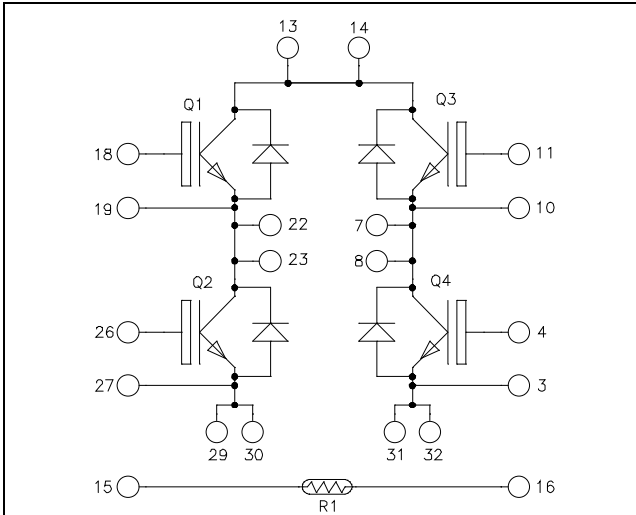


**Full bridge
High speed Trench + Field Stop IGBT4
Power Module**

**$V_{CES} = 1200V$
 $I_C = 75A @ T_c = 80^\circ C$**

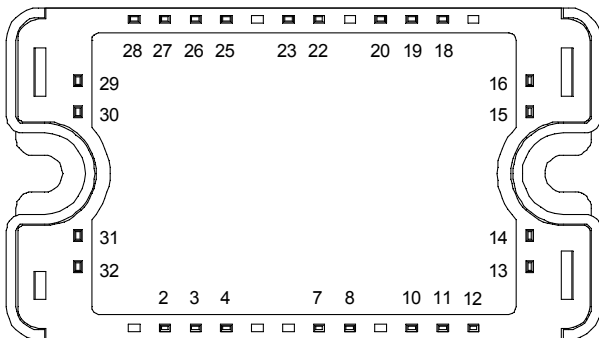


Application

- 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



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 VCEsat
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS compliant

All multiple inputs and outputs must be shorted together
 Example: 13/14 ; 29/30 ; 22/23 ...

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

Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	1200	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	130
		$T_c = 80^\circ C$	75
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	250
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	385	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	150A @ 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	$V_{GE} = 15V$ $I_C = 75A$	$T_j = 25^\circ C$ 1.7	2.05	2.4	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 2.6 mA$	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	$V_{GE} = 0V$		4400		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		250		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		235		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 75A$ $V_{CE} = 960V$		325		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 75A$ $R_G = 7\Omega$		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) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 75A$ $R_G = 7\Omega$		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	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 75A$ $R_G = 7\Omega$	$T_j = 25^\circ C$	5.5		mJ
E_{off}	Turn off Energy		$T_j = 150^\circ C$	6.4		
			$T_j = 25^\circ C$	2.05		
			$T_j = 150^\circ C$	3.84		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 900V$ $t_p \leq 10\mu s; T_j = 150^\circ C$		260		A
R_{thJC}	Junction to Case Thermal Resistance				0.39	$^\circ C/W$

Diode ratings and characteristics (per diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$			150	μA
I_F	DC Forward Current	$T_c = 80^\circ C$		60		A
V_F	Diode Forward Voltage	$I_F = 60A$		2.6	3.1	V
		$I_F = 120A$		3.2		
		$I_F = 60A$	$T_j = 125^\circ C$	1.8		
t_{rr}	Reverse Recovery Time	$I_F = 60A$ $V_R = 800V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$	300		ns
			$T_j = 125^\circ C$	380		
Q_{rr}	Reverse Recovery Charge	$I_F = 60A$ $V_R = 800V$ $di/dt = 400A/\mu s$	$T_j = 25^\circ C$	720		nC
			$T_j = 125^\circ C$	3400		
R_{thJC}	Junction to Case Thermal Resistance				0.65	$^\circ C/W$

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

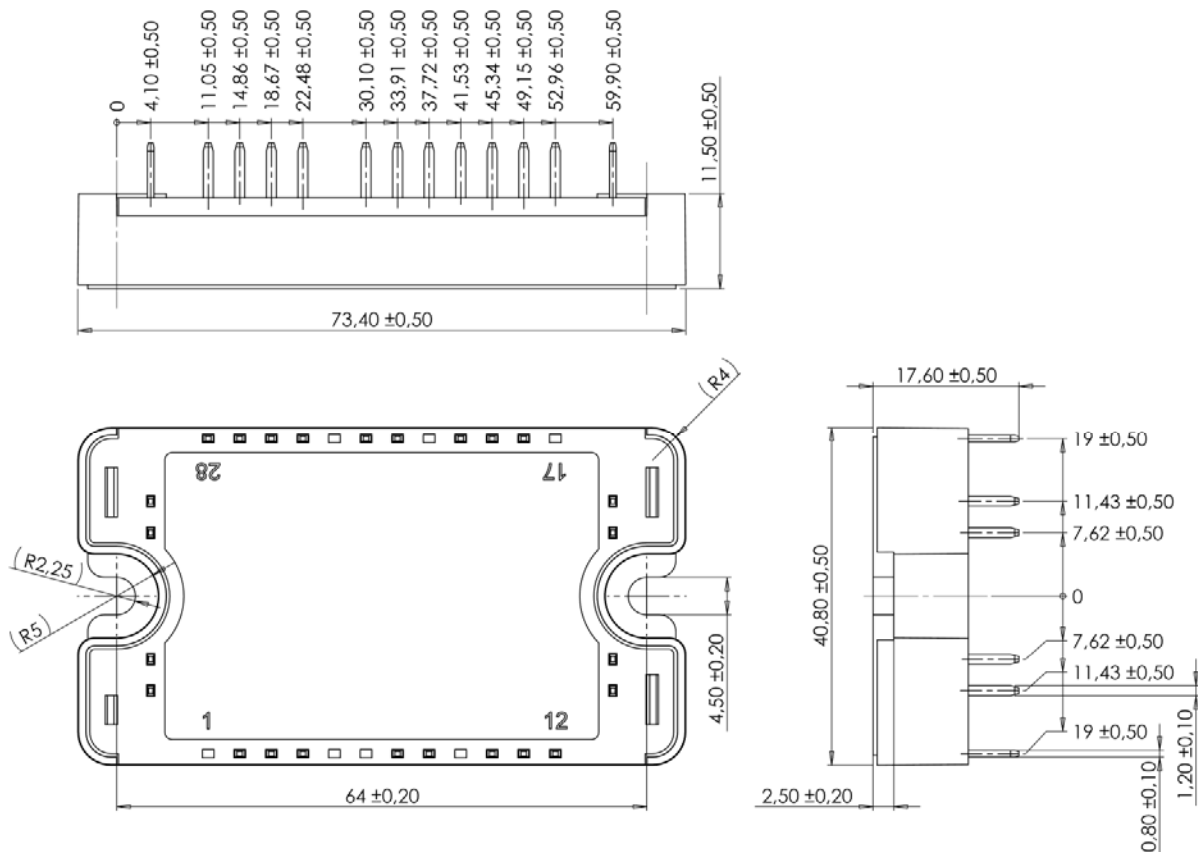
Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C = 100°C		4		%

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

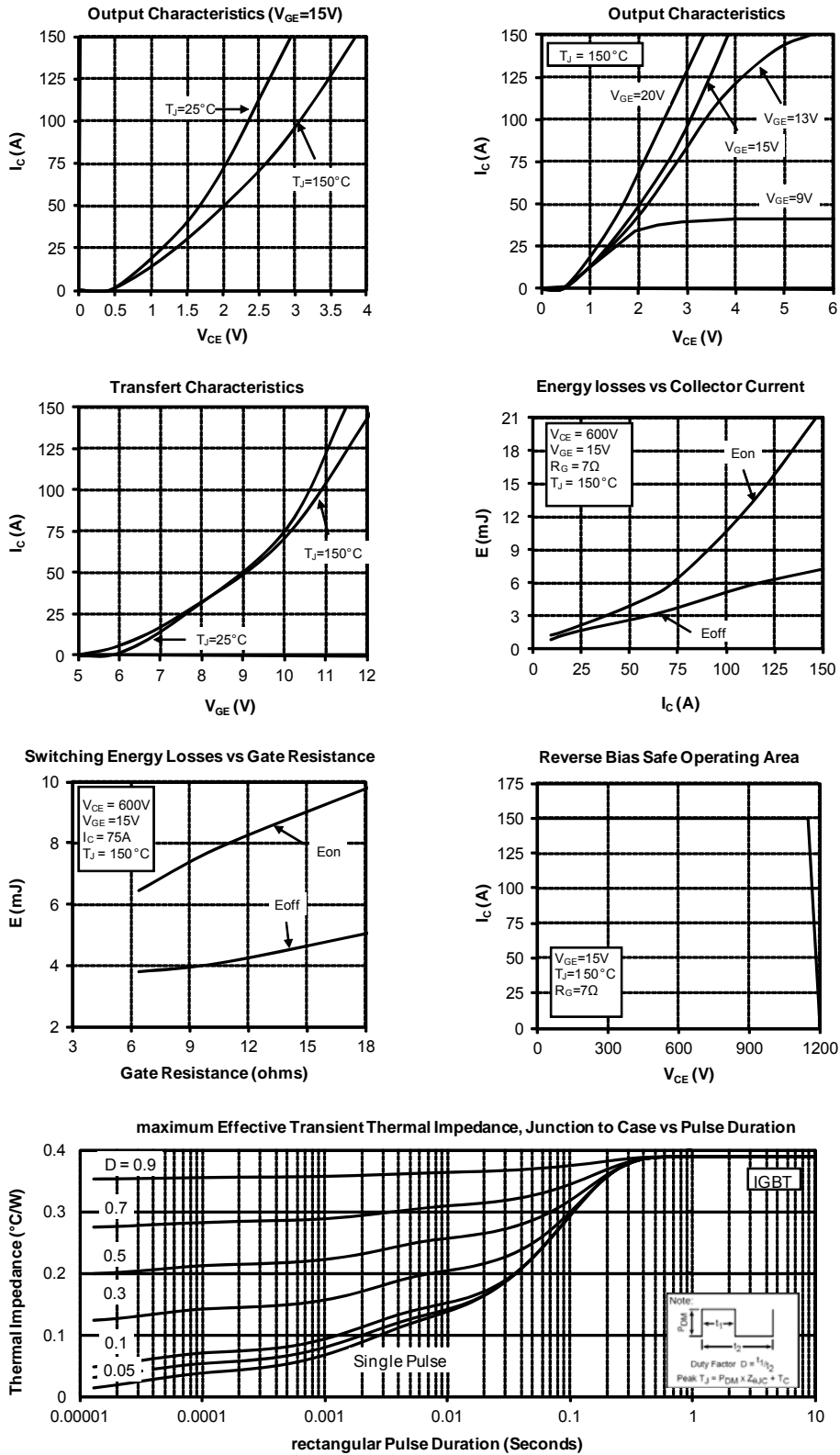
T: Thermistor temperature
 R_T: Thermistor value at T

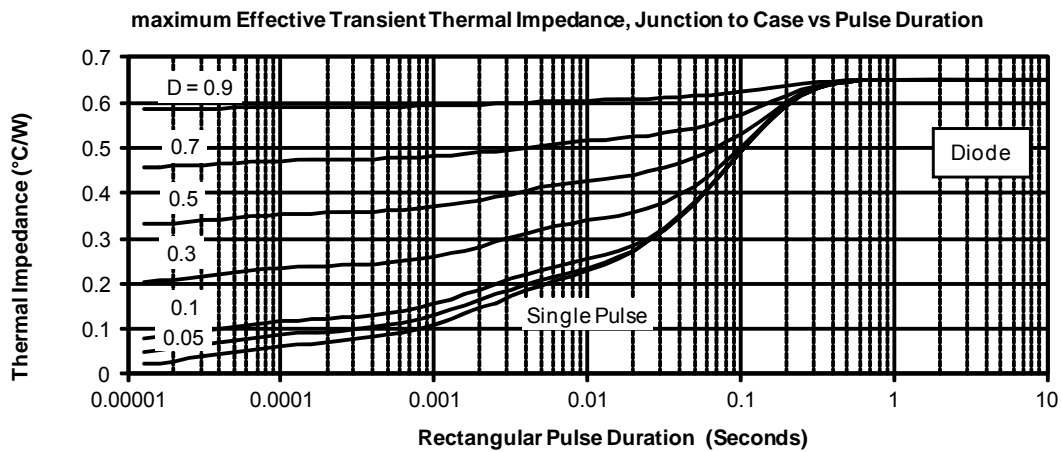
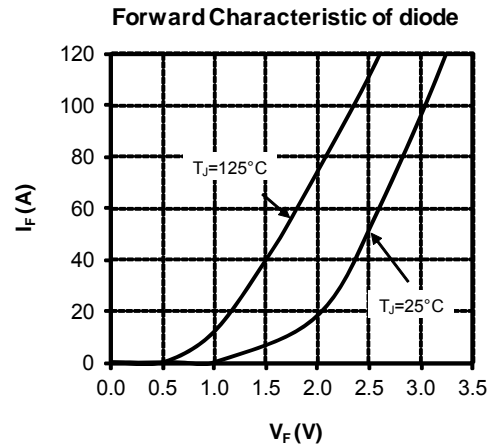
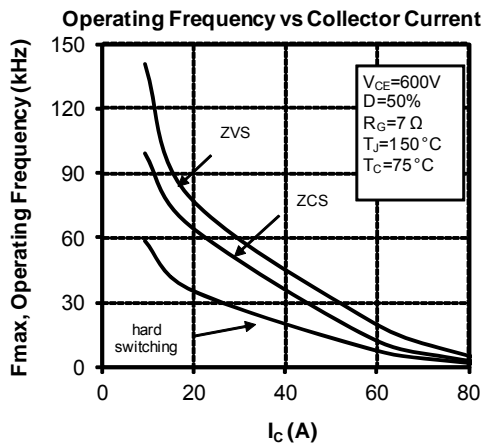
Thermal and package characteristics

Symbol	Characteristic	Min	Typ	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 _{STG}	Storage Temperature Range	-40		125		
T _C	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				110	g

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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