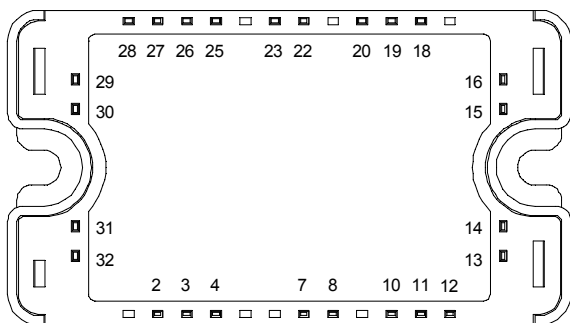
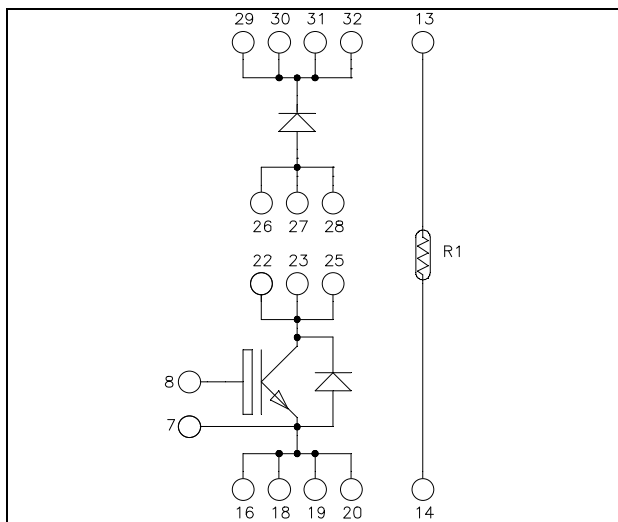


Boost chopper Trench + Field Stop IGBT3 Power Module

$$V_{CES} = 600V$$

$$I_C = 200A @ T_c = 100^\circ C$$



Pins 29/30/31/32 must be shorted together
 Pins 26/27/28/22/23/25 must be shorted together
 to achieve a phase leg
 Pins 16/18/19/20 must be shorted together

Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

Features

- 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
- Very low stray inductance
- Kelvin emitter for easy drive
- Internal thermistor for temperature monitoring
- High level of integration
- AlN substrate for improved thermal performance

Benefits

- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$ 290 $T_C = 100^\circ C$ 200	A
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$ 400	A
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$ 750	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$ 400A @ 550V	

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	$V_{GE} = 0\text{V}$, $V_{CE} = 600\text{V}$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$ $I_C = 200\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.5 1.7	1.9	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 2\text{mA}$	5.0	5.8	6.5	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	$V_{GE} = 0\text{V}$		12.3		nF
C_{oes}	Output Capacitance	$V_{CE} = 25\text{V}$		0.8		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		0.4		
Q_G	Gate charge	$V_{GE} = \pm 15\text{V}$; $V_{CE} = 300\text{V}$ $I_C = 200\text{A}$		2.2		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 2\Omega$		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) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$ $R_G = 2\Omega$		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	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 200\text{A}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1 1.8		mJ
E_{off}	Turn off Energy	$R_G = 2\Omega$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	5.7 7		
I_{sc}	Short Circuit data	$V_{GE} \leq 15\text{V}$; $V_{Bus} = 360\text{V}$ $t_p \leq 6\mu\text{s}$; $T_j = 150^\circ\text{C}$		1000		A

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$		250 500	μA
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$	200		A
V_F	Diode Forward Voltage	$I_F = 200\text{A}$ $V_{GE} = 0\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.6 1.5	2	V
t_{rr}	Reverse Recovery Time	$I_F = 200\text{A}$ $V_R = 300\text{V}$ $di/dt = 2800\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	125 220		ns
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	9 20		
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	2.2 4.8		mJ

Thermal and package characteristics

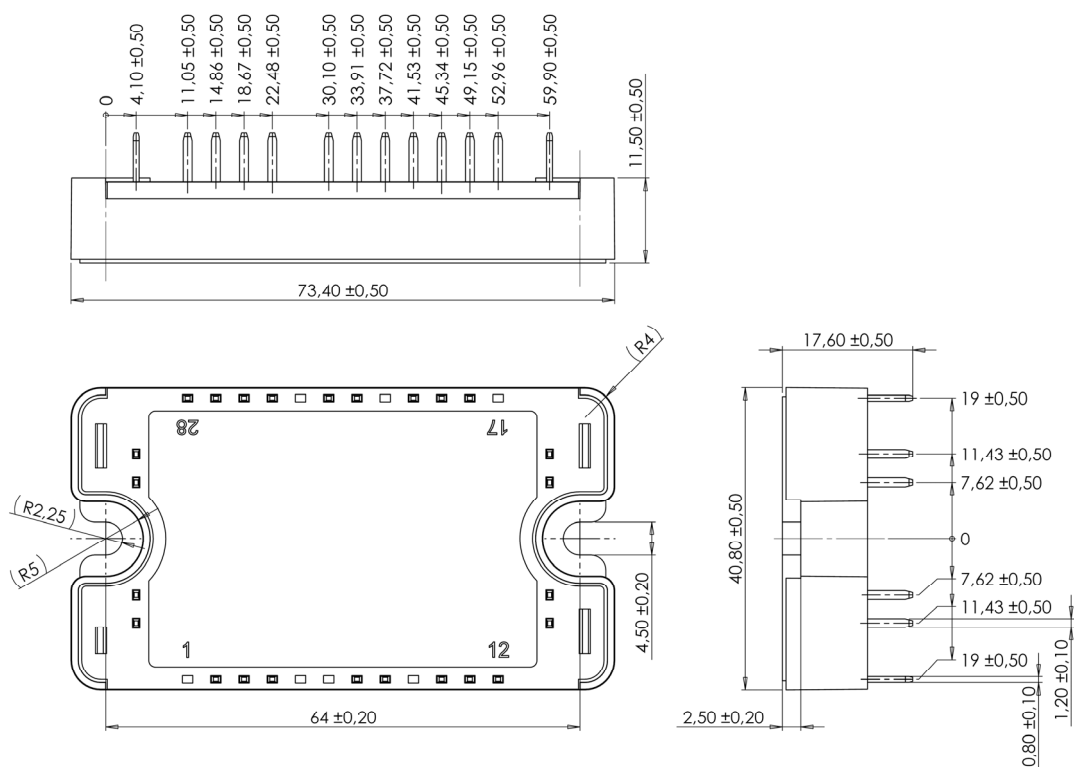
Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT		0.20	°C/W
		Diode		0.31	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000			V
T _J	Operating junction temperature range	-40		175	°C
T _{STG}	Storage Temperature Range	-40		125	
T _C	Operating Case Temperature	-40		100	
Torque	Mounting torque	To heatsink	M4	2	N.m
Wt	Package Weight			110	g

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		%

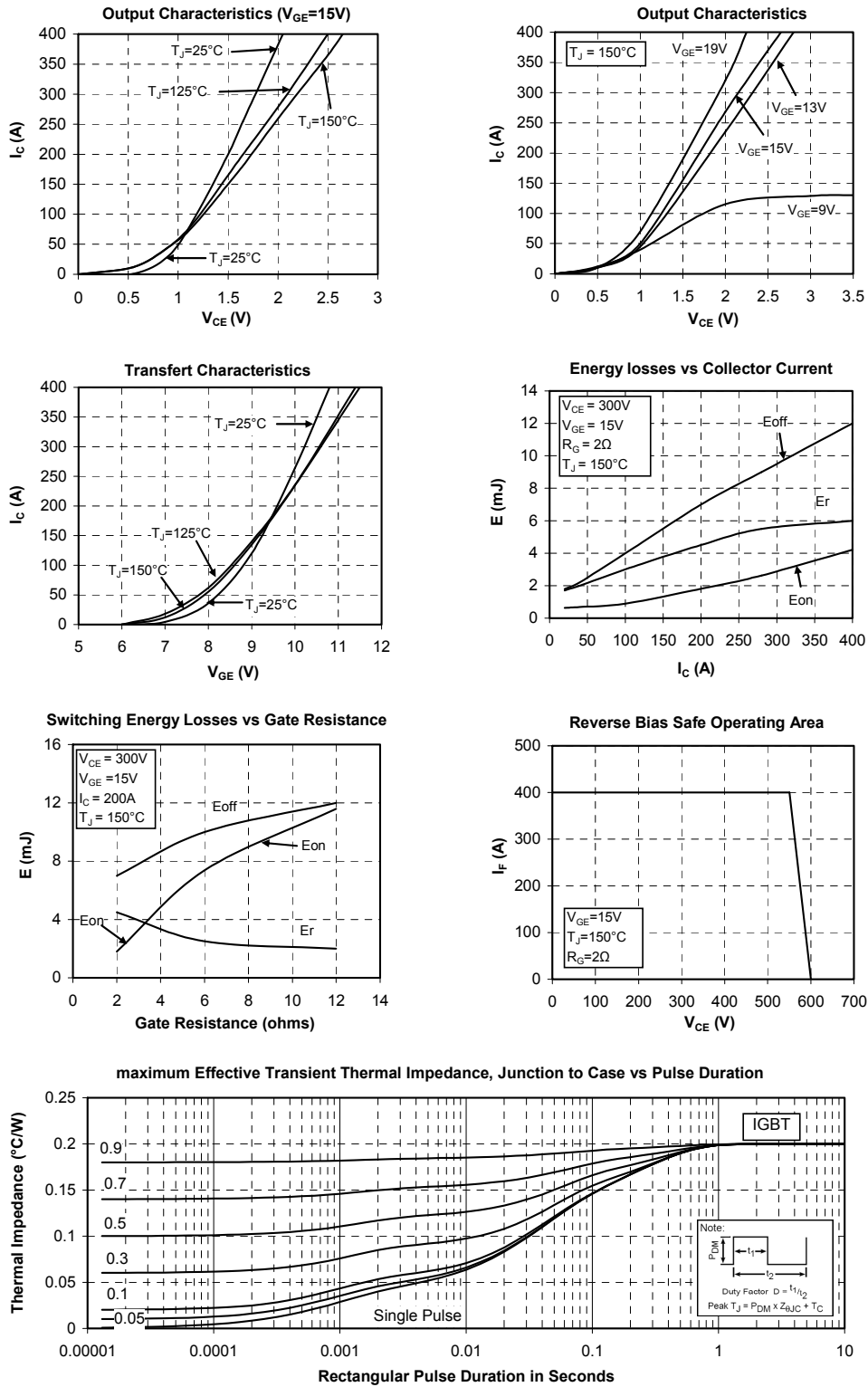
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

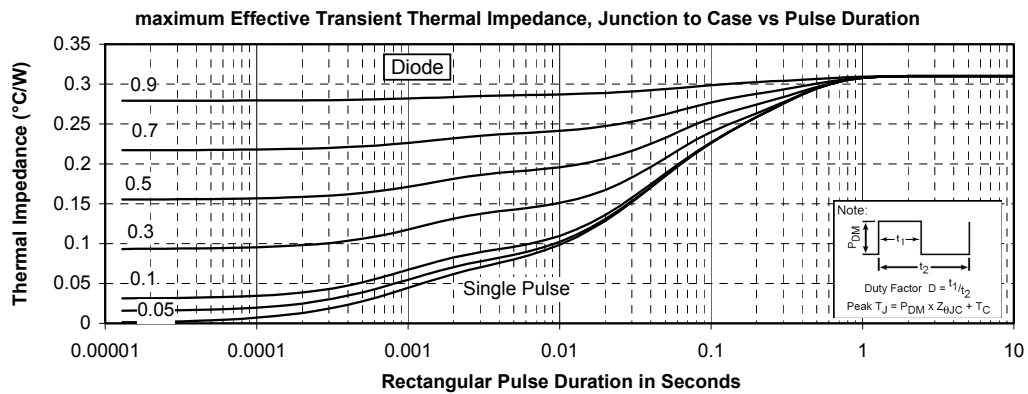
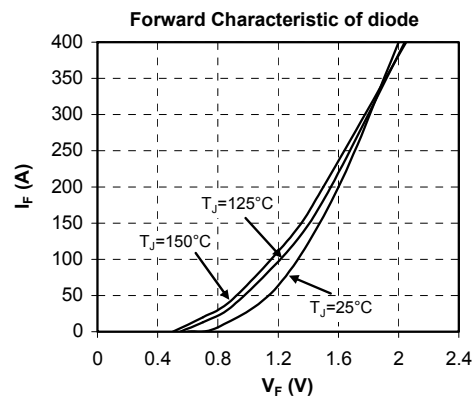
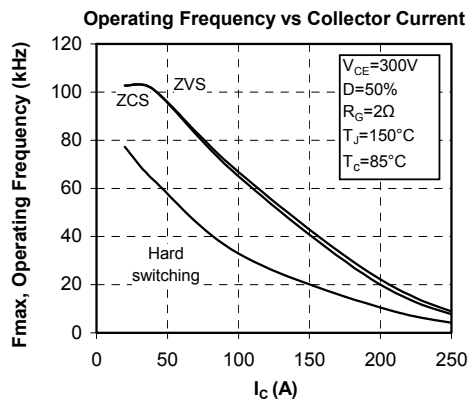
T: Thermistor temperature
R_T: Thermistor value at T

SP3 Package outline (dimensions in mm)


See application note 1901 - Mounting Instructions for SP3 Power Modules on www.microsemi.com

Typical Performance Curve





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