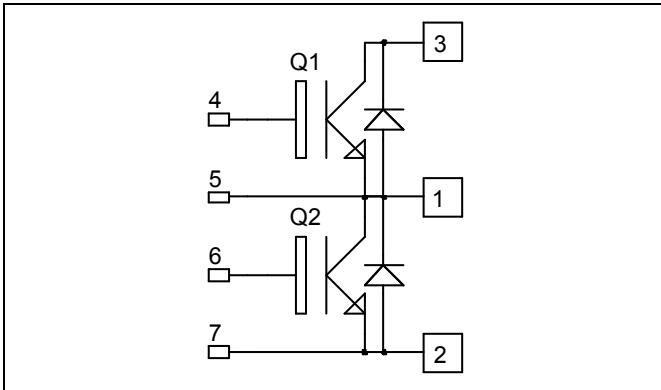


**Phase leg  
Trench + Field Stop IGBT  
Power Module**

**$V_{CES} = 1700V$   
 $I_C = 200A @ T_c = 80^\circ C$**



### Application

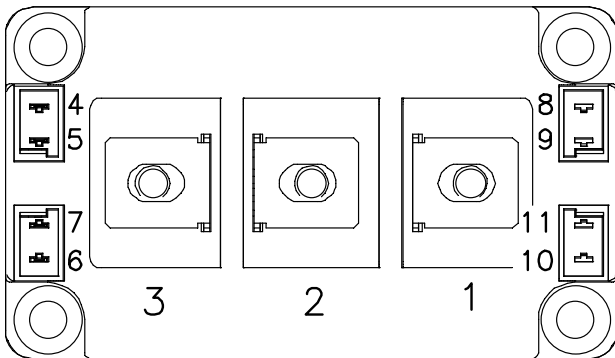
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

### Features

- Trench + Field Stop IGBT 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
- 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	1700	V
$I_C$	Continuous Collector Current	$T_C = 25^\circ C$	310
		$T_C = 80^\circ C$	200
$I_{CM}$	Pulsed Collector Current	$T_C = 25^\circ C$	400
$V_{GE}$	Gate - Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_C = 25^\circ C$	1250
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	400A@1650V

**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	$V_{GE} = 0\text{V}, V_{CE} = 1700\text{V}$			3	mA
$V_{CE(on)}$	Collector Emitter on Voltage	$V_{GE} = 15\text{V}$ $I_C = 200\text{A}$	$T_j = 25^\circ\text{C}$	2.0	2.5	V
			$T_j = 125^\circ\text{C}$	2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 8\text{mA}$	5.2	5.8	6.4	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	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$		18		nF
$C_{res}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.6		
$Q_G$	Gate charge	$V_{GE} = \pm 15\text{V}, I_C = 200\text{A}$ $V_{CE} = 900\text{V}$		2.3		$\mu\text{C}$
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 200\text{A}$ $R_G = 6.8\Omega$		280		ns
$T_r$	Rise Time			80		
$T_{d(off)}$	Turn-off Delay Time			850		
$T_f$	Fall Time			120		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 200\text{A}$ $R_G = 6.8\Omega$		300		ns
$T_r$	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			1000		
$T_f$	Fall Time			200		
$E_{on}$	Turn On Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$	$T_j = 25^\circ\text{C}$	58		mJ
			$T_j = 125^\circ\text{C}$	78		
$E_{off}$	Turn Off Energy	$I_C = 200\text{A}$ $R_G = 6.8\Omega$	$T_j = 25^\circ\text{C}$	43		mJ
			$T_j = 125^\circ\text{C}$	63		
$I_{sc}$	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 1000\text{V}$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		800		A

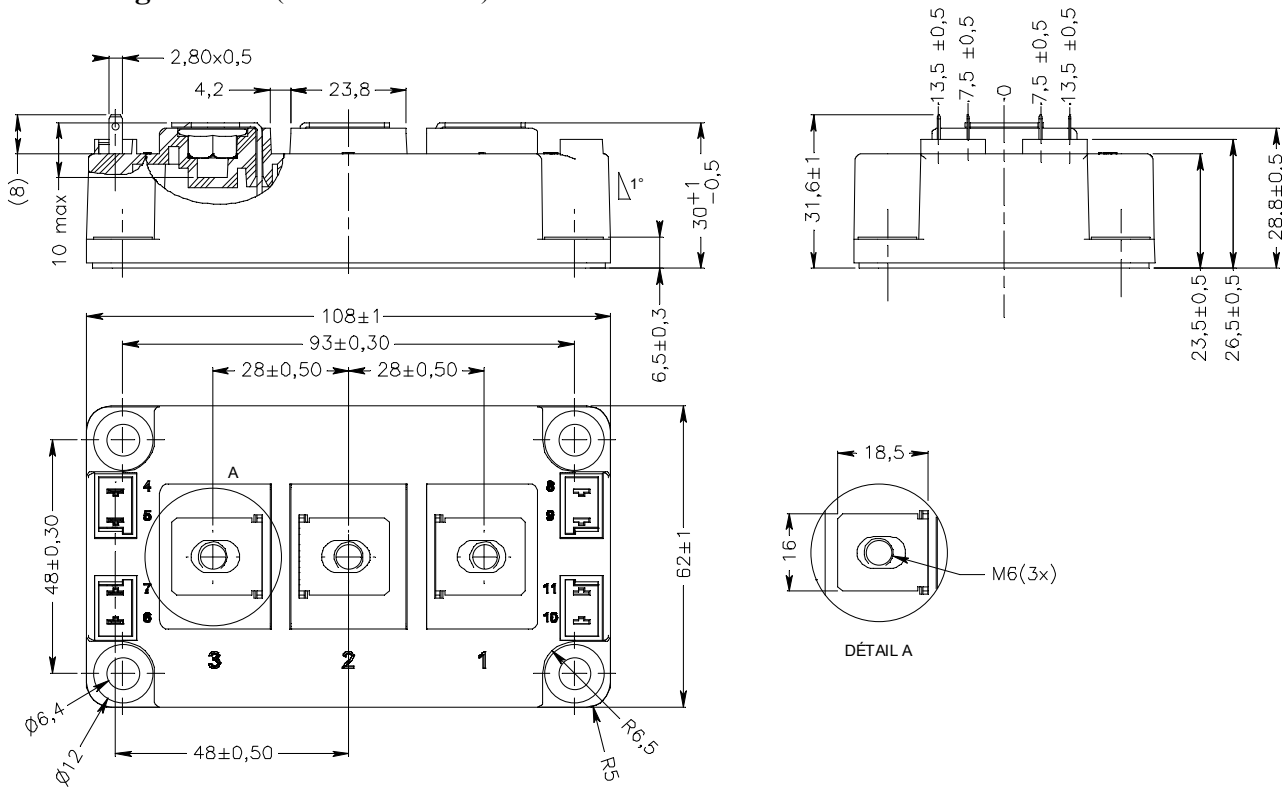
**Reverse diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1700			V
$I_{RRM}$	Maximum Reverse Leakage Current	$V_R = 1700\text{V}$			750	$\mu\text{A}$
					1000	
$I_F$	DC Forward Current			200		A
$V_F$	Diode Forward Voltage	$I_F = 200\text{A}$	$T_j = 25^\circ\text{C}$	1.8	2.2	V
			$T_j = 125^\circ\text{C}$	1.9		
$t_{rr}$	Reverse Recovery Time	$I_F = 200\text{A}$ $V_R = 900\text{V}$ $di/dt = 3200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	385		ns
			$T_j = 125^\circ\text{C}$	490		
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	56		$\mu\text{C}$
			$T_j = 125^\circ\text{C}$	92		
$E_{rr}$	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	24		mJ
			$T_j = 125^\circ\text{C}$	48		

## 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		0.16		
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, I <sub>isol</sub> <1mA, 50/60Hz	3500			V	
T <sub>J</sub>	Operating junction temperature range	-40		150	°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

