T_{STG}	Storage Temperature Range		-40		125	°C
T_C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight				300	g

SP6 Package outline (dimensions in mm)



See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve




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