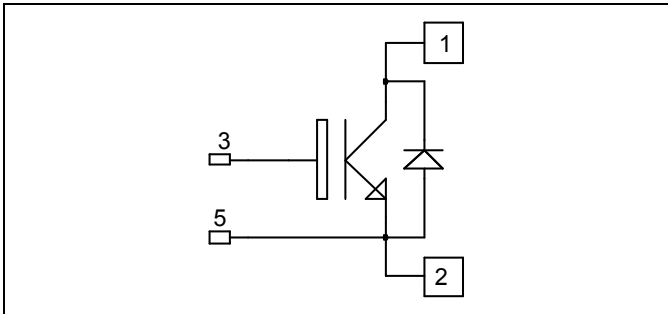


*Single switch
Trench + Field Stop IGBT
Power Module*

**$V_{CES} = 1700V$
 $I_C = 400A @ T_c = 80^\circ C$**

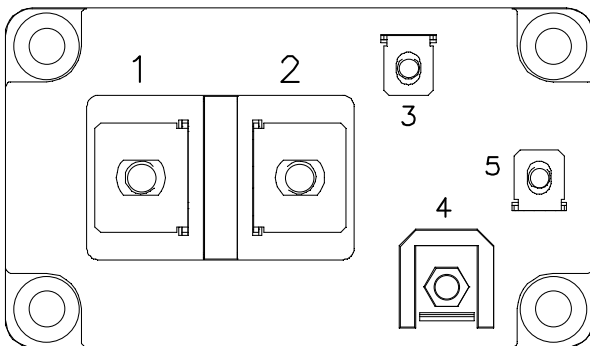

Application

- 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
- M6 connectors for power
- M4 connectors for signal
- 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 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	$T_C = 25^\circ C$	800
		$T_C = 80^\circ C$	400
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	800
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	2080
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	800A@1650V

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	$V_{GE} = 0\text{V}, V_{CE} = 1700\text{V}$			5	mA
$V_{CE(sat)}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 400\text{A}$	$T_j = 25^\circ\text{C}$	2.0	2.4	V
			$T_j = 125^\circ\text{C}$	2.4		
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 16\text{ mA}$	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	$V_{GE} = 0\text{V}, V_{CE} = 25\text{V}$		33		nF
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		1.2		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}, I_C = 400\text{A}$ $V_{CE} = 900\text{V}$		4.6		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 400\text{A}$ $R_G = 3.6\Omega$		250		ns
T_r	Rise Time			100		
$T_{d(off)}$	Turn-off Delay Time			850		
T_f	Fall Time			120		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$ $I_C = 400\text{A}$ $R_G = 3.6\Omega$		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	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 900\text{V}$	$T_j = 125^\circ\text{C}$	135		mJ
E_{off}	Turn Off Energy	$I_C = 400\text{A}$ $R_G = 3.6\Omega$		$T_j = 125^\circ\text{C}$	125	
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}; V_{Bus} = 1000\text{V}$ $t_p \leq 10\mu\text{s}; T_j = 125^\circ\text{C}$		1600		A

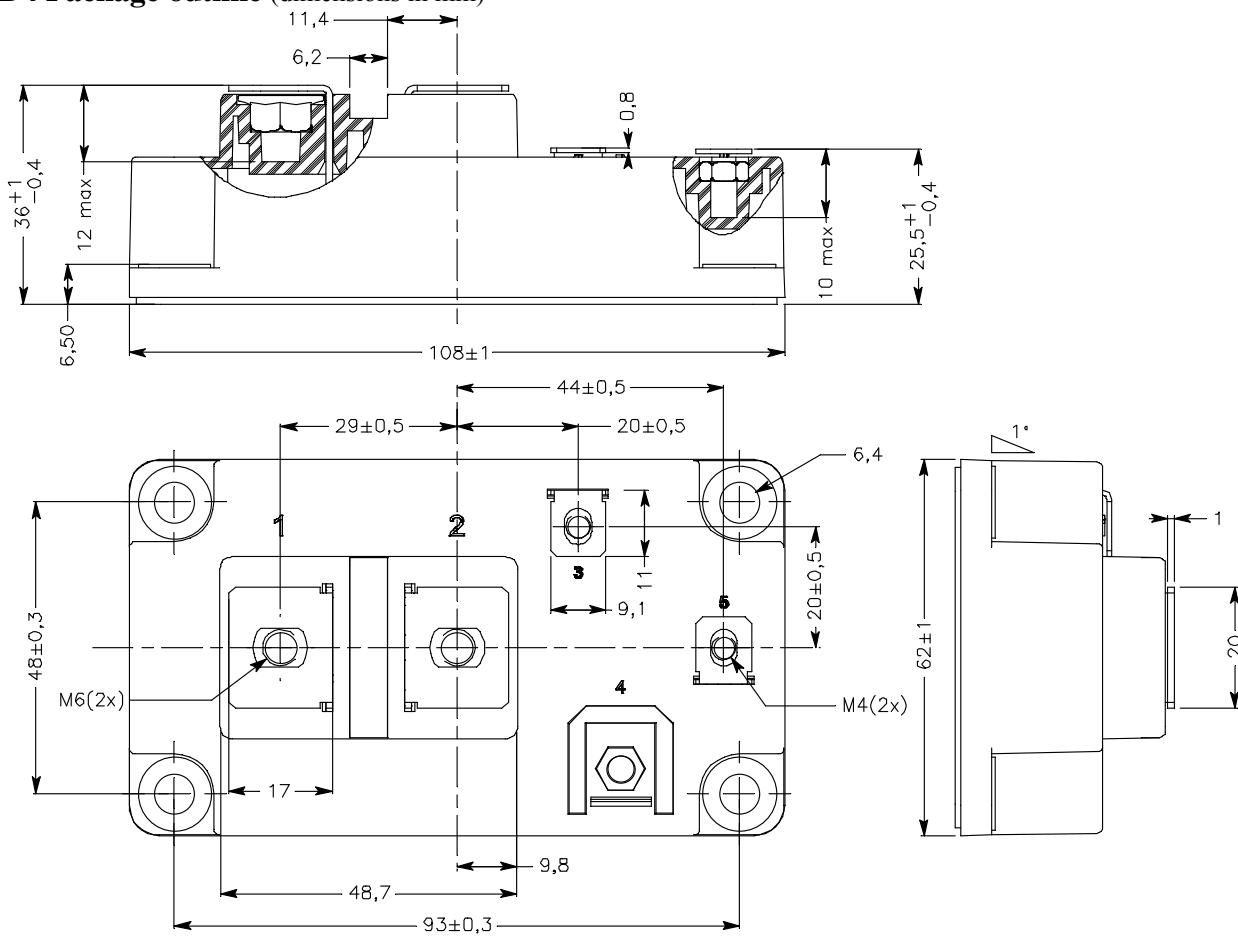
Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1700			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1700\text{V}$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC forward current		$T_C = 80^\circ\text{C}$	400		A
V_F	Diode Forward Voltage	$I_F = 400\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$	1.8	2.2	V
			$T_j = 125^\circ\text{C}$	1.9		
E_{rr}	Reverse Recovery Energy	$I_F = 400\text{A}$ $V_R = 900\text{V}$ $di/dt = 4200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	50		mJ
			$T_j = 125^\circ\text{C}$	96		
t_{rr}	Reverse Recovery Time		$T_j = 25^\circ\text{C}$	420		ns
			$T_j = 125^\circ\text{C}$	525		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	100		μC
			$T_j = 125^\circ\text{C}$	170		

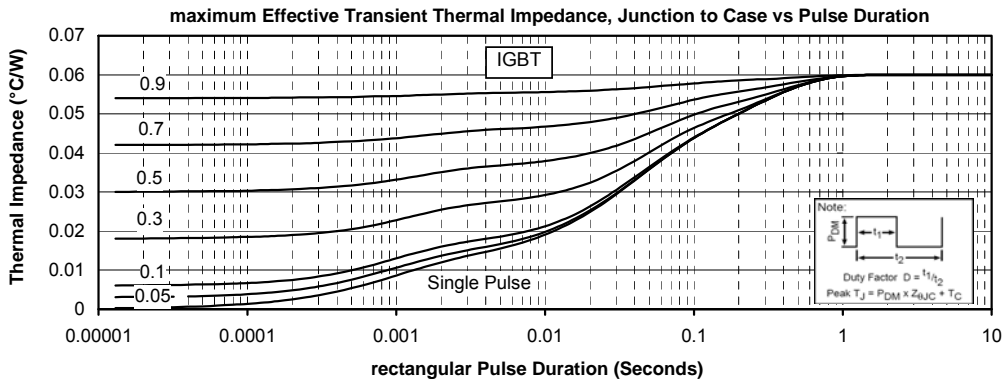
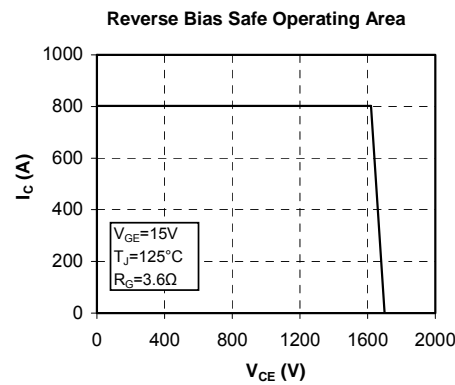
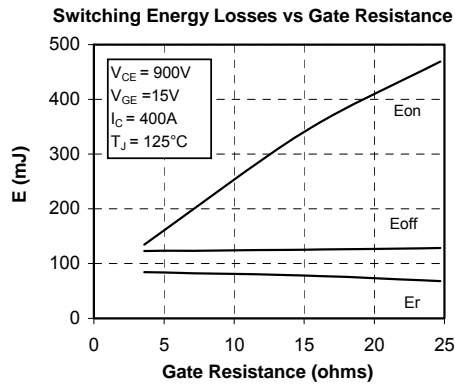
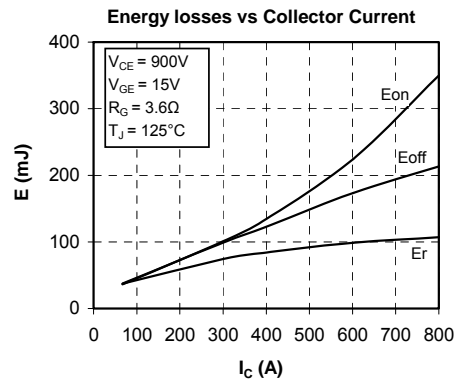
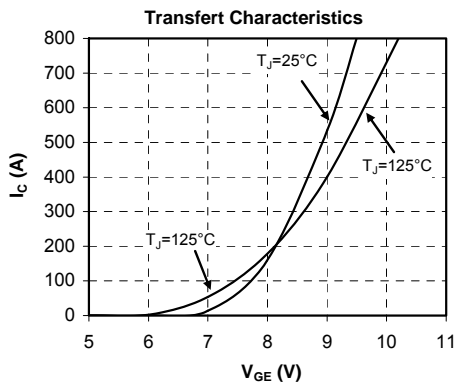
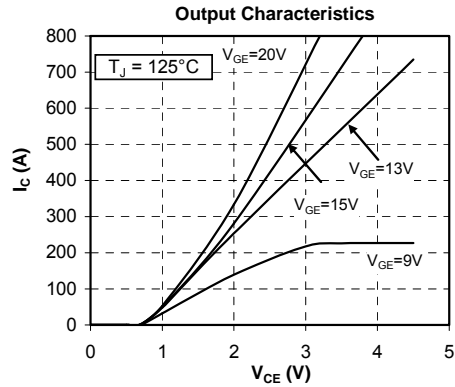
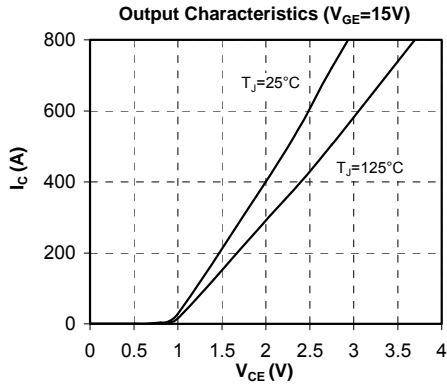
Thermal and package characteristics

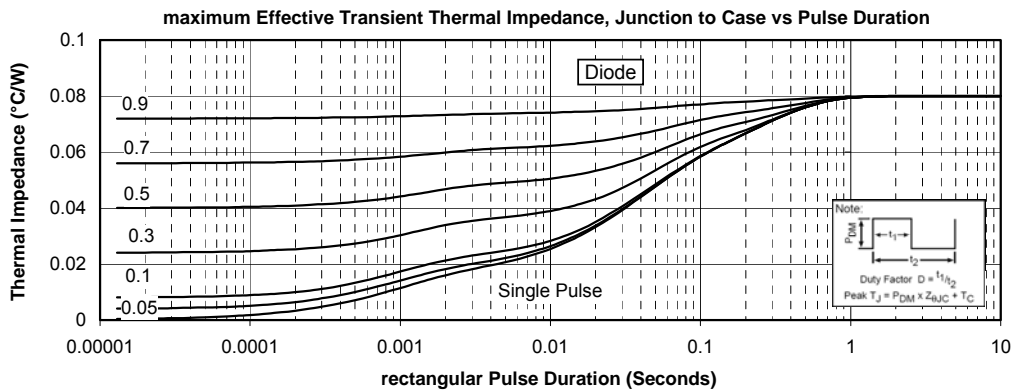
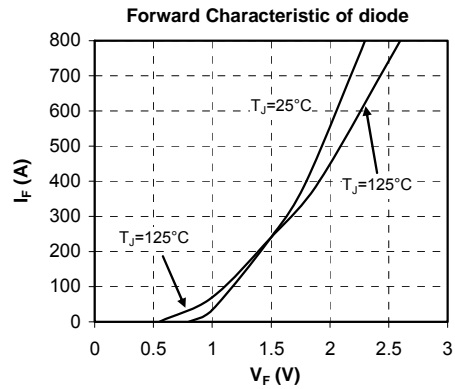
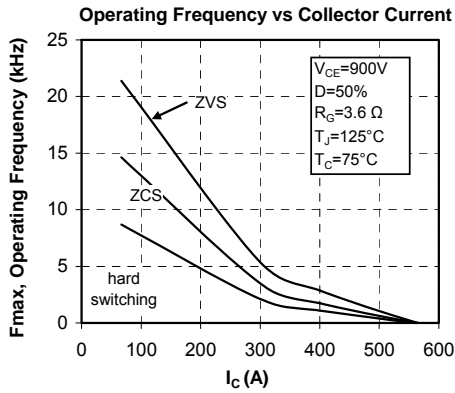
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT		0.06	°C/W
		Diode		0.08	
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{isol}<1$ mA, 50/60Hz	3500			V
T_J	Operating junction temperature range	-40		150	°C
T_{STG}	Storage Temperature Range	-40		125	
T_C	Operating Case Temperature	-40		125	
Torque	Mounting torque	M6	3	5	N.m
		M4	1	2	
Wt	Package Weight			350	g

D4 Package outline (dimensions in mm)



Typical Performance Curve





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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9