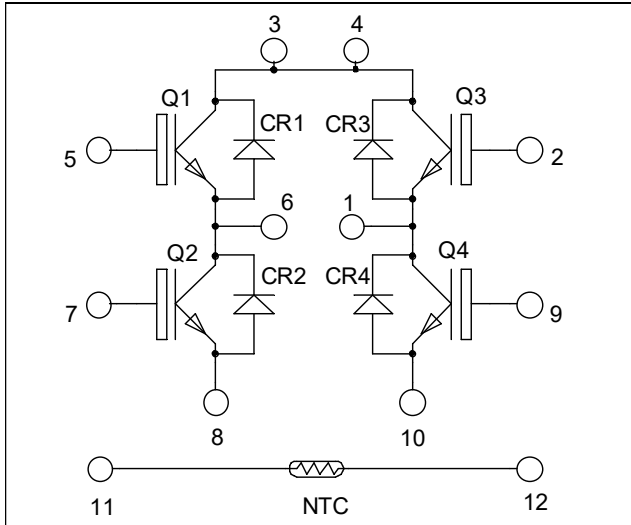


**Full - Bridge
High speed IGBT4 Power
Module**

**$V_{CES} = 1200V$
 $I_C = 25A @ T_c = 80^\circ C$**


Application

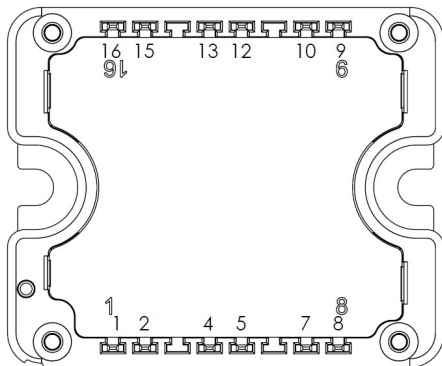
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

Features

- **High speed IGBT4 Technology**
 - Low voltage drop
 - Low leakage current
 - Low switching losses
- Very low stray inductance
- 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
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS Compliant



Pins 3/4 must be shorted together

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	$T_C = 25^\circ C$	50
		$T_C = 80^\circ C$	25
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	100
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Power Dissipation	165	W

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

Electrical Characteristics (per IGBT)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 1200V$			50	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 25A$	$T_j = 25^\circ C$ 1.78	2.05	2.42	V
			$T_j = 150^\circ C$ 2.6			
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 0.85 mA$	5.3	5.8	6.3	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			150	nA

Dynamic Characteristics (per IGBT)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{ies}	Input Capacitance	$V_{GE} = 0V$		1430		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		95		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		75		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 25A$ $V_{CE} = 960V$		115		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 25A$ $R_G = 19\Omega$		27		ns
T_r	Rise Time			41		
$T_{d(off)}$	Turn-off Delay Time			277		
T_f	Fall Time			17		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 25A$ $R_G = 19\Omega$		26		ns
T_r	Rise Time			35		
$T_{d(off)}$	Turn-off Delay Time			347		
T_f	Fall Time			50		
E_{on}	Turn on Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 600V$ $I_C = 25A$	$T_j = 150^\circ C$	2.4		mJ
E_{off}	Turn off Energy	$R_G = 19\Omega$	$T_j = 150^\circ C$	1.4		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V ; V_{Bus} = 600V$ $t_p \leq 10\mu s ; T_j = 150^\circ C$		90		A
R_{thJC}	Junction to Case Thermal Resistance				0.9	$^\circ C/W$

Reverse diode ratings and characteristics (per diode)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V_{RRM}	Peak Repetitive Reverse Voltage				1200	V
I_{RM}	Reverse Leakage Current	$V_R = 1200V$			100	μA
I_F	DC Forward Current		$T_c = 80^\circ C$	30		A
V_F	Diode Forward Voltage	$I_F = 30A$		2.6	3.1	V
		$I_F = 60A$		3.2		
		$I_F = 30A$	$T_j = 125^\circ C$	1.8		
t_{rr}	Reverse Recovery Time	$I_F = 30A$ $V_R = 800V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$	300		ns
			$T_j = 125^\circ C$	380		
Q_{rr}	Reverse Recovery Charge	$I_F = 30A$ $V_R = 800V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ C$	360		nC
			$T_j = 125^\circ C$	1700		
R_{thJC}	Junction to Case Thermal Resistance				1.2	$^\circ C/W$

Thermal and package characteristics

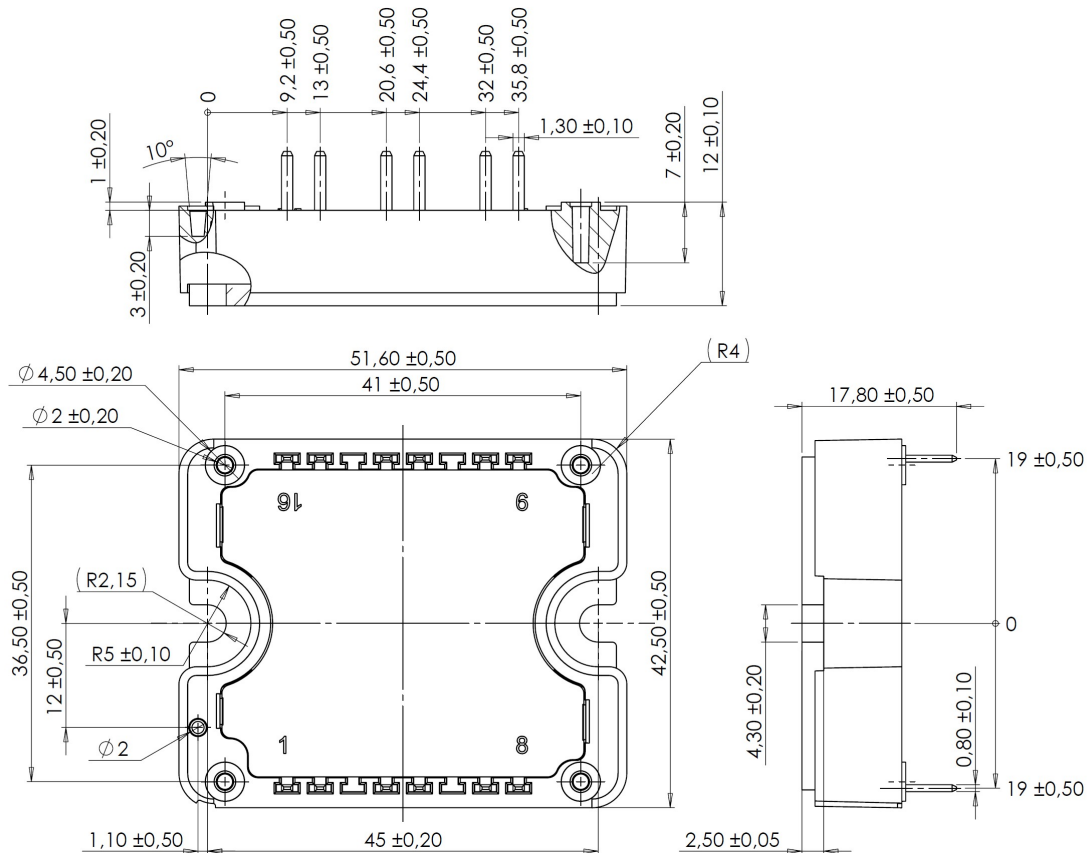
<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Max</i>	<i>Unit</i>		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	175	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	125			
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				80	g

Temperature sensor NTC (see application note APT0406).

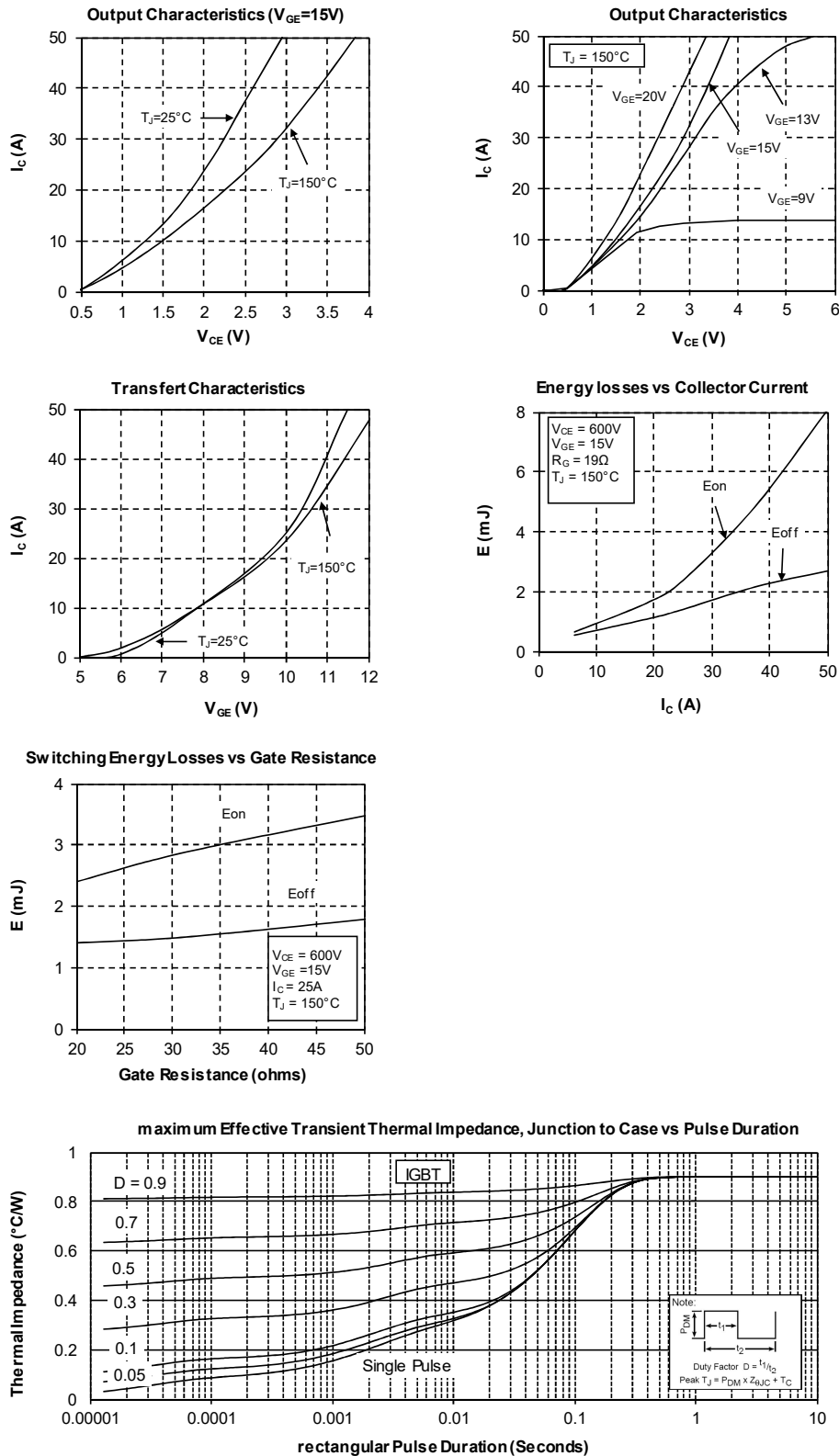
<i>Symbol</i>	<i>Characteristic</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
R ₂₅	Resistance @ 25°C		50		kΩ
ΔR ₂₅ /R ₂₅			5		%
B _{25/85}	T ₂₅ = 298.15 K		3952		K
ΔB/B	T _C =100°C		4		%

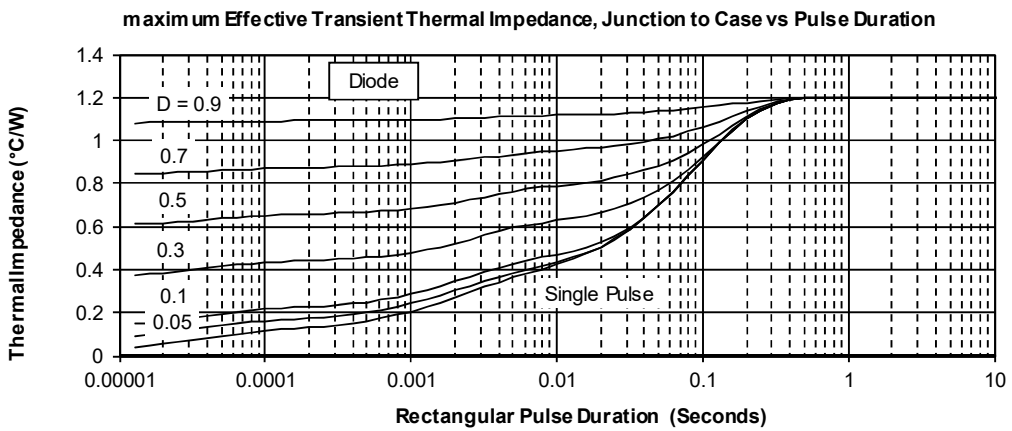
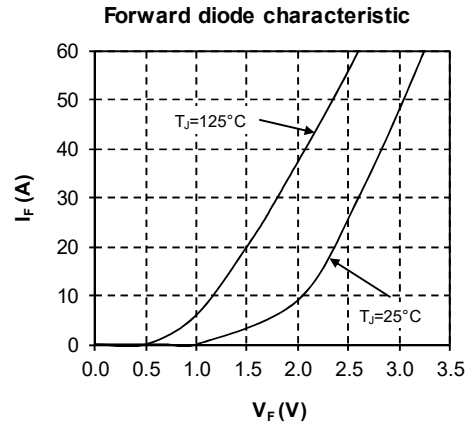
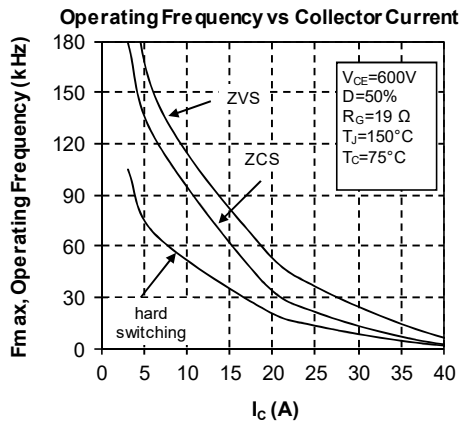
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Package outline (dimensions in mm)


See application note - AN3500A - Mounting instructions for SP1F and SP3F power modules

Typical Performance Curve




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