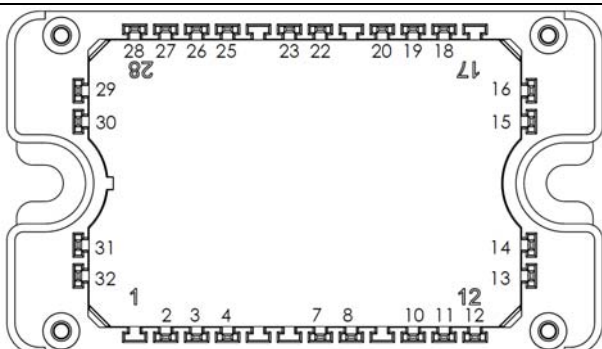
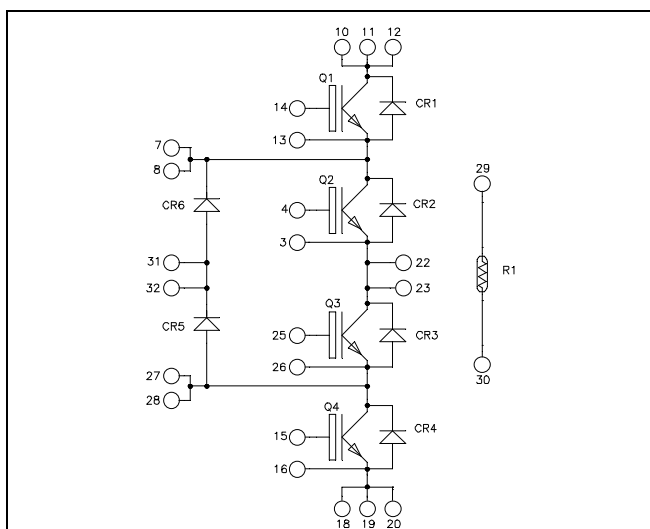


Three level inverter Trench + Field Stop IGBT3 Power Module

$V_{CES} = 600V$
 $I_C = 100A @ T_c = 80^\circ C$



All multiple inputs and outputs must be shorted together
 Example: 10/11/12 ; 7/8 ...

Application

- Solar converter
- Uninterruptible Power Supplies

Features

- Trench + Field Stop IGBT3
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Low leakage current
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring

Benefits

- 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

Q1 to Q4 Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$ 150	A
		$T_C = 80^\circ C$ 100	
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$ 200	
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Power Dissipation	$T_C = 25^\circ C$ 340	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$ 200A @ 550V	

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

Q1 to Q4 Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 600V$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 100A$		1.5 1.7	1.9	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1.5 mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			400	nA

Q1 to Q4 Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		6100		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		390		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		190		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 100A$ $V_{CE} = 300V$		1.1		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 100A$ $R_G = 3.3\Omega$		115		ns
T_r	Rise Time			45		
$T_{d(off)}$	Turn-off Delay Time			225		
T_f	Fall Time			55		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 300V$ $I_C = 100A$ $R_G = 3.3\Omega$		130		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			300		
T_f	Fall Time			70		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$		0.875		mJ
E_{off}	Turn off Energy	$I_C = 100A$ $R_G = 3.3\Omega$		3.5		mJ
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 360V$ $t_p \leq 6\mu s; T_j = 150^\circ C$		500		A
R_{thJC}	Junction to Case Thermal Resistance				0.44	$^\circ C/W$

CR1 to CR4 diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage				600	V
I_{RM}	Reverse Leakage Current	$V_R = 600V$			150	μA
I_F	DC Forward current	$T_c = 80^\circ C$		75		A
V_F	Diode Forward Voltage	$I_F = 75A$ $V_{GE} = 0V$		1.6 1.5	2	V
t_{rr}	Reverse Recovery Time	$I_F = 75A$ $V_R = 300V$ $di/dt = 2000A/\mu s$		100 150		ns
Q_{rr}	Reverse Recovery Charge			3.6 7.6		μC
E_{rr}	Reverse Recovery Energy			0.85 1.8		mJ
R_{thJC}	Junction to Case Thermal Resistance				0.98	$^\circ C/W$

CR5 & CR6 diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
V _{RRM}	Peak Repetitive Reverse Voltage					600	V	
I _{RM}	Reverse Leakage Current	V _R =600V				150	μA	
I _F	DC Forward Current		T _c = 80°C		100		A	
V _F	Diode Forward Voltage	I _F = 100A V _{GE} = 0V	T _j = 25°C		1.6	2	V	
			T _j = 150°C		1.5			
t _{rr}	Reverse Recovery Time	I _F = 100A V _R = 300V di/dt =2000A/μs	T _j = 25°C		125		ns	
			T _j = 150°C		220			
Q _{rr}	Reverse Recovery Charge		T _j = 25°C		4.7		μC	
			T _j = 150°C		9.9			
E _{rr}	Reverse Recovery Energy		T _j = 25°C		1.1		mJ	
			T _j = 150°C		2.4			
R _{thJC}	Junction to Case Thermal Resistance					0.77	°C/W	

Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

Symbol	Characteristic	Min	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000		V
T _J	Operating junction temperature range	-40	175	°C
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25	
T _{STG}	Storage Temperature Range	-40	125	
T _C	Operating Case Temperature	-40	125	
Torque	Mounting torque	To heatsink	M4	N.m
Wt	Package Weight		110	g

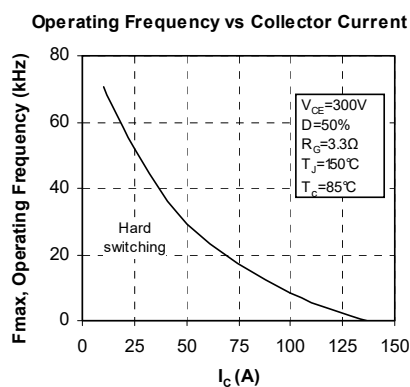
Technical drawing of a mechanical part, showing three views: front, top, and side.

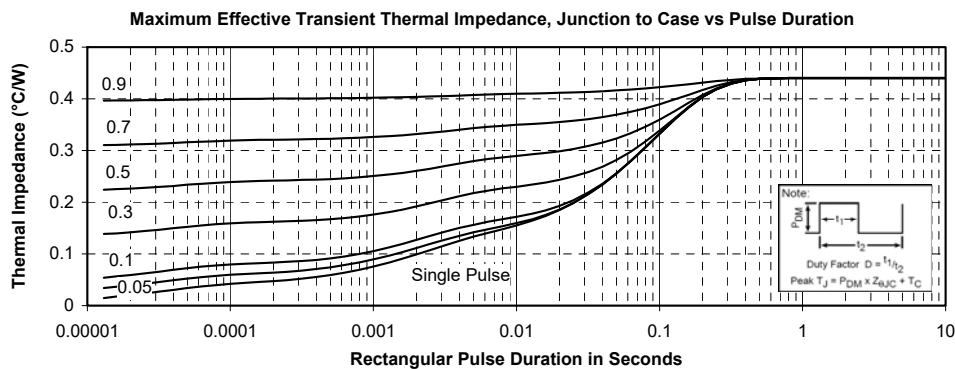
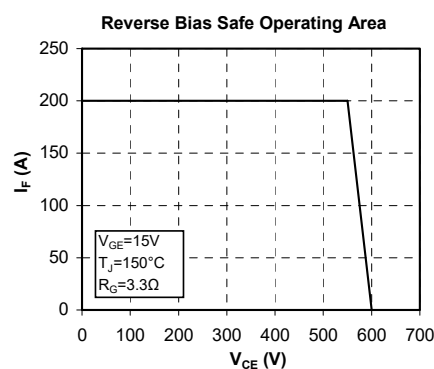
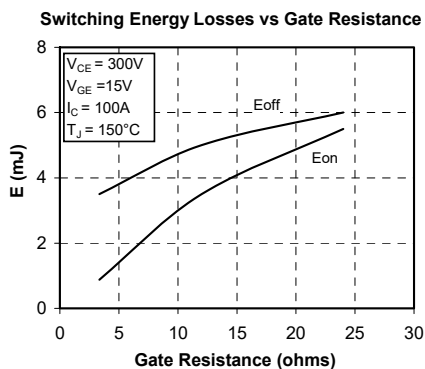
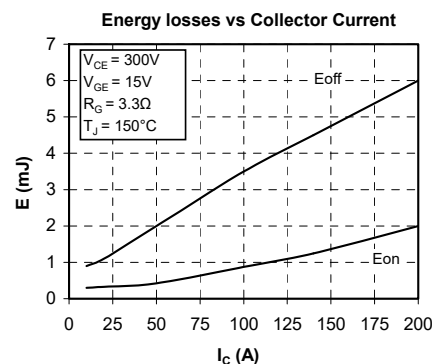
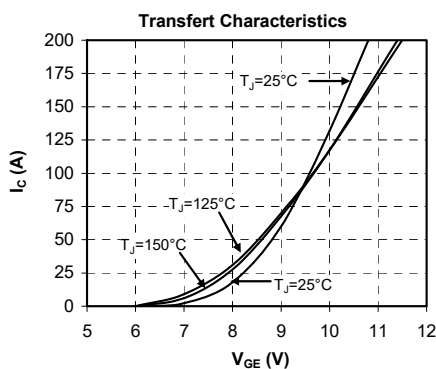
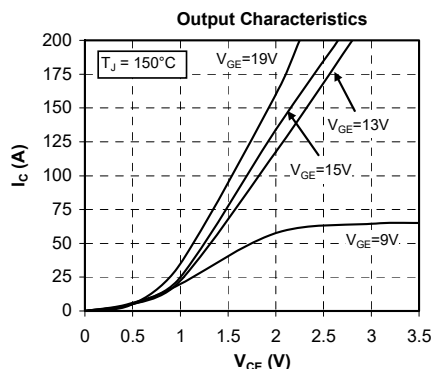
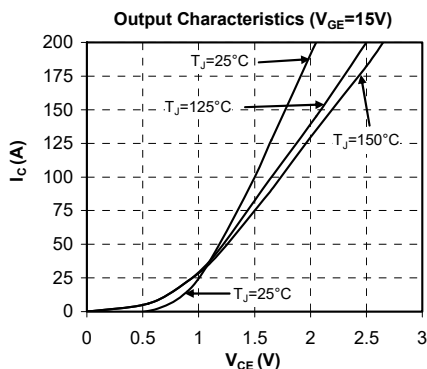
Front View (Top): Shows a long rectangular part with 12 pins. Dimensions include a total length of 73.40 ± 0.50 , a pin pitch of 4.10 ± 0.50 , and a pin diameter of $\phi 4.50 \pm 0.10$. The part has a width of 12 ± 0.10 and a height of 7 ± 0.20 . The pins are numbered 1 through 12.

Top View (Bottom): Shows a rectangular part with rounded corners. Dimensions include a total width of 60 ± 0.50 and 64 ± 0.20 , and a total height of 36.50 ± 0.50 . The part has a corner radius of $R2.25$ and a fillet radius of $R5 \pm 0.10$. The part is labeled with numbers 1, 12, 17, and 28.

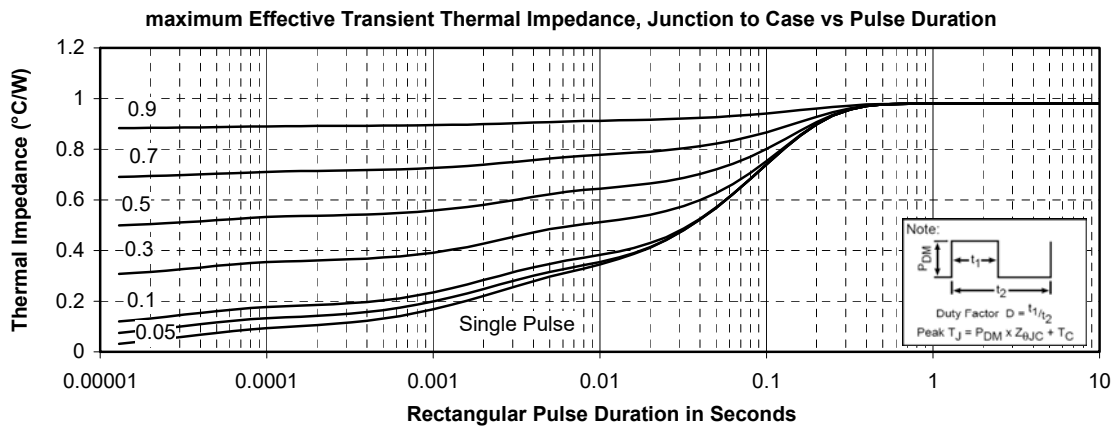
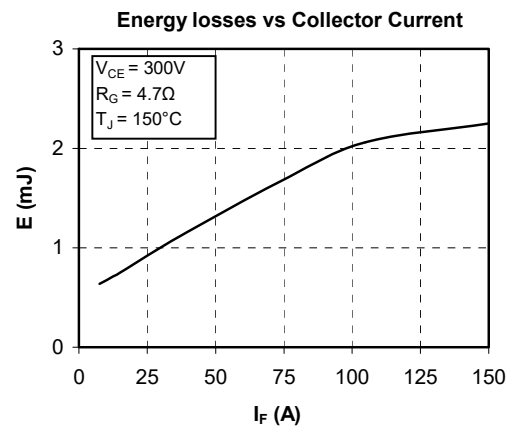
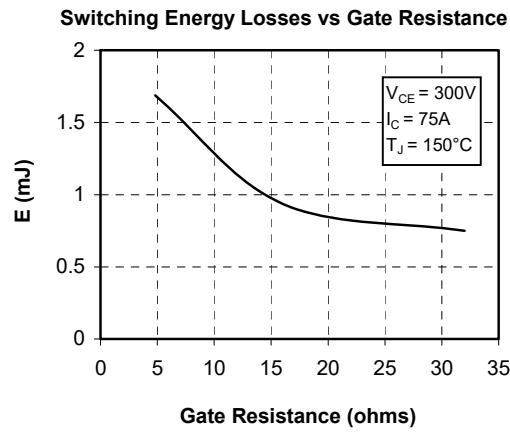
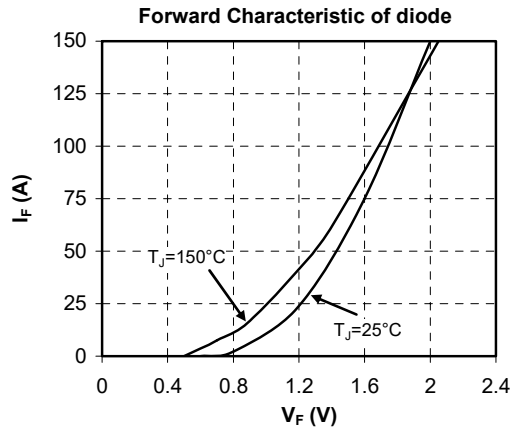
Side View (Right): Shows the profile of the part. Dimensions include a total height of 42.50 ± 0.50 , a top flange width of 17.80 ± 0.50 , and a bottom flange width of 2.50 ± 0.05 . The part has a thickness of 0.80 ± 0.05 and a pin diameter of $\phi 2 \pm 0.10$. The pins are numbered 1 through 12.

Q1 to Q4 Typical performance curve

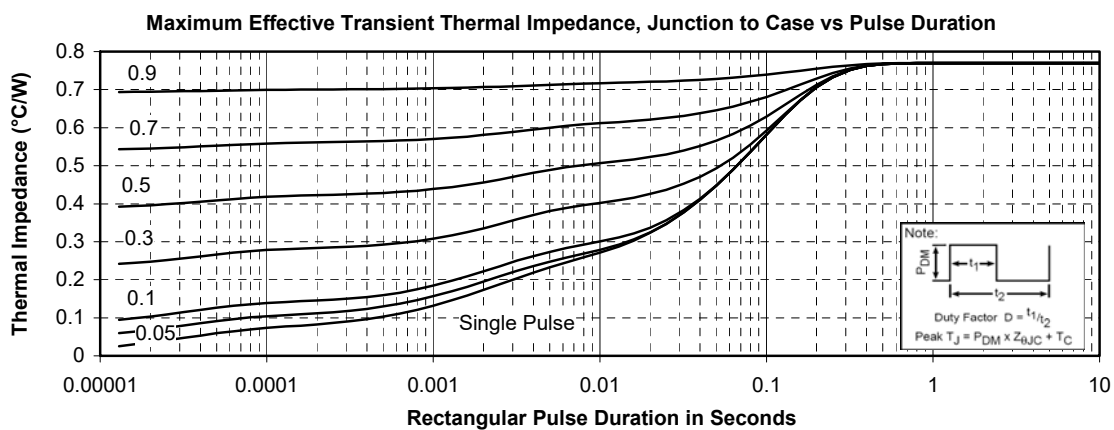
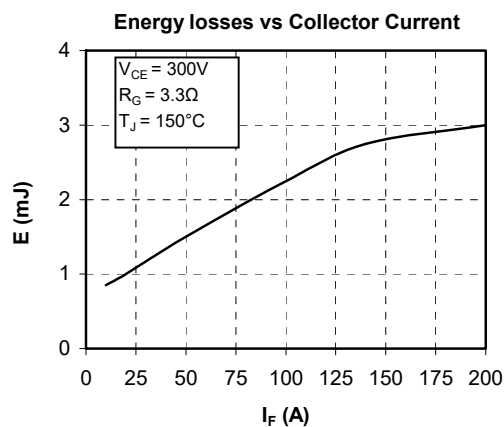
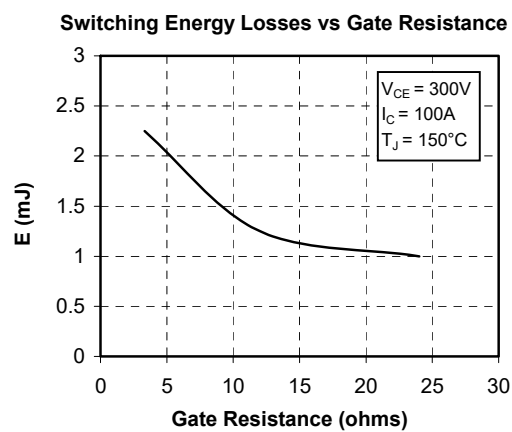
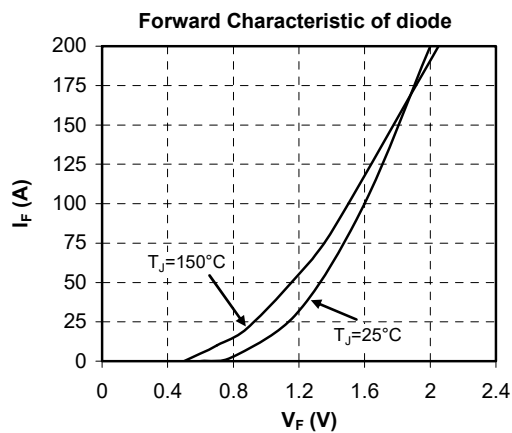




CR1 to CR4 Typical performance curve



CR5 & CR6 Typical performance curve



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