

PRELIMINARY DATASHEET
**1200V, 75A 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), at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Value	Units
Collector-emitter voltage	V_{CE}	1200	V
DC collector current $T_C = 80^\circ\text{C}$	I_C	75	A
Peak collector current, limited by T_{jmax}	I_{CM}	150	
Diode forward current, per Diode	I_F	50	
Repetitive peak forward current, limited by T_{jmax} , per Diode	I_{FRM}	100	
Gate-emitter voltage	V_{GES}	± 20	V
IGBT short circuit SOA $V_{CC} = 900\text{V}$, $V_{CEM} \leq 1200\text{V}$, $V_{GE} \leq 15\text{V}$, $T_{vj} = 125^\circ\text{C}$	t_{psc}	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}	0.34	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 at $T = 25^\circ\text{C}$ at $T = 125^\circ\text{C}$	$V_{CE(sat)}$	$V_{GE} = 15\text{V}$, $I_C = 75\text{A}$	1.4 -	1.9 2.1	2.4 -	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C = 3\text{mA}$, $V_{CE} = V_{GE}$	5	6.2	7	
Diode forward voltage, per Diode	V_F	$I_F = 50\text{A}$	1.4	1.8	2.2	
Zero gate voltage collector current at $T = 25^\circ\text{C}$ at $T_j = 125^\circ\text{C}$	I_{CES}	$V_{CE} = 1200\text{V}$, $V_{GE} = 0$	- -	- 85	100 -	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0\text{V}$, $V_{GE} = \pm 20\text{V}$ at $T = 125^\circ\text{C}$	-200	-	200	nA
Short Circuit Current	I_{SC}	$V_{CC} = 900\text{V}$, $V_{GE} = 15\text{V}$ $t_{psc} \leq 10\mu\text{s}$ $V_{CEM} \leq 1200\text{V}$ at $T_C = 125^\circ\text{C}$	-	350	-	A

ELECTRICAL CHARACTERISTICS (per IGBT), at $T_j = 25^\circ\text{C}$, unless otherwise specified

Dynamic Characteristics						
Input capacitance	C_{iss}	$V_{CE} = 25\text{V},$ $V_{GE} = 0\text{V},$ $f = 1\text{MHz}$	-	5.52	-	nF
Output capacitance	C_{oss}		-	0.40	-	
Reverse transfer capacitance	C_{rss}		-	0.26	-	
Gate Charge	Q_g	$V_{CE} = 600\text{V } I_c = 75\text{A}$ $V_{GE} = -15\text{V}, 15\text{V}$	-	780	-	nC

SWITCHING CHARACTERISTICS² (per IGBT), at $T_j = 25^\circ\text{C}$, unless otherwise specified

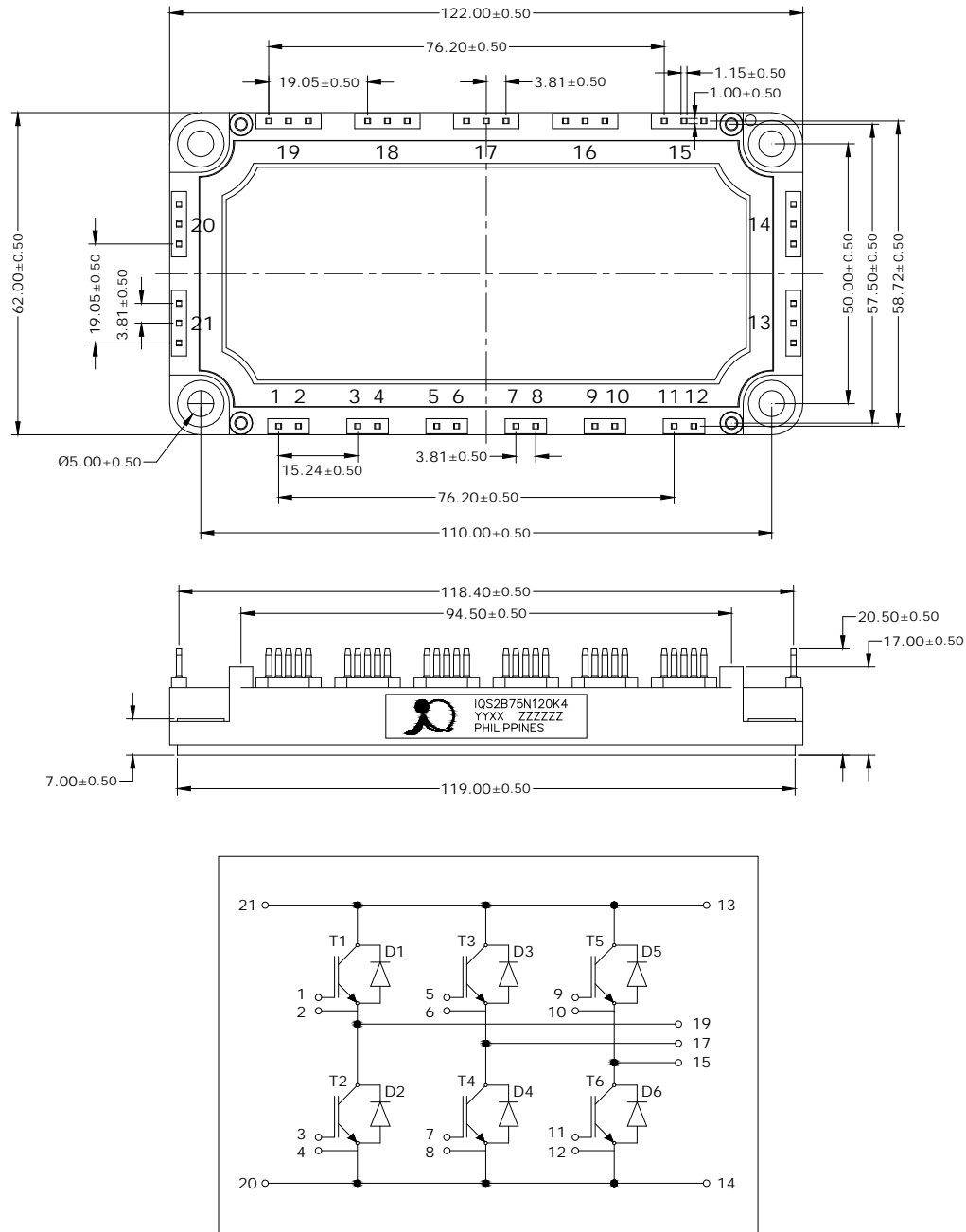
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{V}, I_c = 75\text{A},$ $V_{GE} = \pm 15\text{V},$ $R_G = 15\Omega, L_\sigma = 60\text{nH}$ Inductive Load	-	165	-	ns
Rise time	t_r		-	75	-	
Turn-off delay time	$t_{d(off)}$		-	435	-	
Fall time	t_f		-	50	-	
Turn-on energy	E_{on}		-	9.3	-	mJ
Turn-off energy	E_{off}		-	4.5	-	
Anti – Parallel Diode Characteristics						
Diode reverse recovery time	t_{rr}	$I_F = 50\text{A}$ $V_R = 600\text{V}$	-	190	-	ns
Diode reverse recovery charge	Q_{rr}	$di/dt = 1200\text{A}/\mu\text{s}$ $L_\sigma = 60\text{nH},$	-	7.5	-	μC
Diode peak reverse recovery current	I_{rrm}	Inductive load	-	55	-	A

SWITCHING CHARACTERISTICS² (per IGBT), at $T_j = 125^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{V}, I_c = 75\text{A},$ $V_{GE} = \pm 15\text{V},$ $R_G = 15\Omega, L_\sigma = 60\text{nH}$ Inductive Load	-	175	-	ns
Rise time	t_r		-	70	-	
Turn-off delay time	$t_{d(off)}$		-	500	-	
Fall time	t_f		-	70	-	
Turn-on energy	E_{on}		-	12.4	-	μJ
Turn-off energy	E_{off}		-	7.5	-	
Anti – Parallel Diode Characteristics (per Diode)						
Diode reverse recovery time	t_{rr}	$I_F = 50\text{A}$ $V_R = 600\text{V}$	-	280	-	ns
Diode reverse recovery charge	Q_{rr}	$di/dt = 1200\text{A}/\mu\text{s}$ $L_\sigma = 60\text{nH},$	-	13.5	-	μC
Diode peak reverse recovery current	I_{rrm}	Inductive load	-	70	-	A

1) Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747-9

2) Characteristic values according to IEC 60747-9

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.**