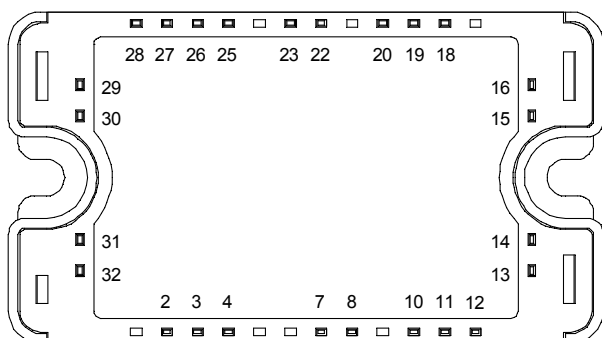
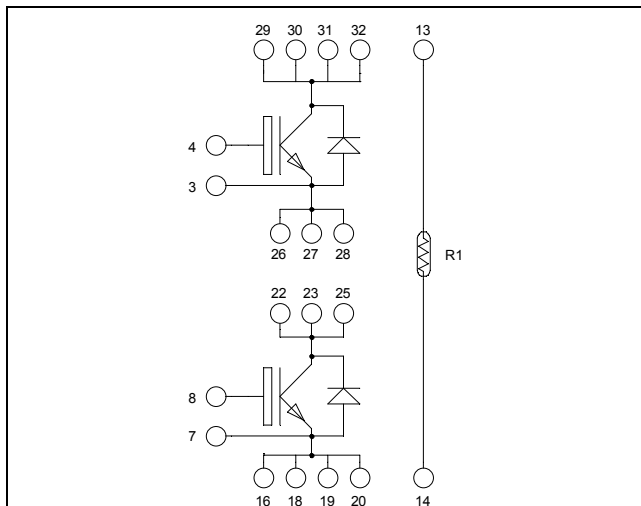


Phase leg
High speed Trench + Field Stop IGBT4
Power Module

$V_{CES} = 1200V$
 $I_C = 100A @ T_c = 100^\circ C$



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

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

Features

- **High speed Trench + Field Stop IGBT 4 Technology**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
 - RBSOA and SCSOA rated
- Kelvin emitter for easy drive
- Very low stray inductance
- High level of integration
- Internal thermistor for temperature monitoring
- AlN substrate for improved thermal performance

Benefits

- Outstanding performance at high frequency operation
- 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
- Easy paralleling due to positive TC of V_{CEsat}
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS compliant

All ratings @ $T_j = 25^\circ C$ unless otherwise specified

Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Voltage	1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	A
		$T_c = 100^\circ C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	375
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	650	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	200A @ 1100V

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.
 See application note APT0502 on www.microsemi.com

Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			50	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 100A$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	1.7 2.05 2.6	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 3.8 mA$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			150	nA

Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		6150		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		350		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		300		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 100A$ $V_{CE} = 960V$		450		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 5\Omega$		30		ns
T_r	Rise Time			57		
$T_{d(off)}$	Turn-off Delay Time			290		
T_f	Fall Time			16		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 5\Omega$		30		ns
T_r	Rise Time			49		
$T_{d(off)}$	Turn-off Delay Time			366		
T_f	Fall Time			48		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 100A$ $R_G = 5\Omega$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	7.7 9		mJ
E_{off}	Turn off Energy		$T_j = 25^\circ C$ $T_j = 150^\circ C$	2.9 5.4		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu s; T_j = 150^\circ C$		350		A
R_{thJC}	Junction to Case Thermal Resistance				0.23	°C/W

Diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage				1200	V
I_{RM}	Reverse Leakage Current	$V_R = 1200V$			150	μA
I_F	DC Forward Current	$T_c = 80^\circ C$		120		A
V_F	Diode Forward Voltage	$I_F = 120A$		2.6	3	V
		$I_F = 240A$		3		
		$I_F = 120A, T_j = 125^\circ C$		1.8		
t_{rr}	Reverse Recovery Time	$I_F = 120A$ $V_R = 800V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$	265		ns
			$T_j = 125^\circ C$	350		
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ C$	1120		nC
			$T_j = 125^\circ C$	5780		
R_{thJC}	Junction to Case Thermal Resistance				0.37	°C/W

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

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		%

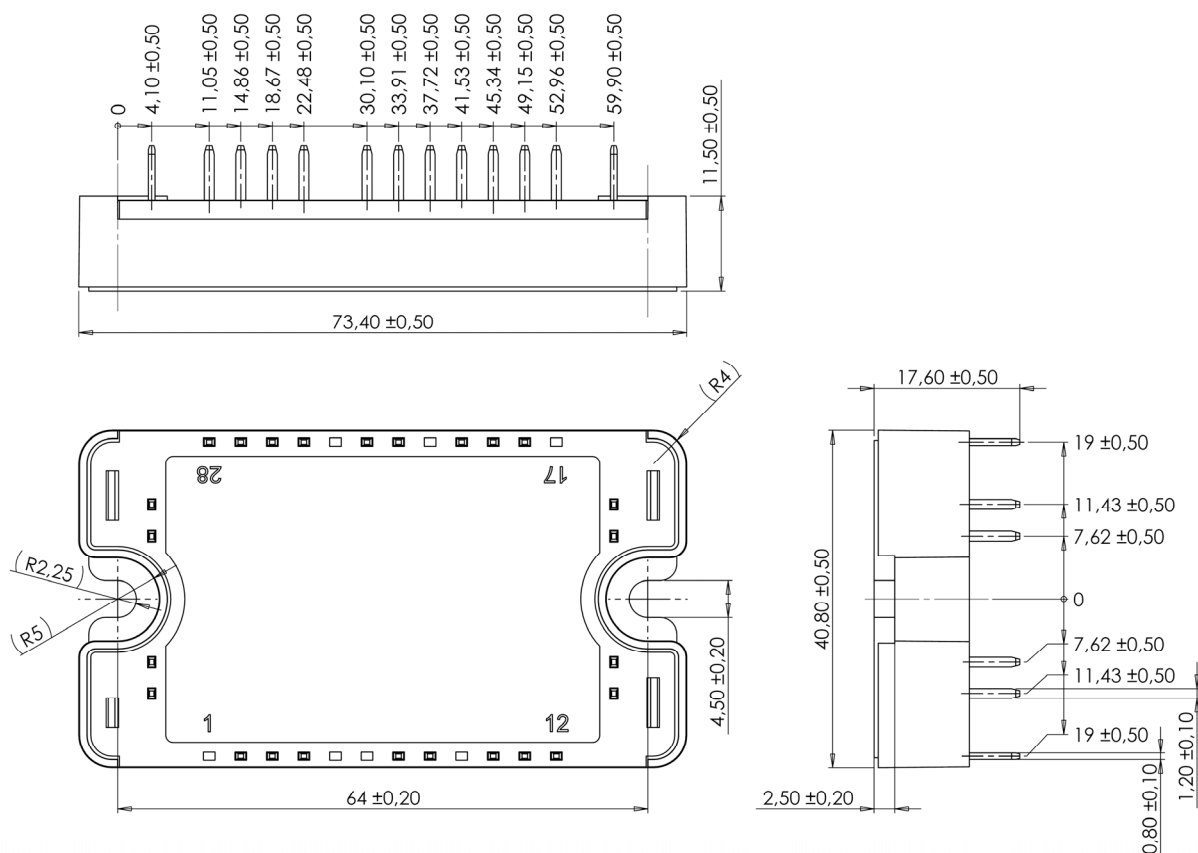
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

Thermal and package characteristics

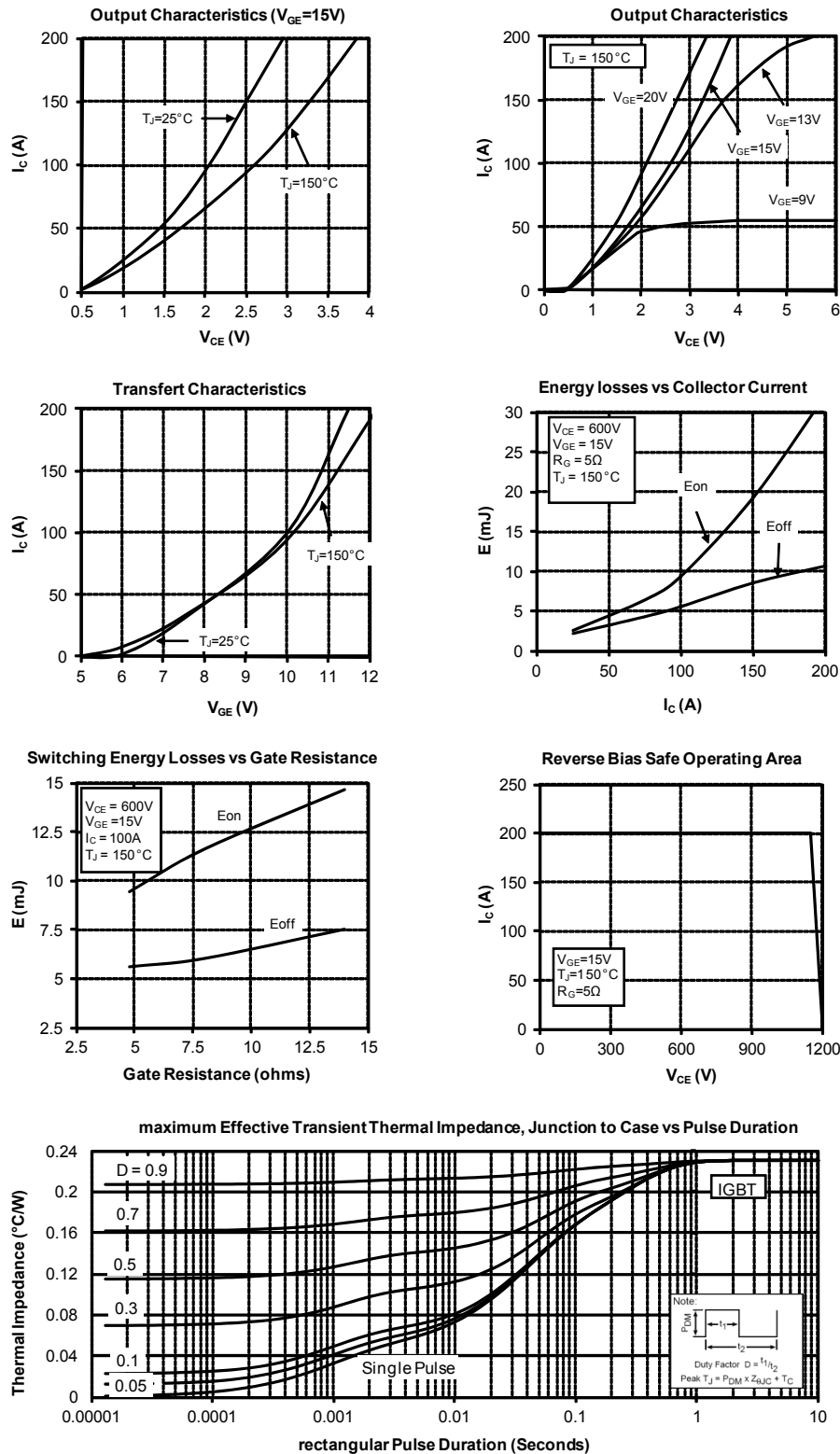
Symbol	Characteristic	Min	Max	Unit
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V
T _J	Operating junction temperature range	-40	175	°C
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25	
T _{STG}	Storage Temperature Range	-40	125	
T _C	Operating Case Temperature	-40	100	
Torque	Mounting torque	To heatsink	M4	N.m
Wt	Package Weight		110	g

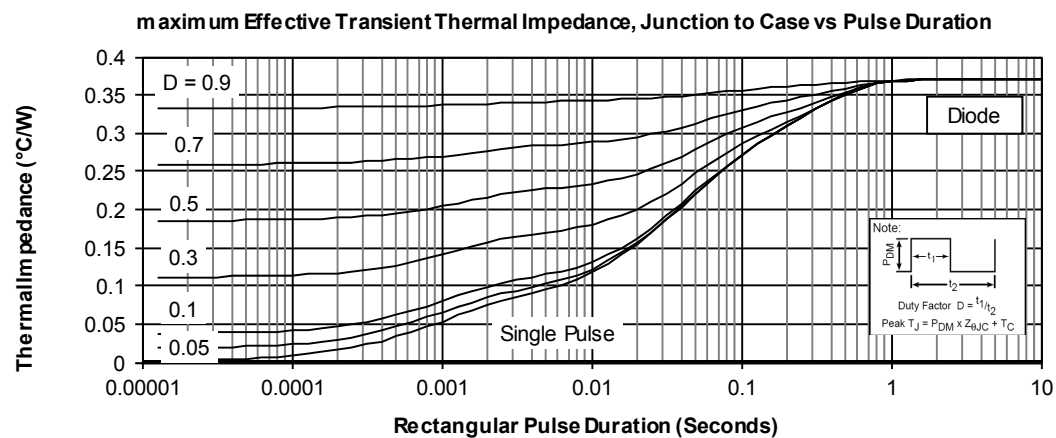
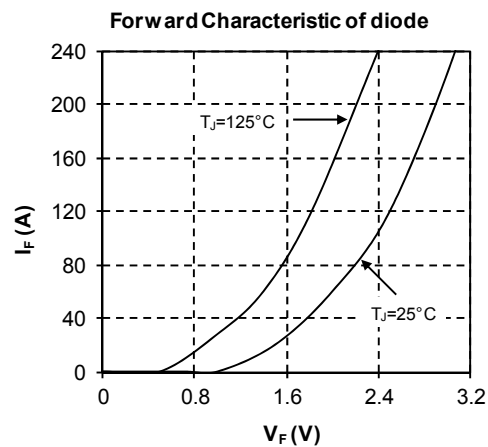
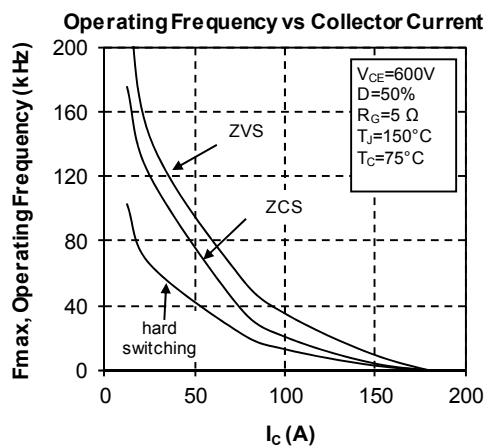
Package outline (dimensions in mm)



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

Typical performance curve





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