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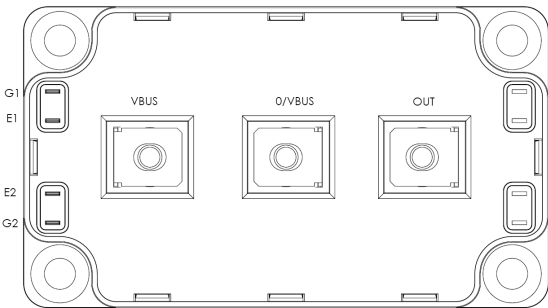
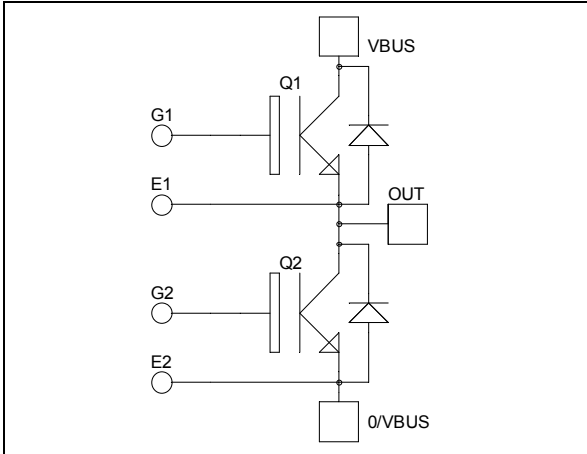
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**Phase leg**  
**High speed Trench + Field Stop**  
**IGBT4 Power module**

**$V_{CES} = 1200V$**   
 **$I_C = 300A @ T_c = 80^\circ C$**



**Application**

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

**Features**

- **High speed Trench + Field Stop IGBT 4**
  - Low voltage drop
  - Low leakage current
  - Low switching losses
- Kelvin emitter for easy drive
- Very low stray inductance
- M5 power connectors

**Benefits**

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS compliant

**All ratings @  $T_j = 25^\circ C$  unless otherwise specified**

**Absolute maximum ratings** (Per IGBT)

<i>Symbol</i>	<i>Parameter</i>	<i>Max ratings</i>	<i>Unit</i>
$V_{CES}$	Collector - Emitter Voltage	1200	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	500
		$T_C = 80^\circ C$	300
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	960
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Power Dissipation	1500	W

 **CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

**Electrical Characteristics (Per IGBT)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{CES}$	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			200	$\mu A$
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 300A$	1.78	$T_j = 25^\circ C$ 2.05	2.42	V
		$T_j = 150^\circ C$		2.6		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 10.4 mA$	5.3	5.8	6.3	V
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			480	nA

**Dynamic Characteristics (Per IGBT)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$ $V_{CE} = 25V$ $f = 1MHz$		17.6		nF
$C_{oes}$	Output Capacitance			1		
$C_{res}$	Reverse Transfer Capacitance			0.9		
$Q_G$	Gate charge	$V_{GE} = 15V, I_C = 300A$ $V_{CE} = 960V$		1290		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$ $R_G = 1.6\Omega$		30		ns
$T_r$	Rise Time			57		
$T_{d(off)}$	Turn-off Delay Time			290		
$T_f$	Fall Time			16		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$ $R_G = 1.6\Omega$		30		ns
$T_r$	Rise Time			49		
$T_{d(off)}$	Turn-off Delay Time			366		
$T_f$	Fall Time			48		
$E_{on}$	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 300A$	$T_j = 150^\circ C$	26		mJ
$E_{off}$	Turn off Energy	$R_G = 1.6\Omega$		16		
$R_G$	Integrated gate resistor			2.5		$\Omega$
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 600V$ $t_p \leq 10\mu s; T_j = 150^\circ C$		1000		A
$R_{thJC}$	Junction to Case Thermal Resistance				0.1	$^\circ C/W$

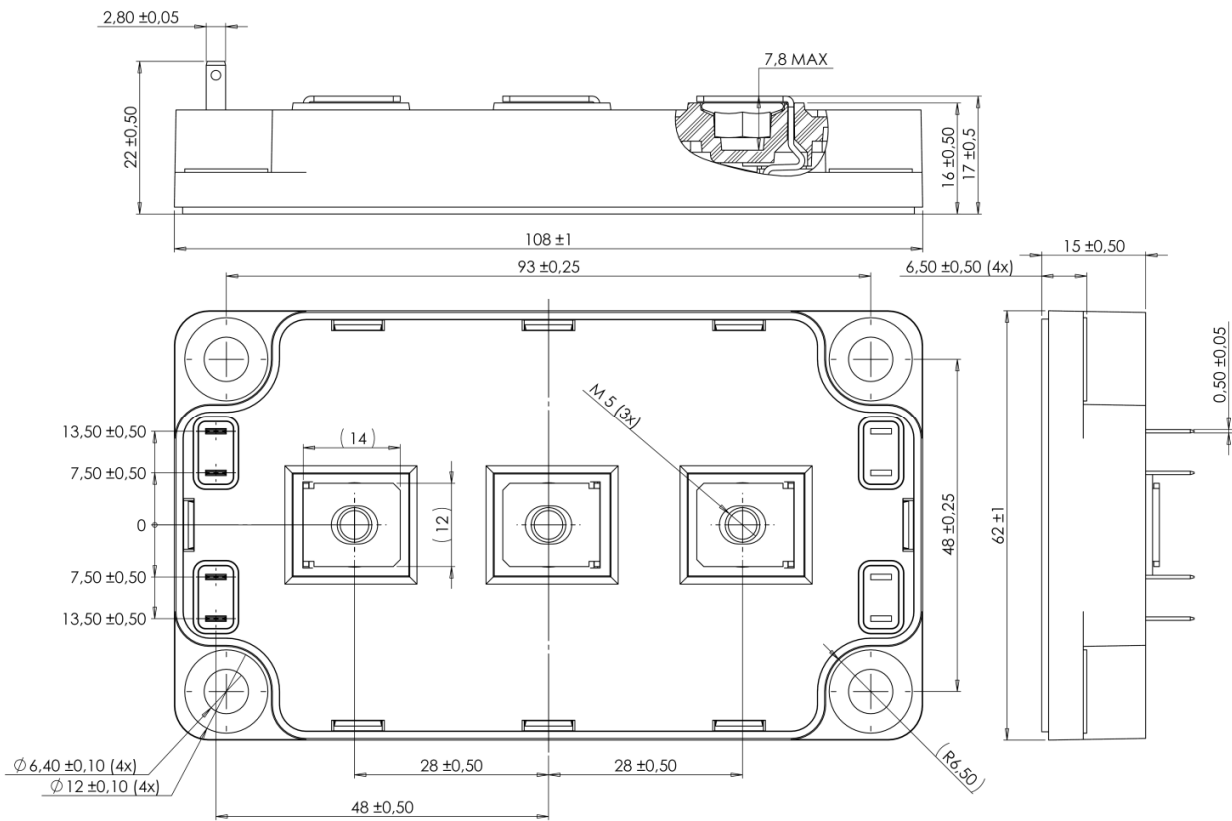
**Diode ratings and characteristics (per diode)**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage				1200	V
$I_{RM}$	Reverse Leakage Current	$V_R = 1200V$			400	$\mu A$
$I_F$	DC Forward Current	$T_c = 60^\circ C$		240		A
$V_F$	Diode Forward Voltage	$I_F = 240A$		2.5	3.5	V
		$I_F = 480A$		3		
		$I_F = 240A$	$T_j = 125^\circ C$	1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 240A$ $V_R = 800V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ C$	265		ns
			$T_j = 125^\circ C$	350		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 240A$ $V_R = 800V$ $di/dt = 800A/\mu s$	$T_j = 25^\circ C$	2.24		$\mu C$
			$T_j = 125^\circ C$	11.6		
$R_{thJC}$	Junction to Case Thermal Resistance				0.17	$^\circ C/W$

## Thermal and package characteristics

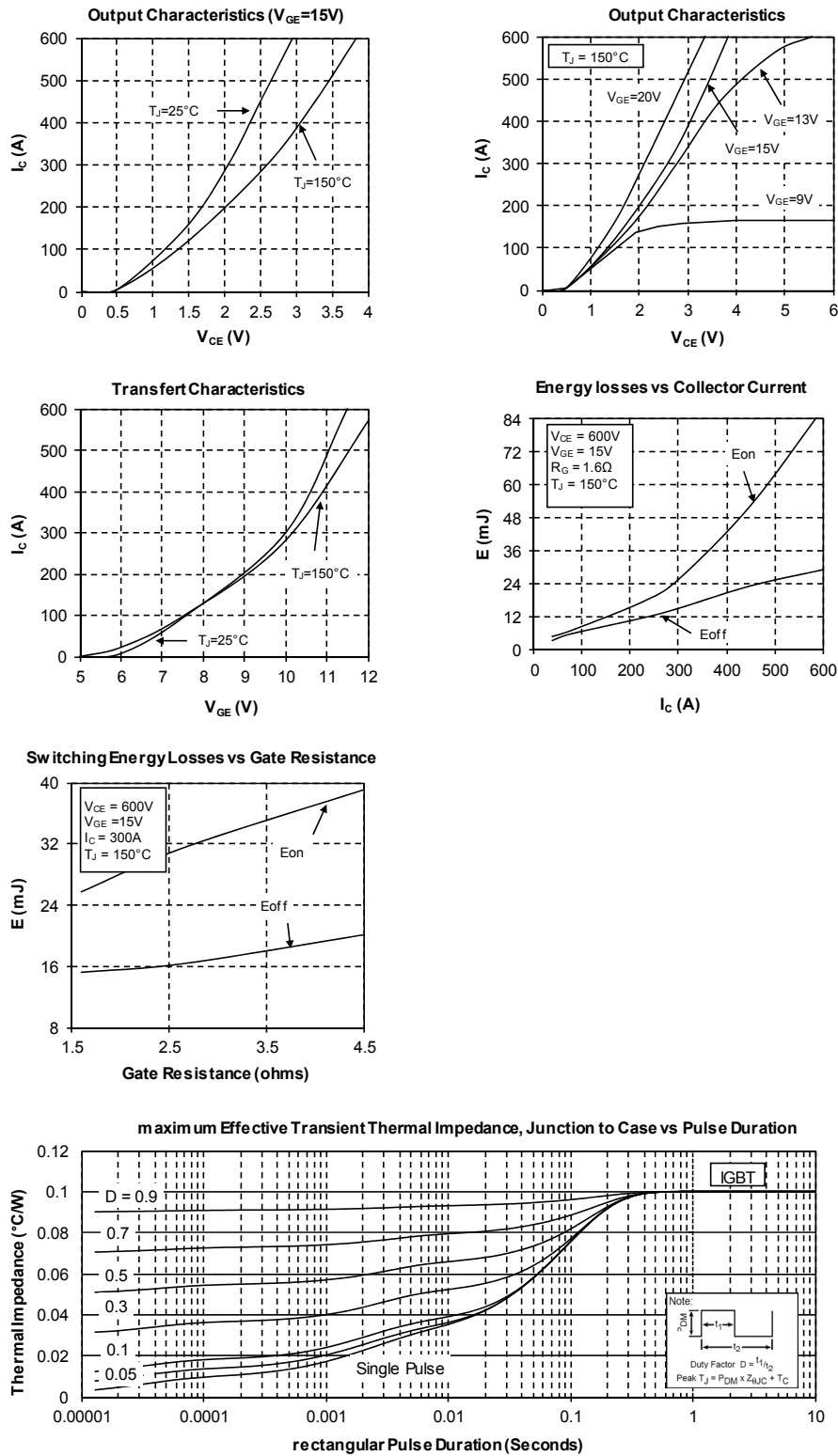
Symbol	Characteristic	Min	Max	Unit		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz	4000		V		
T <sub>J</sub>	Operating junction temperature range	-40	175	°C		
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40	T <sub>Jmax</sub> -25			
T <sub>STG</sub>	Storage Temperature Range	-40	125			
T <sub>C</sub>	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M6	3	5	N.m
		For terminals	M5	2	3.5	
Wt	Package Weight			300	g	

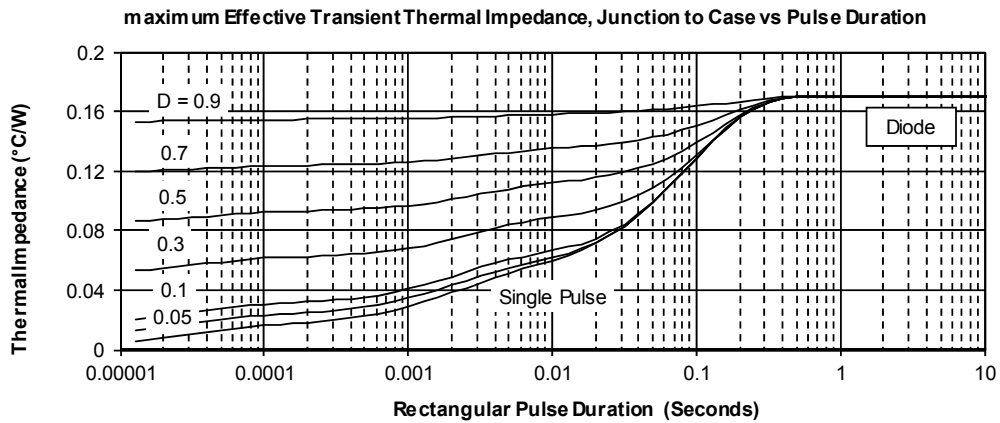
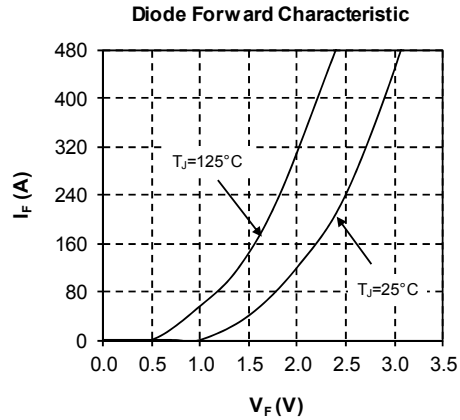
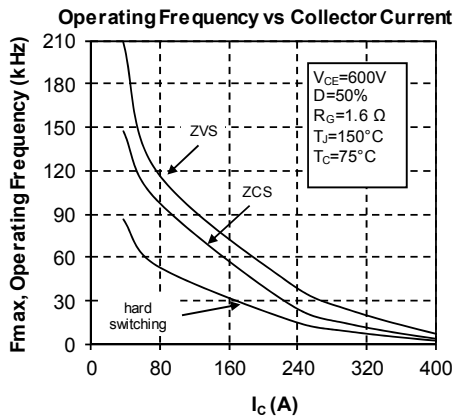
## Package outline (dimensions in mm)



See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve





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