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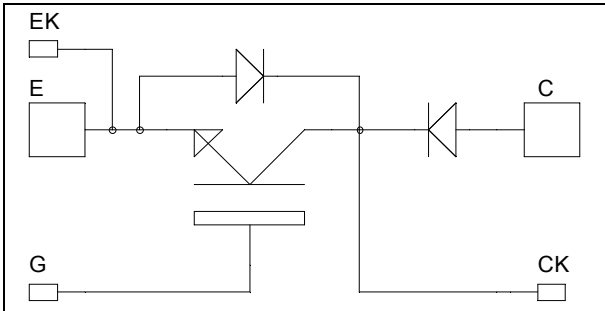
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*Single switch
with Series diode
Trench + Field Stop IGBT4*

**$V_{CES} = 1200V$
 $I_C = 475A @ T_c = 100^\circ C$**


Application

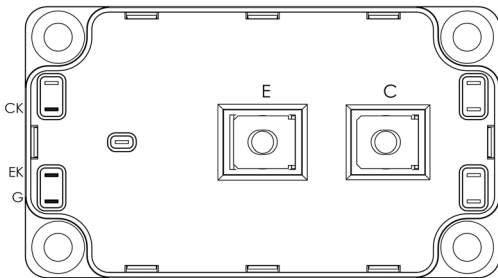
- Zero Current Switching resonant mode

Features

- Trench + Field Stop IGBT 4 Technology
 - Low voltage drop
 - Low leakage current
 - Low switching losses
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration
- AlN substrate for improved thermal performance

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- 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
		$T_c = 100^\circ C$	475
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	2307
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	800A @ 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	$V_{GE} = 15V$ $I_C = 400A$		1.8	2.2	V
		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 10\text{ mA}$	5	5.8	6.5	V

Dynamic Characteristics

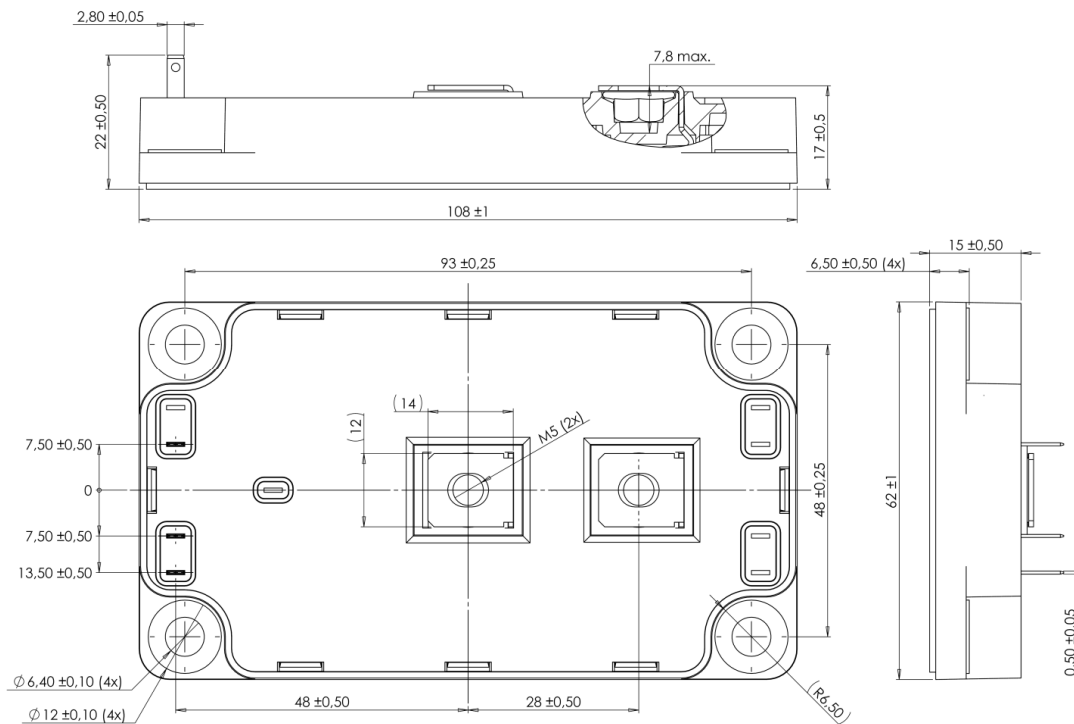
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		24.6		nF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		1.62		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.38		
Q_G	Gate charge	$V_{GE} = \pm 15V$		3.4		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$		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) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$		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	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 400A$ $R_G = 1.8\Omega$	$T_j = 25^\circ\text{C}$	20.8		mJ
			$T_j = 150^\circ\text{C}$	42		
E_{off}	Turn-off Switching Energy	$I_C = 400A$ $R_G = 1.8\Omega$	$T_j = 25^\circ\text{C}$	22		mJ
			$T_j = 150^\circ\text{C}$	37.2		
I_{SC}	Short circuit current	$V_{GE} \leq 15V$; $V_{CC} = 900V$ $t_p \leq 10\mu\text{s}$; $T_j = 150^\circ\text{C}$		2000		A

Series diode ratings and characteristics

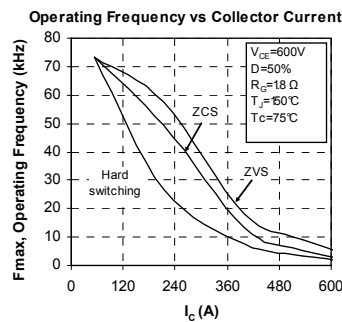
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$			400	μA
			$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			
I_F	DC Forward Current			360		A
V_F	Diode Forward Voltage	$I_F = 360A$		2.5	3	V
		$I_F = 720A$		3		
		$I_F = 360A$	$T_j = 125^\circ\text{C}$	1.8		
t_{rr}	Reverse Recovery Time	$I_F = 360A$ $V_R = 800V$ $di/dt = 1200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	265		ns
			$T_j = 125^\circ\text{C}$	350		
Q_{rr}	Reverse Recovery Charge	$I_F = 360A$ $V_R = 800V$ $di/dt = 1200A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	3.3		μC
			$T_j = 125^\circ\text{C}$	17.3		

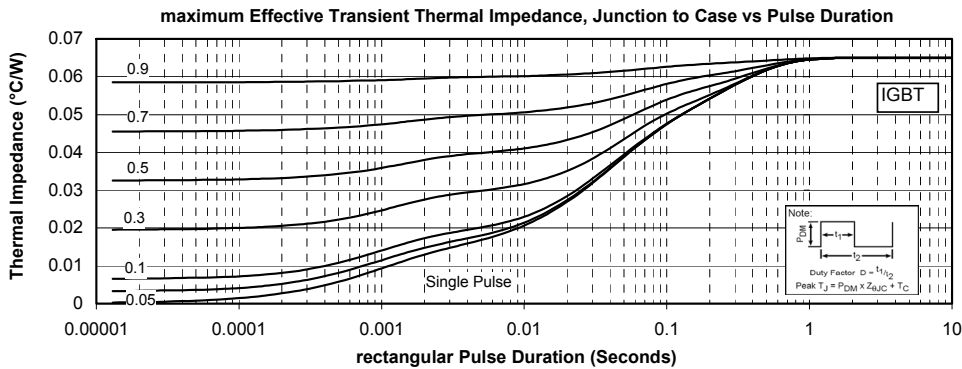
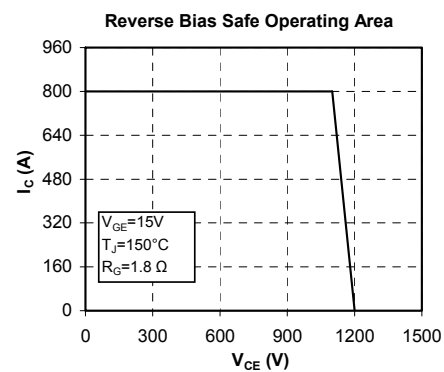
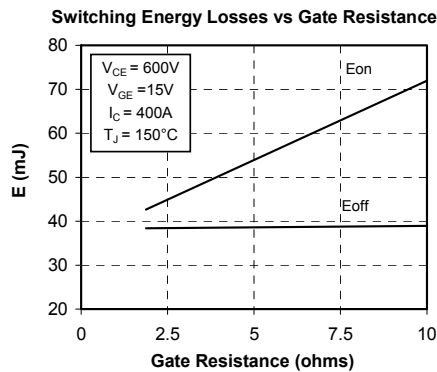
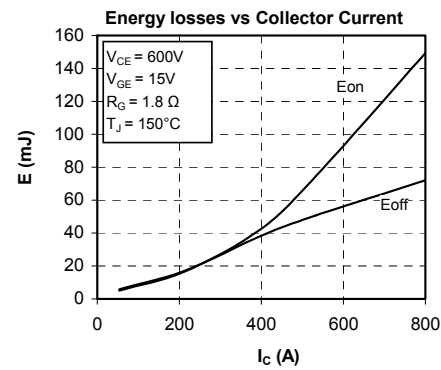
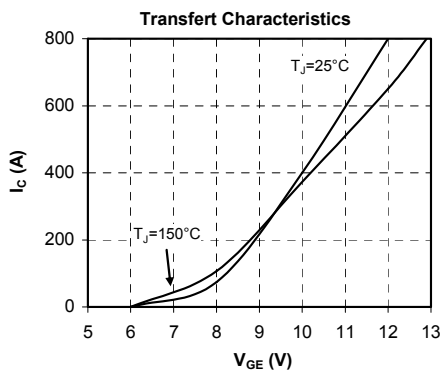
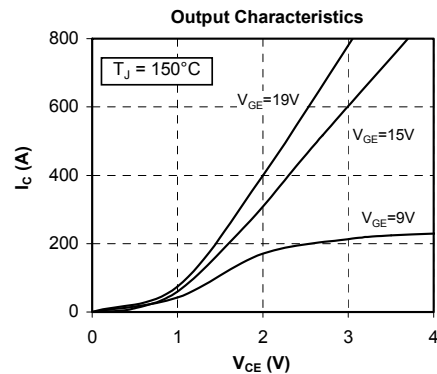
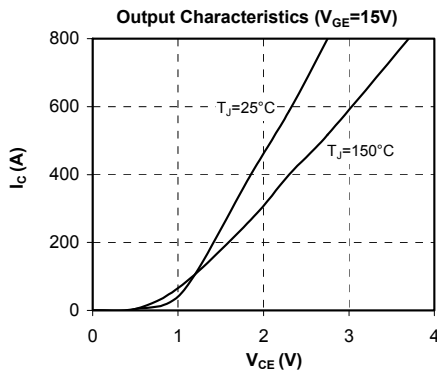
Thermal and package characteristics

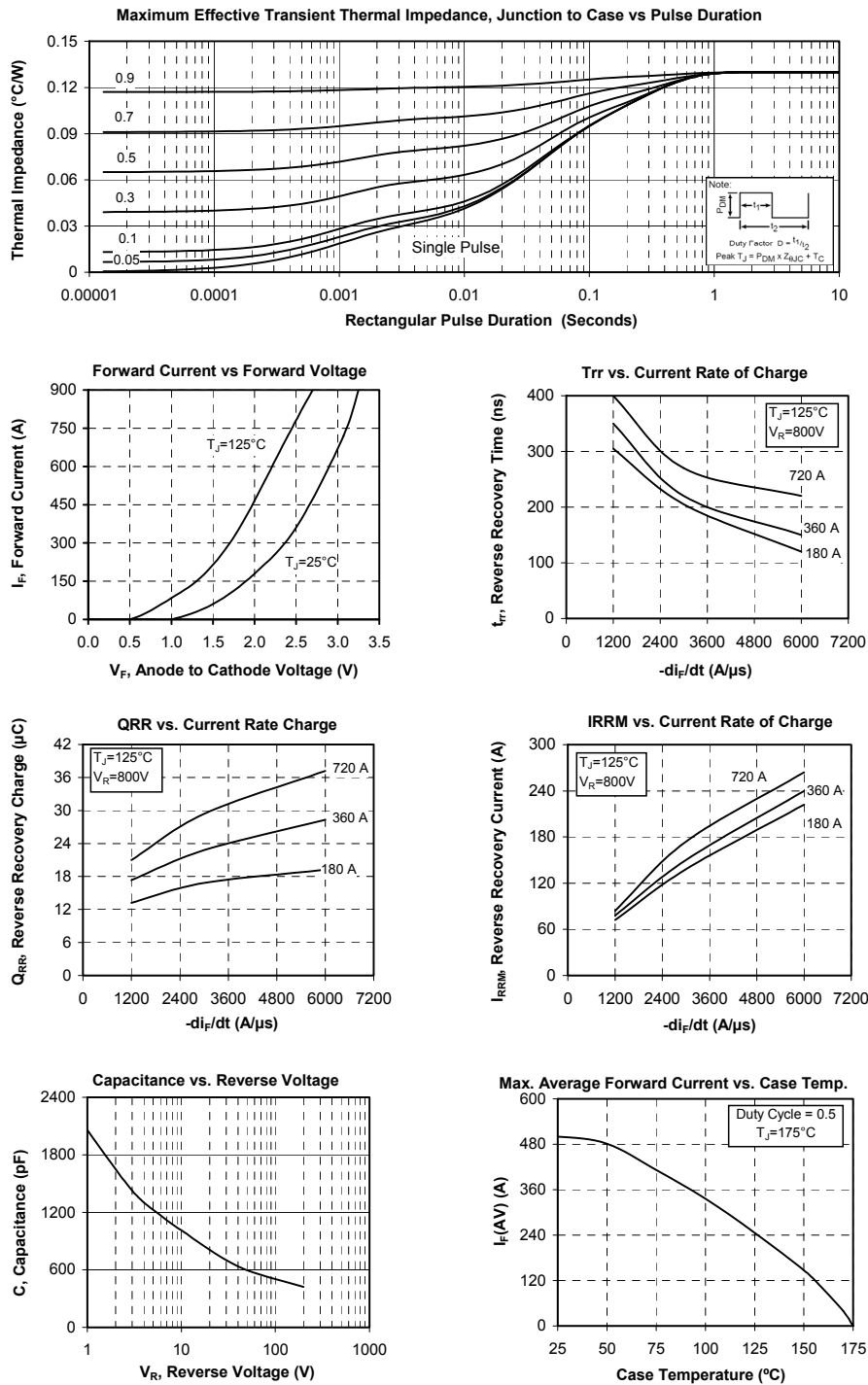
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.065	°C/W
		Series diode			0.13	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		175	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		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 IGBT Performance Curve




Typical Series diode Performance Curve


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