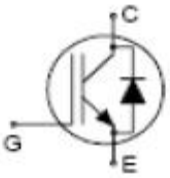
PRELIMINARY DATASHEET

600V 50A, N-Channel IGBT in Trench & Field Stop technology with soft, fast recovery anti-parallel diode, in TO247 Package

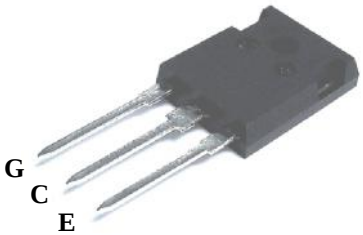
APPLICATION

- Uninterruptible power supplies (UPS)
- Solar inverters
- Welding inverters
- Motor drives
- Low power lighting: low frequency



FEATURES

- Low $V_{CE(sat)}$
- Low turn-off losses
- Short tail current
- Positive temperature coefficient
- Easy paralleling
- Very soft, fast recovery anti-parallel diode
- Pb-free finished; **RoHS compliant**



MAXIMUM RATINGS, at T_j = 25°C, unless otherwise specified

Parameter	Symbol	Value	Units
Collector-emitter voltage	V_{CE}	600	V
DC collector current T_C= 25°C T_C= 100°C	I_C	 100 50	A
Pulsed collector current, t_p limited by T_{jmax}	I_{Cpulse}	150	
Turn off safe operating area $V_{CE} \leq$ 600V, $T_J \leq$ 150°C	-	150	
Diode forward current T_C= 25°C T_C= 100°C	I_F	 100 50	
Gate-emitter voltage	V_{GE}	± 20	V
Short circuit withstand time[1] V_{GE} = 15V, $V_{CC} \leq$ 400V, $T_j \leq$ 150°C	t_{SC}	5	µs
Power dissipation T_C = 25°C	P_{tot}	333	W
Operating junction and storage temperature	T_j, T_{stg}	-55…+175	°C

Thermal Characteristics

Parameter	Symbol	Max. Value	Units
Characteristics			
IGBT thermal resistance, junction to case	R_{thJC}	0.45	K/W
Diode thermal resistance, junction to case	R_{thJCD}	0.8	

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Electrical Characteristics, at T_j = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Characteristics						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0V, I_C = 0.2mA	600	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C = 50A	-	1.5	2.0	
Diode forward voltage	V_F	V_{GE} = 0V, I_F = 50A	-	1.55	1.95	
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C = 0.8mA, V_{CE} = V_{GE}	4.1	4.9	5.7	
Zero gate voltage collector current	I_{CES}	V_{CE} = 600V, V_{GE} = 0	-	-	40	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = 20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE} = 20V, I_C = 50A	-	31	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	3140	-	pF
Output capacitance	C_{oss}		-	200	-	
Reverse transfer capacitance	C_{rss}		-	93	-	
Gate charge	Q_{Gate}	V_{CC} = 480V, I_C = 50A V_{GE} = 15V	-	310	-	nC
Internal emitter inductance measured 5mm (0,197 in.) from case	L_E		-	13	-	nH
Short circuit collector current[1]	$I_{C(SC)}$	V_{GE} = 15V, tsc≤5µs V_{CC} ≤ 400V, T_J =150 °C	-	458	-	A

SWITCHING CHARACTERISTICS, Inductive Load at T_j = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	T_j = 25°C, V_{CC}=400V, I_C=50A, V_{GE}=0/15V, R_G=7Ω, Energy losses included tail and diode reverse recovery.	-	26	-	ns
Rise time	t_r		-	29	-	
Turn-off delay time	$t_{d(off)}$		-	299	-	
Fall time	t_f		-	29	-	
Turn-on energy	E_{on}		-	1.2	-	mJ
Turn-off energy	E_{off}		-	1.4	-	
Total switching energy	E_{ts}		-	2.6	-	
Anti-Parallel Diode Characteristics						
Peak Reverse recovery current	I_{rrm}	I_F = 50A di_F/dt = 2800A/us V_R = 300V V_{GE} = 0V	-	78	-	A
Reverse recovery charge	Q_{rr}		-	2.25	-	µC

1. *Allowed number of short circuits: < 1000; time between short circuits: > 1s.*
2. *Leakage inductance L_σ and Stray capacity C_σ due to dynamic test circuit.*

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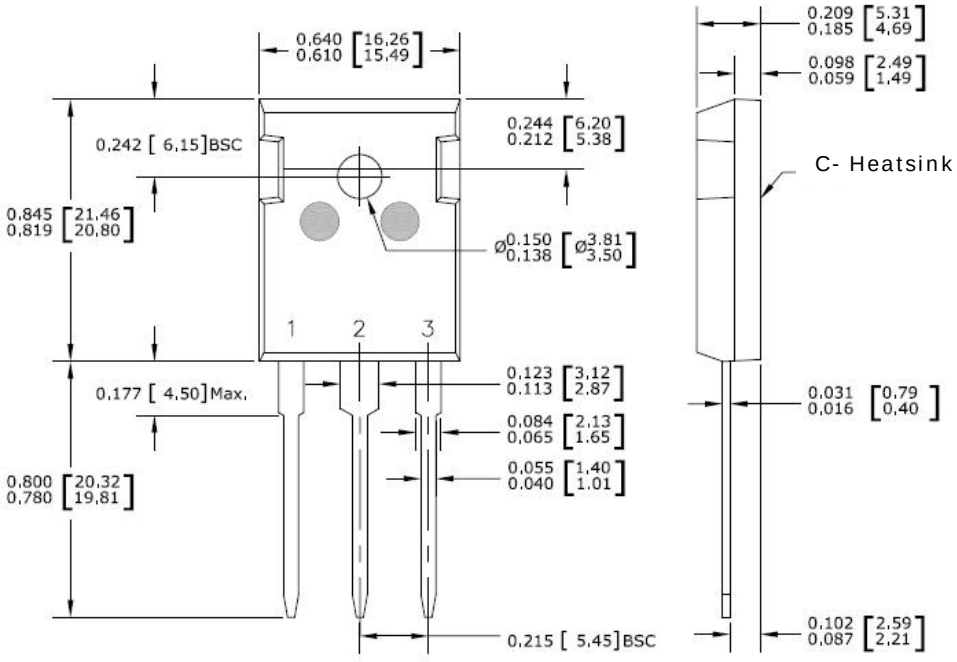
Package Outline Drawing



CAUTION: These devices are ESD sensitive. Use proper handling procedure.

Disclaimer

These specifications may not be considered as a guarantee of components characteristics. Components have to be tested depending on intended application as adjustments may be necessary. The use of **iQXPRZ Power Inc.** components in life support appliances and systems are subject to written approval of **iQXPRZ Power Inc.**

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