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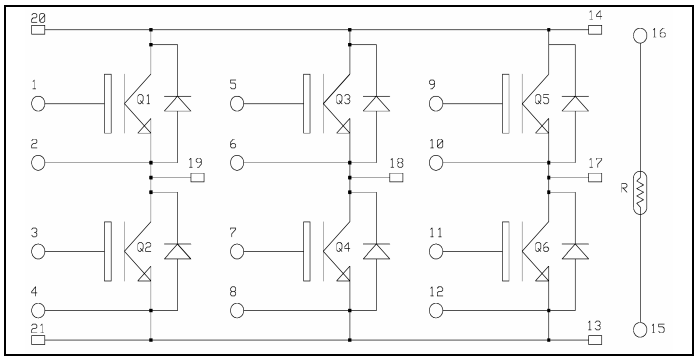
3 Phase bridge
NPT IGBT Power Module

V_{CES} = 600V
I_C = 125A @ Tc = 80°C

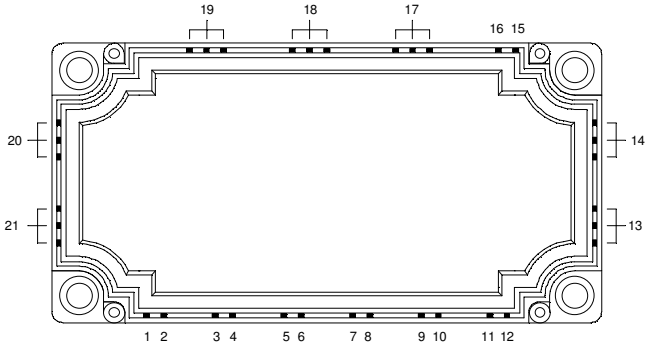


Application

- AC Motor control

Features

- Non Punch Through (NPT) Fast IGBT®
  - Low voltage drop
  - Low tail current
  - Switching frequency up to 50 kHz
  - Soft recovery parallel diodes
  - Low diode VF
  - Low leakage current
  - Avalanche energy rated
  - 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
- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- Low profile

Absolute maximum ratings

Symbol	*Parameter*		*Max ratings*	*Unit*
V_{CES}	Collector - Emitter Breakdown Voltage		600	V
I_C	Continuous Collector Current	T_C = 25°C	180	A
		T_C = 80°C	125	
I_{CM}	Pulsed Collector Current	T_C = 25°C	350	
V_{GE}	Gate – Emitter Voltage		±20	V
P_D	Maximum Power Dissipation	T_C = 25°C	570	W
RBSOA	Reverse Bias Safe Operating Area	T_j = 125°C	300A@480V	

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

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Electrical Characteristics

All ratings @ T_j = 25°C unless otherwise specified

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
BV_{CES}	Collector - Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 500µA		600			V
I_{CES}	Zero Gate Voltage Collector Current	V_{GE} = 0V V_{CE} = 600V	T_j = 25°C		1	500	µA
			T_j = 125°C		1		mA
$V_{CE(on)}$	Collector Emitter on Voltage	V_{GE} =15V I_C = 150A	T_j = 25°C	1.7	2.0	2.45	V
			T_j = 125°C		2.2		
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE} = V_{CE} , I_C = 3 mA		4.5		6.5	V
I_{GES}	Gate – Emitter Leakage Current	V_{GE} = 20V, V_{CE} = 0V				450	nA

Dynamic Characteristics

Symbol	*Characteristic*	*Test Conditions*	*Min*	*Typ*	*Max*	*Unit*
C_{ies}	Input Capacitance	V_{GE} = 0V, V_{CE} = 25V f = 1MHz		6500		pF
C_{res}	Reverse Transfer Capacitance			600		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 150A R_G = 1.5Ω		115		ns
T_r	Rise Time			28		
$T_{d(off)}$	Turn-off Delay Time			200		
T_f	Fall Time			25		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (125°C) V_{GE} = ±15V V_{Bus} = 300V I_C = 150A R_G = 1.5Ω		125		ns
T_r	Rise Time			30		
$T_{d(off)}$	Turn-off Delay Time			225		
T_f	Fall Time			35		
E_{off}	Turn off Energy			4.6		mJ

Reverse diode ratings and characteristics

Symbol	*Characteristic*	*Test Conditions*		*Min*	*Typ*	*Max*	*Unit*
V_F	Diode Forward Voltage	I_F = 150A V_{GE} = 0V	T_j = 25°C		1.25	1.6	V
			T_j = 125°C		1.2		
E_r	Reverse Recovery Energy	I_F = 150A V_R = 300V di/dt =800A/µs	T_j = 125°C		4.7		mJ
Q_{rr}	Reverse Recovery Charge	I_F = 150A V_R = 300V di/dt =800A/µs	T_j = 25°C		10		µC
			T_j = 125°C		18		

Temperature sensor NTC

Symbol	*Characteristic*	*Min*	*Typ*	*Max*	*Unit*
R_{25}	Resistance @ 25°C		5		kΩ
$B_{25/50}$	T_{25} = 298.16 K		3375		K

$$R_T = \frac{R_{25}}{\exp\left[B_{25/50}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

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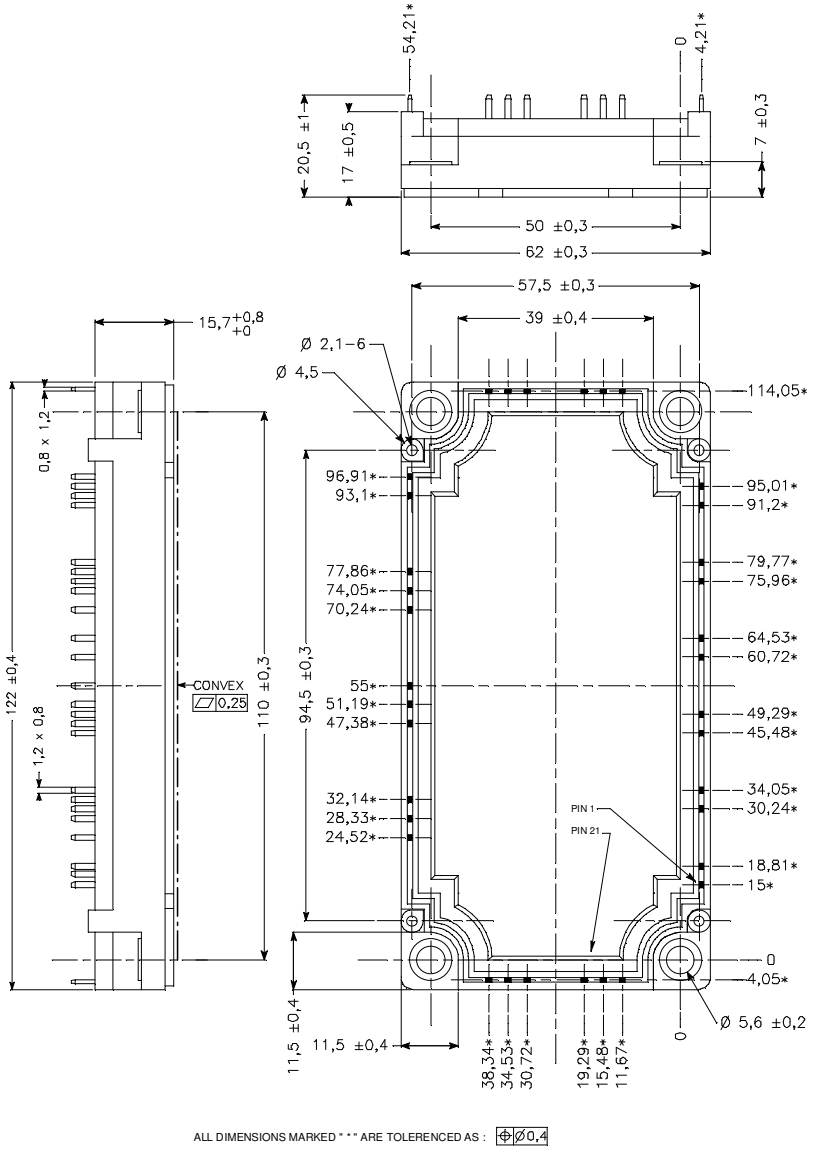
Thermal and package characteristics

Symbol	*Characteristic*			*Min*	*Typ*	*Max*	*Unit*
R_{thJC}	Junction to Case		IGBT			0.22	°C/W
			Diode			0.44	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T_J	Operating junction temperature range			-40		150	°C
T_{STG}	Storage Temperature Range			-40		125	
T_C	Operating Case Temperature			-40		125	
Torque	Mounting torque	To heatsink	M5	3		4.5	N.m
Wt	Package Weight					300	g

Package outline



ALL DIMENSIONS MARKED " * " ARE TOLERENCED AS : ⌖ Ø 0,4

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