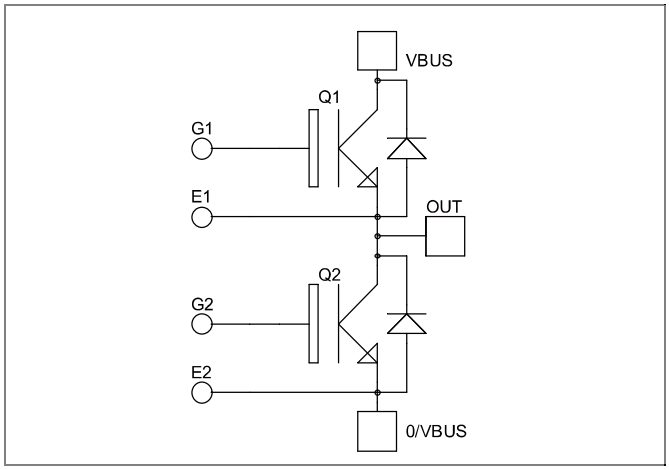
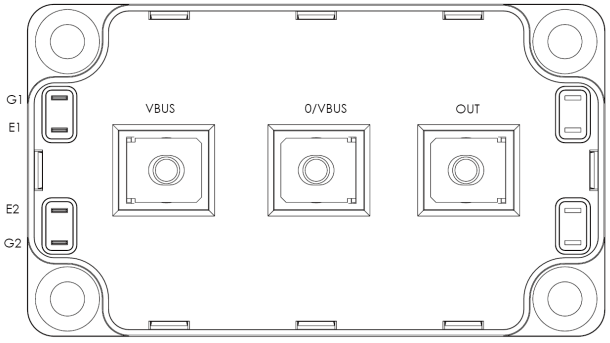
01

V_{CES} = 1200V
I_C=300A @T_C=80°C





Phase leg
Fast Trench + Field Stop IGBT3
Power Module

Application

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

Features

- Fast Trench + Field Stop IGBT3 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
- Very low stray inductance
  - -Symmetrical design
  - -M5 power connectors
- 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 TC of VCEsat
- 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°C	420	A
		T_C = 80°C	300	
I_{CM}	Pulsed Collector Current	T_C = 25°C	600	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	1380	W
RBSOA	Reverse Bias Safe Operating Area	T_j = 125°C	600A @ 1100V	

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

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Electrical Characteristics (All ratings @ T_j = 25°C unless otherwise specified)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V, V_{CE} = 1200V				500	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	V_{GE} =15V, I_C = 300A,	T_j = 25°C	1.4	1.7	2.1	V
			T_j = 125°C		2.0		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE}, I_C = 4 mA		5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	V_{GE} = 20V, V_{CE} = 0V				600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	V_{GE} = 0V, V_{CE} = 25V, f = 1MHz			21		nF
C_{oes}	Output Capacitance				1.2		
C_{res}	Reverse Transfer Capacitance				0.9		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C), V_{GE} = ±15V, V_{Bus} = 600V, I_C = 300A, R_G = 1.8Ω			260		ns
T_r	Rise Time				30		
$T_{d(off)}$	Turn-off Delay Time				420		
T_f	Fall Time				70		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C), V_{GE} = ±15V, V_{Bus} = 600V, I_C = 300A, R_G = 1.8Ω			290		ns
T_r	Rise Time				50		
$T_{d(off)}$	Turn-off Delay Time				520		
T_f	Fall Time				90		
E_{on}	Turn on Energy	V_{GE} = ±15V, V_{Bus} = 600V, I_C = 300A, R_G = 1.8Ω	T_j = 125°C		30		mJ
E_{off}	Turn off Energy		T_j = 125°C		30		

Reverse diode ratings and characteristics

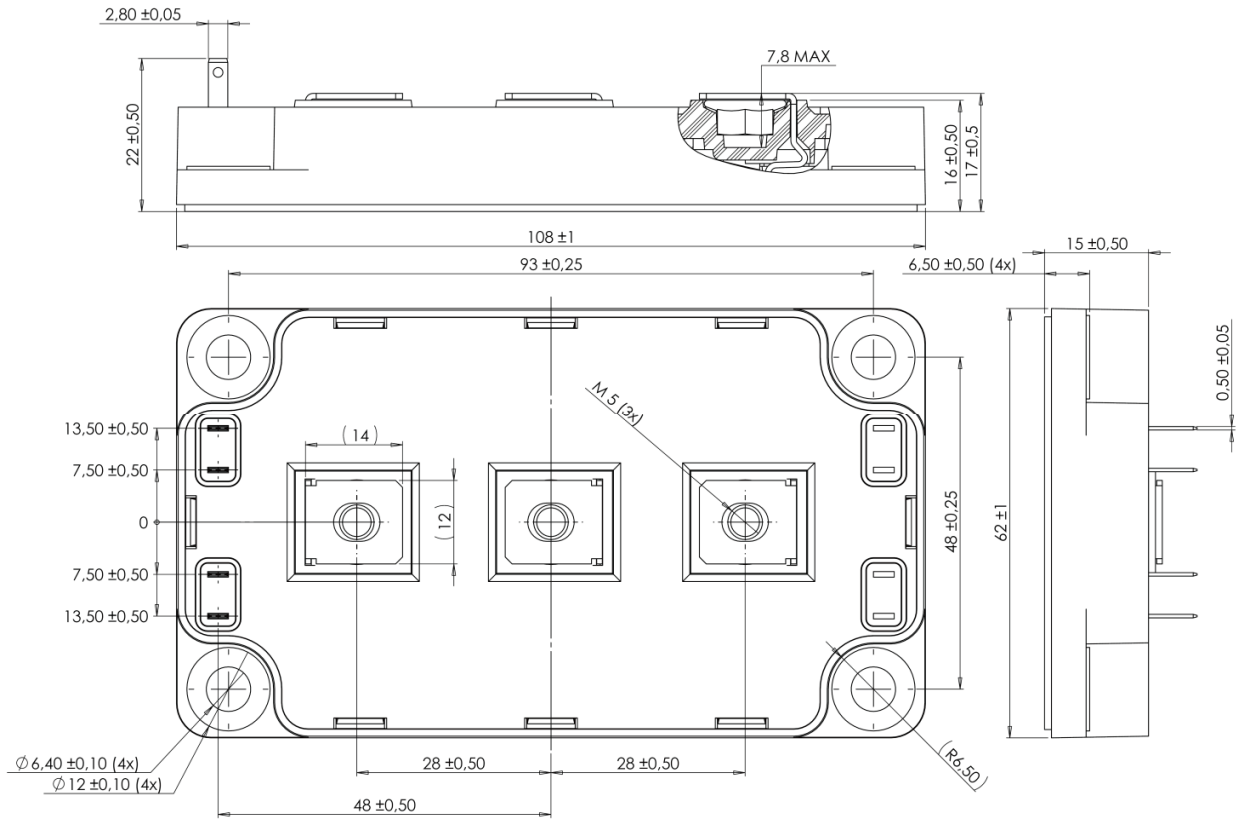
Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V
I_{RM}	Maximum Reverse Leakage Current	V_R=1200V	T_j= 25°C			500	μA
			T_j= 125°C			700	
I_F	DC Forward Current		T_c= 80°C		300		A
V_F	Diode Forward Voltage	I_F = 300A, V_{GE} = 0V	T_j= 25°C		1.6	2.1	V
			T_j= 125°C		1.6		
t_{rr}	Reverse Recovery Time	I_F = 300A V_R = 600V, di/dt =3000A/μs	T_j= 25°C		170		ns
			T_j= 125°C		280		
Q_{rr}	Reverse Recovery Charge		T_j= 25°C		27		μC
			T_j= 125°C		54		
E_r	Reverse Recovery Energy		T_j= 25°C		15		mJ
			T_j= 125°C		27		

03

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance		IGBT			0.09	°C/W
			Diode			0.17	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T_J	Operating junction temperature range			-40		150	°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

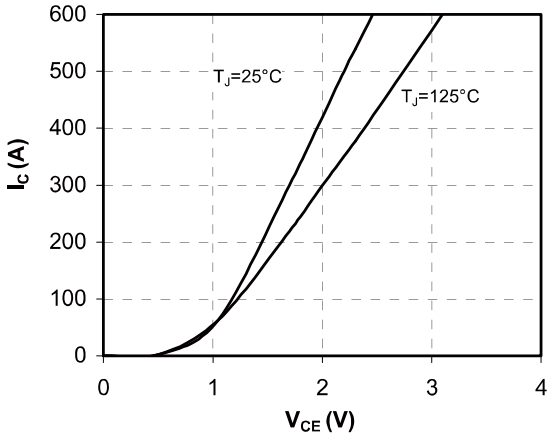
SP6 Package outline (dimensions in mm)



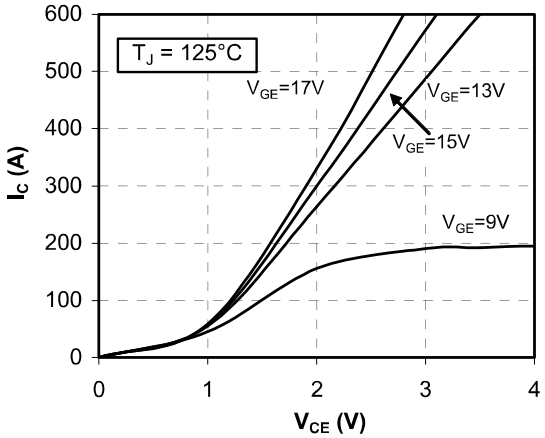
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Typical Performance Curve

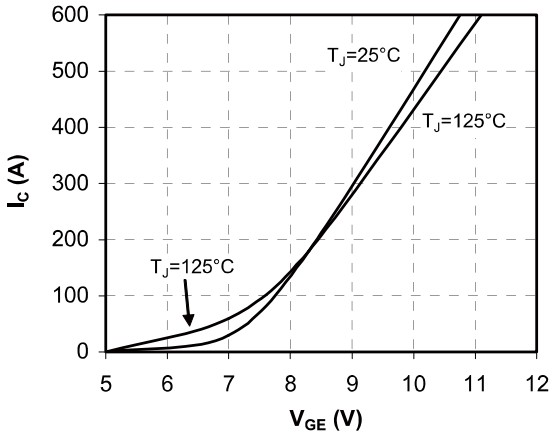
Output Characteristics (V_{GE}=15V)



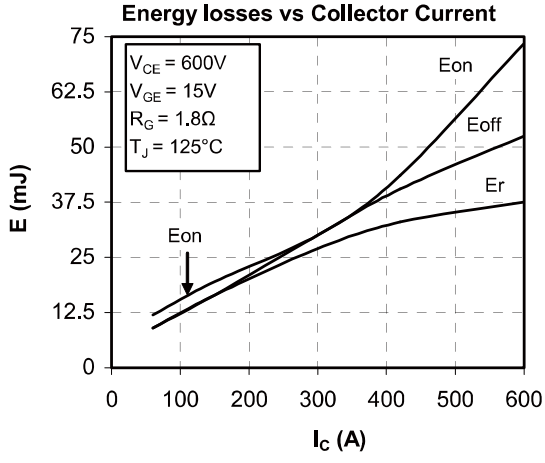
Output Characteristics



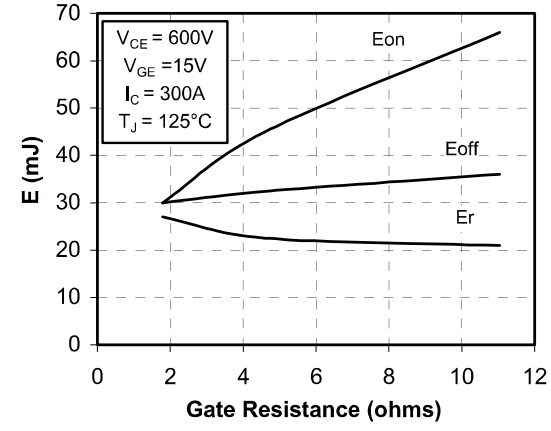
Transfert Characteristics



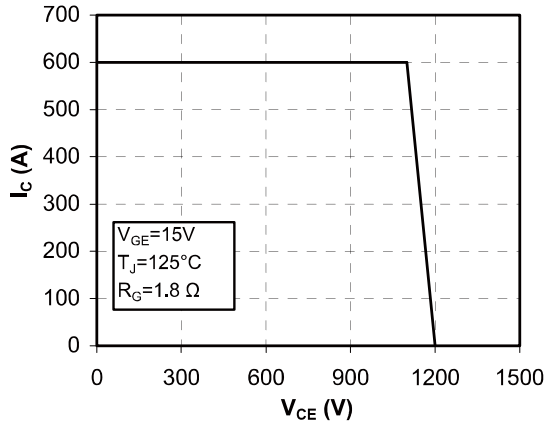
Energy losses vs Collector Current



Switching Energy Losses vs Gate Resistance

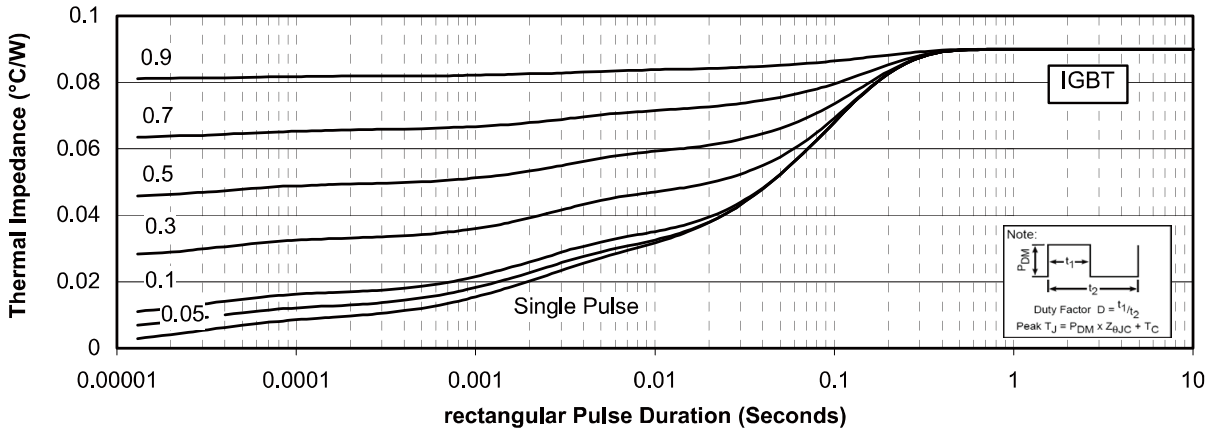


Reverse Bias Safe Operating Area

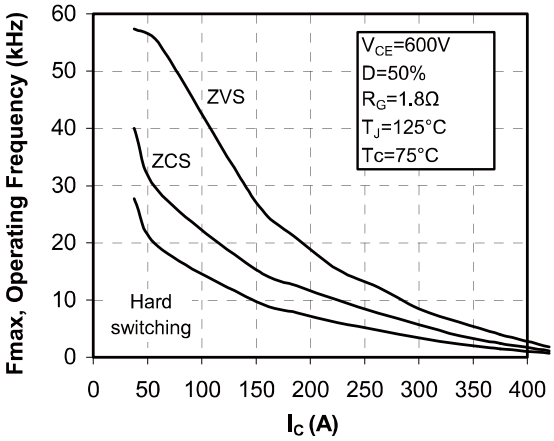


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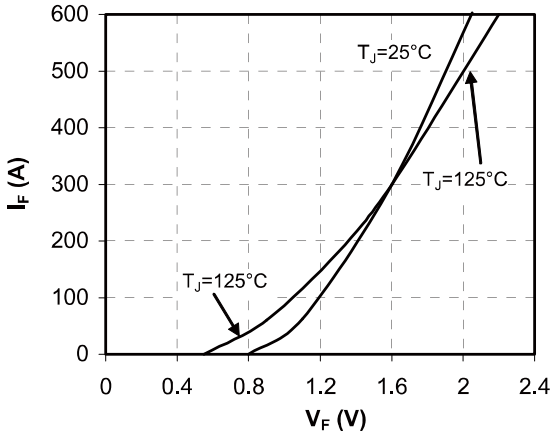
maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



Operating Frequency vs Collector Current



Forward Characteristic of diode



maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration

