

PRELIMINARY DATASHEET
**1200V, 57A 6-pack Bridge IGBT in SPT+ Technology
with Fast and Soft Recovery Anti-parallel Diode in
iQpowermod™1 Package**

- Ultra low loss IGBT
- Smooth switching for good EMC
- Highly rugged SPT+ design
- Pb-free finished; RoHS compliant


MAXIMUM RATINGS (per IGBT), $T_j = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Value	Units
Collector-emitter voltage	V_{CES}	1200	V
DC collector current $T_C=80^\circ\text{C}$	I_C	57	A
Peak collector current	I_{CM}	114	
Diode forward current, per Diode $T_C=80^\circ\text{C}$	I_F	50	
Gate-emitter voltage	V_{GE}	± 20	V
IGBT short circuit SOA $V_{CC} = 1200\text{V}$, $V_{GE} = 15\text{V}$, $V_{CEM} \leq 1200\text{V}$, $T_{VJ} \leq 125^\circ\text{C}$	t_{SC}	10	μs
Operating junction and storage temperature	T_j, T_{stg}	-40... +150	$^\circ\text{C}$

Thermal and Isolation Characteristics

Parameter	Symbol	Max. Value	Units
Characteristics			
IGBT thermal resistance, junction to case, per IGBT	R_{thJC}	0.43	K/W
Diode thermal resistance, junction to case, per Diode	R_{thJCD}	0.65	
Isolation voltage, RMS (measured between terminals and mounting base, 50-60 Hz, for 1-3 seconds)	V_{iso}	3000	V

Electrical characteristics (Per IGBT), at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Characteristics						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE} = 0\text{V}$, $I_C = 1\text{mA}$	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{V}$, $I_C = 57\text{A}$	1.4	1.85	2.2	
Diode forward voltage, per Diode	V_F	$V_{GE} = 0\text{V}$, $I_F = 50\text{A}$	1.5	1.8	2.2	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C = 2\text{mA}$, $V_{CE} = V_{GE}$	5.0	6.3	7.0	
Zero gate voltage collector current	I_{CES}	$V_{CE} = 1200\text{V}$, $V_{GE} = 0$ $T = 25^\circ\text{C}$	-	-	100	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0\text{V}$, $V_{GE} = \pm 20\text{V}$,	-	-	± 100	nA
Internal gate resistance	R_{Gint}		-	10	-	Ω

Electrical Characteristics (Per IGBT), at $T_j = 25^\circ\text{C}$, unless otherwise specified

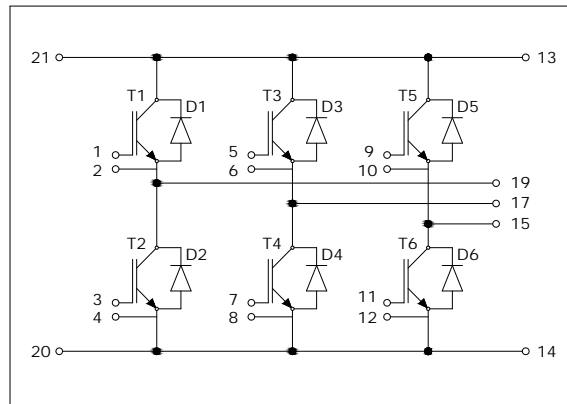
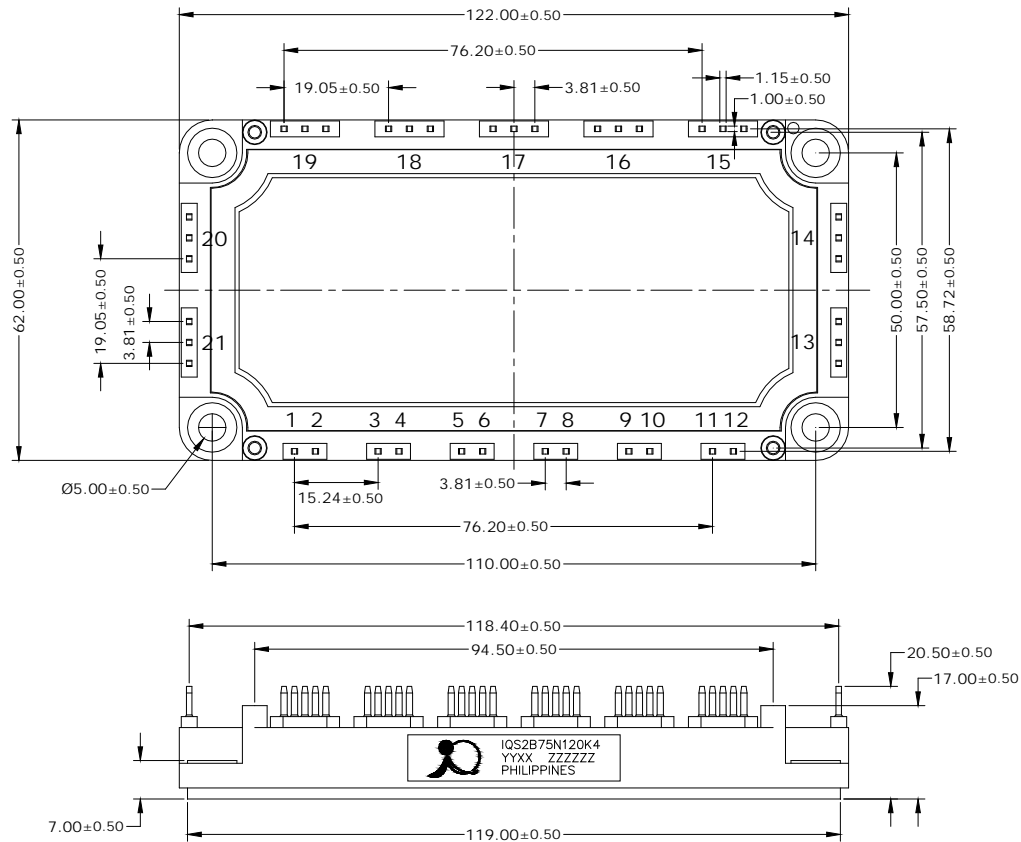
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
Gate charge	Q_{ge}	$I_C = 57\text{A}, V_{CE} = 600\text{V}, V_{GE} = \pm 15\text{V}$	-	611	-	nC
Input capacitance	C_{iss}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$	-	4.29	-	nF
Output capacitance	C_{oss}		-	0.3	-	
Reverse transfer capacitance	C_{rss}		-	0.2	-	
Short circuit current	I_{sc}	$T_C = 125^\circ\text{C}, V_{CC} = 900\text{V}, V_{GE} = 15\text{V}, t_{psc} \leq 10\mu\text{s}, V_{CEM} \leq 1200\text{V}$	-	270	-	A

Switching Characteristics (Per IGBT), Inductive Load at $T_j = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{V}, I_C = 57\text{A}, V_{GE} = \pm 15\text{V}, R_G = 18\Omega, L_\sigma = 60\text{nH},$ Inductive load.	-	270	-	ns
Rise time	t_r		-	60	-	
Turn-off delay time	$t_{d(off)}$		-	480	-	
Fall time	t_f		-	60	-	
Turn-on energy	E_{on}		-	6.0	-	mJ
Turn-off energy	E_{off}		-	3.7	-	

Anti-Parallel Diode Characteristics (Per Diode), $T_C = 25^\circ\text{C}$ unless otherwise specified

Diode reverse recovery time	t_{rr}	$T_j = 25^\circ\text{C}, V_R = 600\text{V}, I_F = 50\text{A}, di_F/dt = 1200\text{A}/\mu\text{s}, L_o = 60\text{nH},$ Inductive load	-	190	-	ns
Diode reverse recovery charge	Q_{rr}		-	7.5	-	μC
Diode peak reverse recovery current	I_{rrm}		-	55	-	A

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.**