

PRELIMINARY DATASHEET

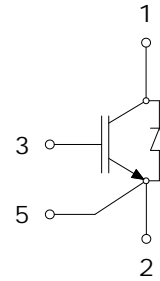
1200V 300A, Single Switch IGBT Module in iQpak®3 Package

APPLICATION

- Motor drives
- UPS
- High power inverters
- Induction heating
- Welding inverters

FEATURES

- Highly rugged SPT+ technology
- Low turn-off losses
- Low conduction loss: $V_{CE(sat)typ} = 1.87V$
- Fast & soft anti-parallel diode
- Pb free finished; **RoHS compliant**



MAXIMUM RATINGS

Parameter	Symbol	Value	Units
Collector-emitter voltage	V_{CES}	1200	V
DC collector current, $T_{jmax}=150^{\circ}C$ $T_C=80^{\circ}C$	I_C	300	A
Peak collector current	I_{CM}	600	
Diode forward current, $T_{jmax}=150^{\circ}C$ $T_C=80^{\circ}C$	I_F	200	
Gate-emitter voltage	V_{GE}	± 20	V
IGBT short circuit SOA $V_{CC}=1200V$, $V_{GE}=15V$, $V_{CEM} \leq 1200V$, $T_{VJ} \leq 125^{\circ}C$	t_{SC}	10	μs
Operating junction and storage temperature	T_j, T_{stg}	-40... +150	$^{\circ}C$

Thermal and Isolation Characteristics

Parameter	Symbol	Max. Value	Units
Characteristics			
IGBT thermal resistance, junction to case	R_{thJC}	0.09	K/W
Diode thermal resistance, junction to case	R_{thJCD}	0.11	
Isolation voltage, RMS (measured between terminals and mounting base, 50-60 Hz, for 1-3 seconds)	V_{iso}	3000	V

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Characteristics						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE} = 0V, I_C = 4mA$	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15V, I_C = 300A$	-	1.85	2.2	
Diode forward voltage	V_F	$V_{GE} = 0V, I_F = 200A$	-	1.80	2.2	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C = 12 mA, V_{CE} = V_{GE}$	5	-	7	
Zero gate voltage collector current	I_{CES}	$V_{CE} = 1200V, V_{GE} = 0$ $T = 25^\circ\text{C}$	-	-	400	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V,$	-	-	0.8	μA
Internal gate resistance	R_{Gint}		-	0.75	-	Ω

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
Gate charge	Q_{ge}	$I_C = 300A, V_{CE} = 600V,$ $V_{GE} = \pm 15V$	-	3120	-	nC
Input capacitance	C_{iss}	$V_{CE} = 25V,$ $V_{GE} = 0V,$ $f = 1\text{MHz}$	-	22.1	-	nF
Output capacitance	C_{oss}		-	1.6	-	
Reverse transfer capacitance	C_{rfs}		-	1.04	-	
Short circuit current	I_{sc}	$T_C = 125^\circ\text{C},$ $V_{CC} = 900V, V_{GE} = 15V,$ $t_{psc} \leq 10\mu\text{s},$ $V_{CEM} \leq 1200V$	-	1400	-	A

SWITCHING CHARACTERISTICS, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600V, I_C = 300A,$ $V_{GE} = \pm 15V,$ $R_G = 2.4\Omega,$ Inductive load.	-	378	-	ns
Rise time	t_r		-	56	-	
Turn-off delay time	$t_{d(off)}$		-	426	-	
Fall time	t_f		-	67	-	
Turn-ON energy	E_{on}	$V_{CC} = 600V, I_C = 300A,$ $V_{GE} = \pm 15V,$ $R_G = 2.4\Omega,$ Inductive load.	-	30	-	mJ
Turn-OFF energy	E_{off}		-	17	-	

Anti-Parallel Diode Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Diode reverse recovery time	t_{rr}	$V_R = 600V, I_F = 300A,$ $V_{GE} = 0V$ $di_F/dt = 2000A/\mu\text{s}$ Inductive load	-	497	-	ns
Diode reverse recovery charge	Q_{rr}		-	30.8	-	μC
Diode peak reverse recovery current	I_{rrm}		-	114	-	A

Figure 1: Typical IGBT turn-on switching times vs R_G , $T_j = 25^\circ\text{C}$

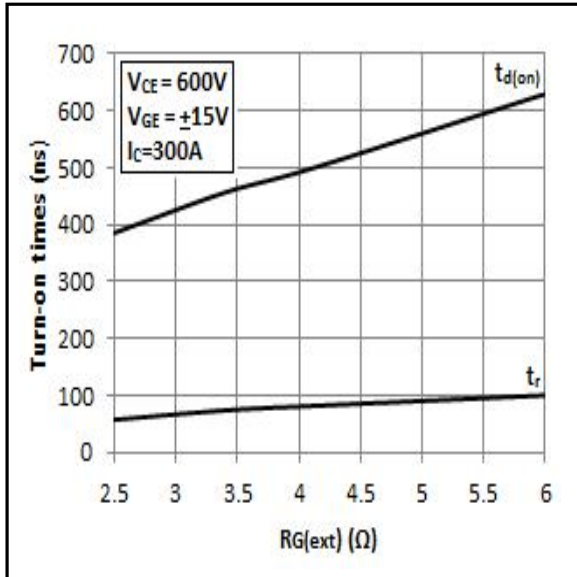


Figure 2: Typical IGBT turn-off switching times vs R_G , $T_j = 25^\circ\text{C}$

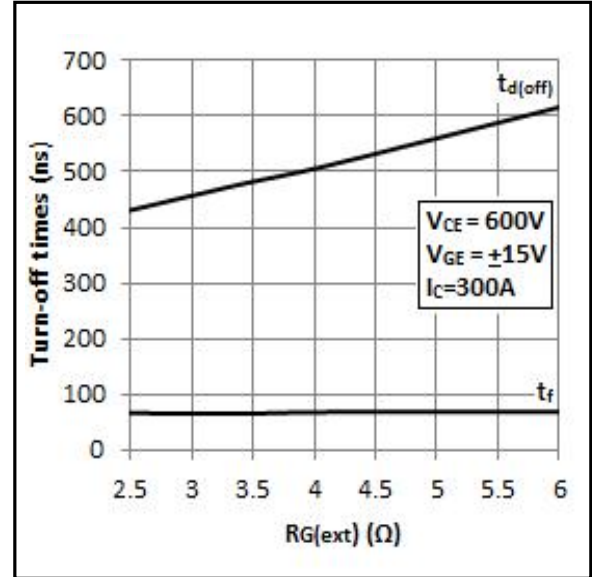


Figure 3: Typical IGBT turn-on switching times vs I_C , $T_j = 25^\circ\text{C}$

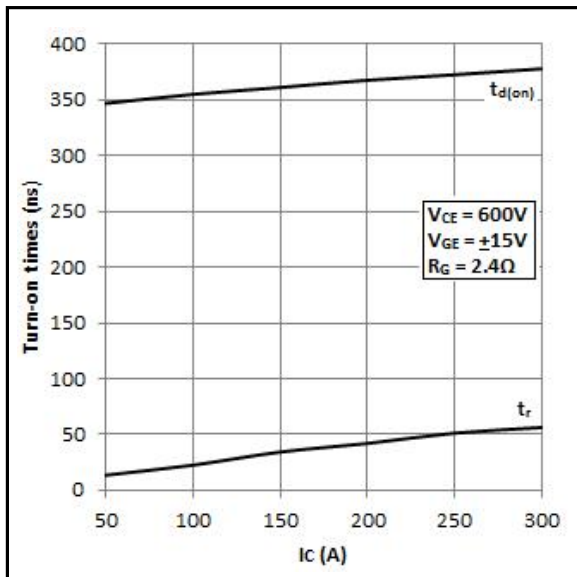


Figure 4: Typical IGBT turn-off switching times vs I_C , $T_j = 25^\circ\text{C}$

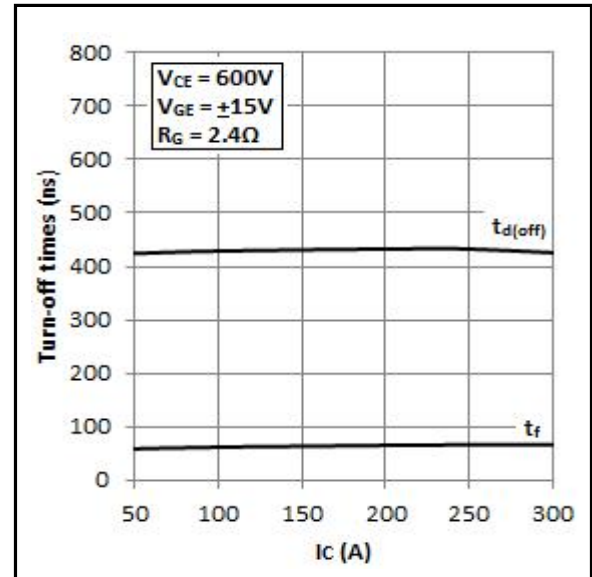


Figure 5: Typical IGBT switching losses vs R_G , $T_j = 25^\circ\text{C}$

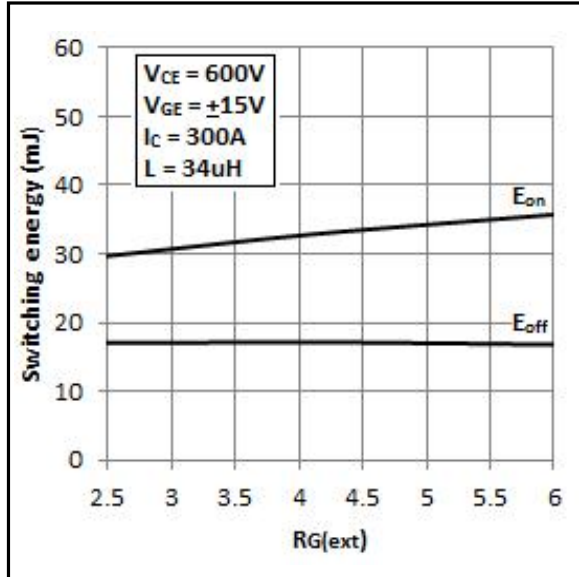
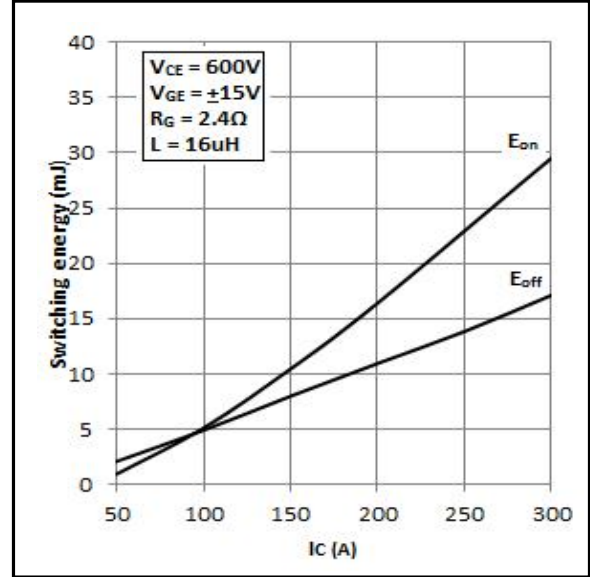
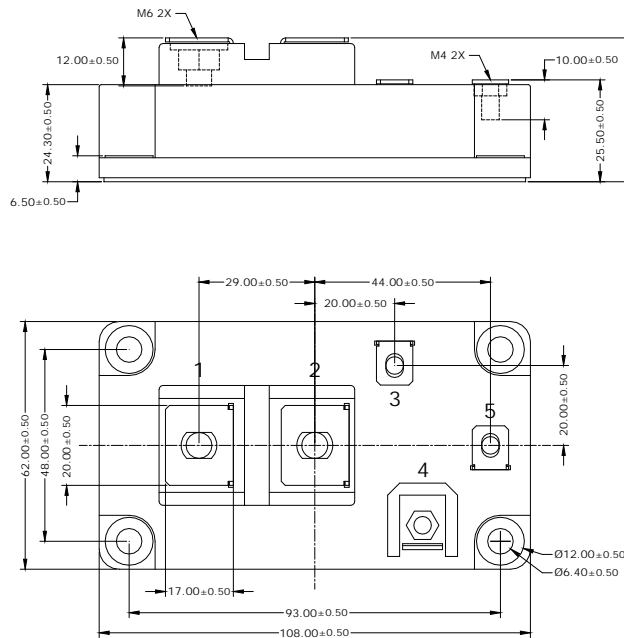


Figure 6: Typical IGBT switching losses vs I_C , $T_j = 25^\circ\text{C}$



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.**