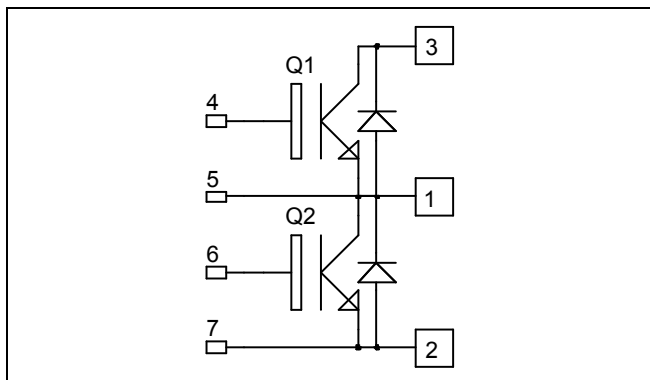


*Phase leg  
Trench + Field Stop IGBT4  
Power Module*

**$V_{CES} = 1200V$   
 $I_C = 325A @ T_c = 80^\circ C$**



## Application

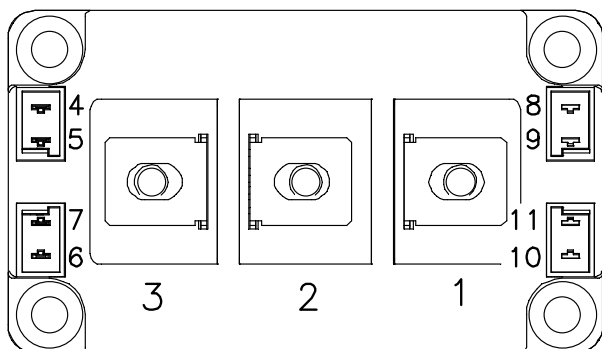
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

## 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	$T_C = 25^\circ C$	A
		$T_C = 80^\circ C$	
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	600
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	1500
RBSOA	Reverse Bias Safe Operating Area	$T_J = 125^\circ C$	600A @ 1100V

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.  
See application note APT0502 on [www.microsemi.com](http://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	$V_{GE} = 15V$ $I_C = 300A$		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	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

**Dynamic Characteristics**

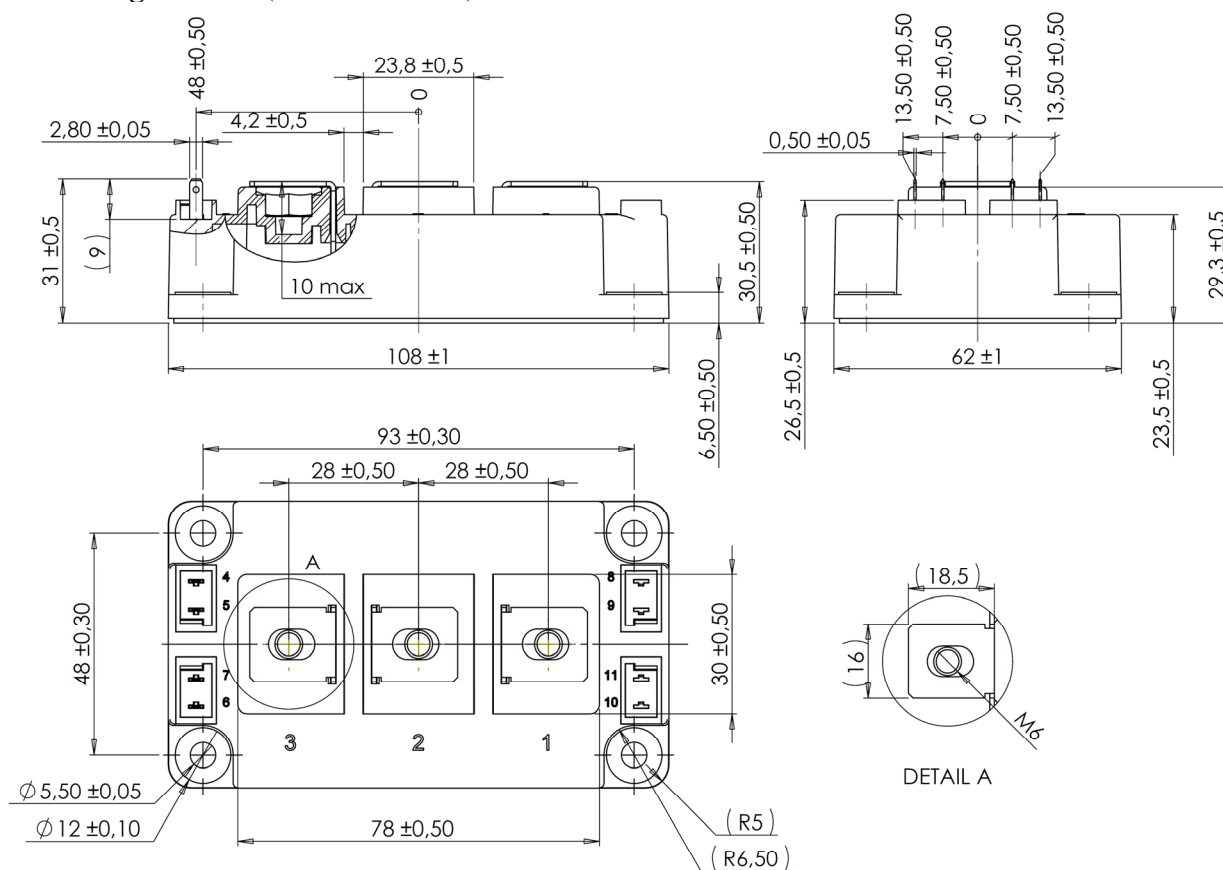
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0V$		18.6		nF
$C_{oes}$	Output Capacitance	$V_{CE} = 25V$		1.16		
$C_{res}$	Reverse Transfer Capacitance	$f = 1MHz$		1		
$Q_G$	Gate charge	$V_{GE} = -8V / 15V ; V_{CE} = 600V$ $I_C = 300A$		1.7		$\mu C$
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 300A$ $R_G = 1.5\Omega$		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 ( $150^\circ\text{C}$ ) $V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 300A$ $R_G = 1.5\Omega$		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	$V_{GE} = \pm 15V$ $V_{CE} = 600V$ $I_C = 300A$	$T_j = 150^\circ\text{C}$	27		mJ
$E_{off}$	Turn-off Switching Energy	$R_G = 1.5\Omega$	$T_j = 150^\circ\text{C}$	29		mJ
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 900V$ $t_p \leq 10\mu s ; T_j = 150^\circ\text{C}$		1200		A

**Diode ratings and characteristics**

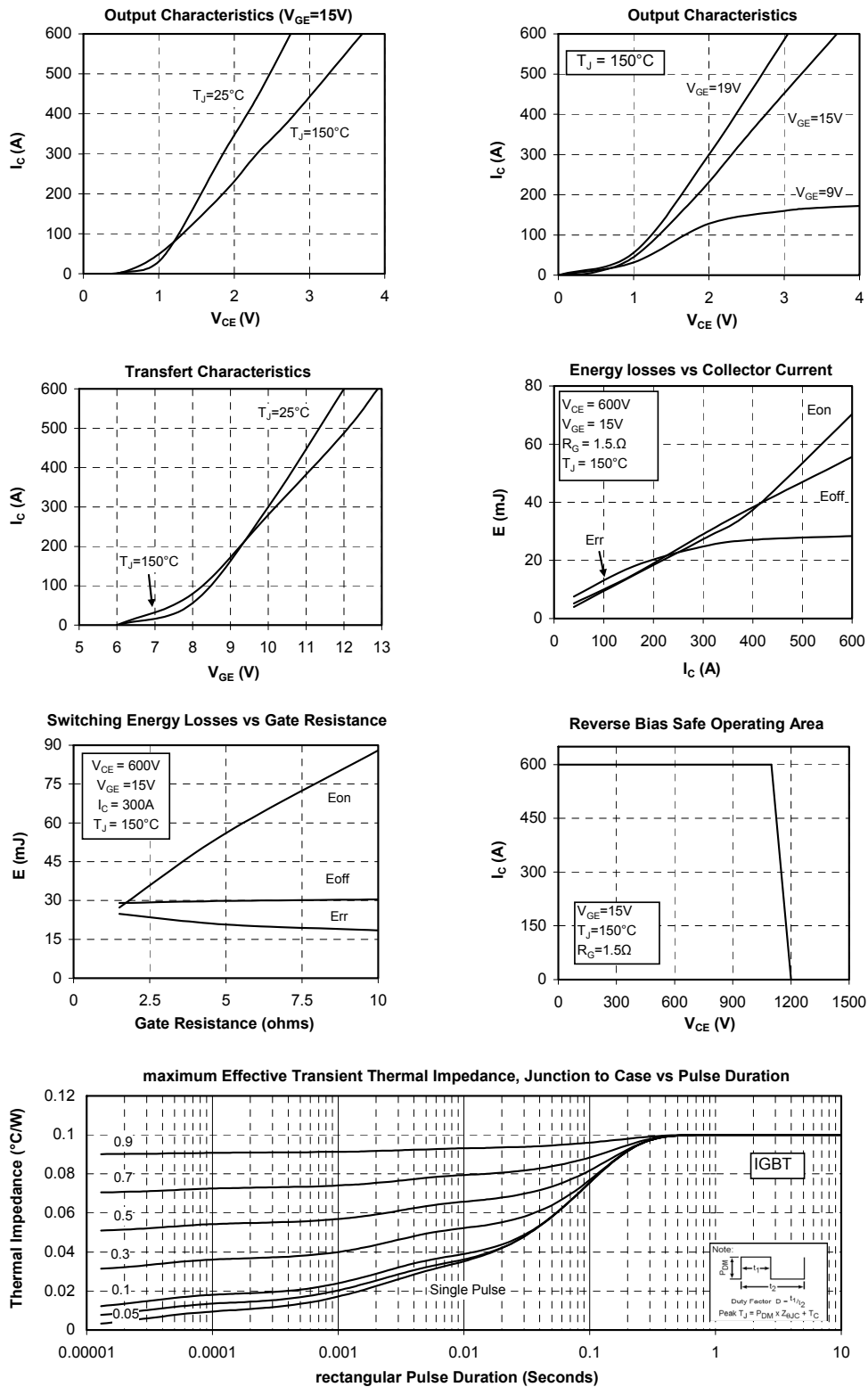
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Repetitive Reverse Voltage		1200			V
$I_{RRM}$	Maximum Reverse Leakage Current	$V_R = 1200V$			250 2000	$\mu A$
		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$				
$I_F$	DC Forward Current			300		A
$V_F$	Diode Forward Voltage	$I_F = 300A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.7 1.65	2.2	V
$t_{rr}$	Reverse Recovery Time	$I_F = 300A$ $V_R = 600V$ $di/dt = 7000A/\mu s$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	155 300		ns
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	29 61		$\mu C$
$E_{rr}$	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	13 24		mJ

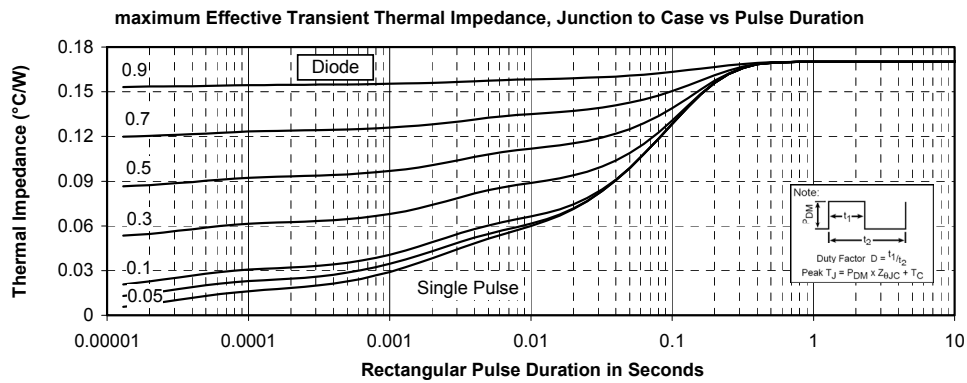
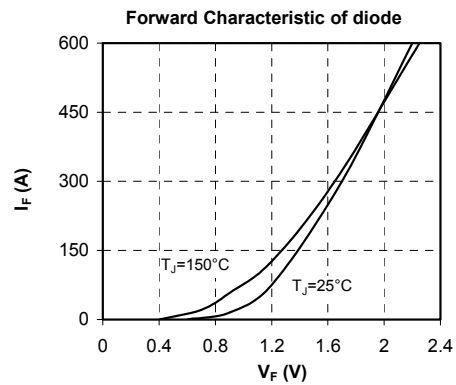
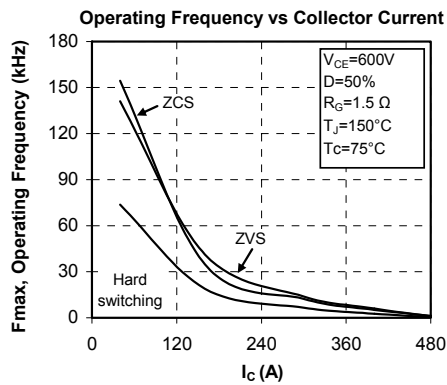
**Thermal and package characteristics**

Symbol	Characteristic		Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance	IGBT			0.10	°C/W
		Diode			0.17	
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>STG</sub>	Storage Temperature Range		-40		125	
T <sub>C</sub>	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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