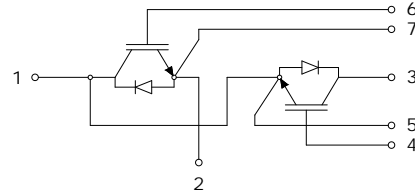


600V 300A, Trench & Field Stop IGBT3 technology with soft, fast recovery anti-parallel diode, in iQPak®2 Module Package

APPLICATIONS

- Motor drives
- UPS
- High power inverters
- Induction heating
- Electronic welders



FEATURES

- IGBT3 - fast trench & field stop IGBT technology
- High switching speed
- Very low $V_{CE(sat)}$
- Short circuit withstand time – 5 μ s
- High ruggedness, temperature stability
- Soft & fast recovery anti-parallel diode
- Pb-free finished; **RoHS compliant**



MAXIMUM RATINGS (per Leg)

Parameter	Symbol	Value	Units
Collector-emitter voltage	V_{CES}	600	V
DC collector current $T_C=80^\circ\text{C}$	I_C	300	A
Pulse collector current, t_p limited by t_{jmax}	I_{Cpulse}	900	
Diode forward current $T_C=80^\circ\text{C}$	I_F	300	
Gate-emitter voltage	V_{GE}	± 20	V
Short circuit withstand time $V_{GE} = 15\text{V}, V_{CC} \leq 400\text{V}, T_j \leq 150^\circ\text{C}$	t_{SC}	5	μs
Operating junction and storage temperature	T_j, T_{stg}	-55... +175	$^\circ\text{C}$

Thermal and Isolation Characteristics

Parameter	Symbol	Max. Value	Units
Characteristics			
IGBT thermal resistance, junction to case, (Per Leg)	R_{thJC}	0.12	K/W
Diode thermal resistance, junction to case, (Per Leg)	R_{thJCD}	0.16	
Isolation voltage, RMS (measured between terminals and mounting base, 50-60 Hz, for 1-3 seconds)	V_{iso}	3000	V

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Characteristics						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE} = 0V, I_C = 0.8mA$	600	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15V, I_C = 300A$	-	1.5	2.0	
Diode forward voltage	V_F	$V_{GE} = 0V, I_F = 300A$	-	1.6	2.0	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C = 4.8 mA, V_{CE} = V_{GE}$	4.1	4.9	5.7	
Zero gate voltage collector current	I_{CES}	$V_{CE} = 600V, V_{GE} = 0$	-	-	160	μA
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0V, V_{GE} = 20V,$	-	-	400	nA

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
Gate charge	Q_{ge}	$V_{CC} = 480V, I_C = 300A$ $V_{GE} = 15V$	-	1880	-	nC
Input capacitance	C_{iss}	$V_{CE} = 25V$ $V_{GE} = 0V$ $f = 1MHz$	-	18.48	-	nF
Output capacitance	C_{oss}		-	1.15	-	
Reverse transfer capacitance	C_{riss}		-	0.55	-	
Short circuit current	I_{sc}	$V_{GE} = 15V, t_{sc} \leq 5 \mu s$ $V_{CC} = 400V,$ $T_j \leq 150^\circ\text{C}$	-	2760	-	A

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 300V, I_C = 300A,$ $V_{GE} = 0/15V,$ $R_G = 3.4\Omega,$ Inductive Load	-	84	-	ns
Rise time	t_r		-	92	-	
Turn-off delay time	$t_{d(off)}$		-	829	-	
Fall time	t_f		-	82	-	
Turn-ON energy	E_{on}		-	30	-	mJ
Turn-OFF energy	E_{off}		-	10	-	

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

Diode reverse recovery time	t_{rr}	$V_R = 300V, I_F = 300A$ $di_F/dt = 1950A/\mu s$	-	283	-	ns
Diode reverse recovery charge	Q_{rr}		-	8	-	μC
Diode peak reverse recovery current	I_{rrm}		-	62	-	A

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

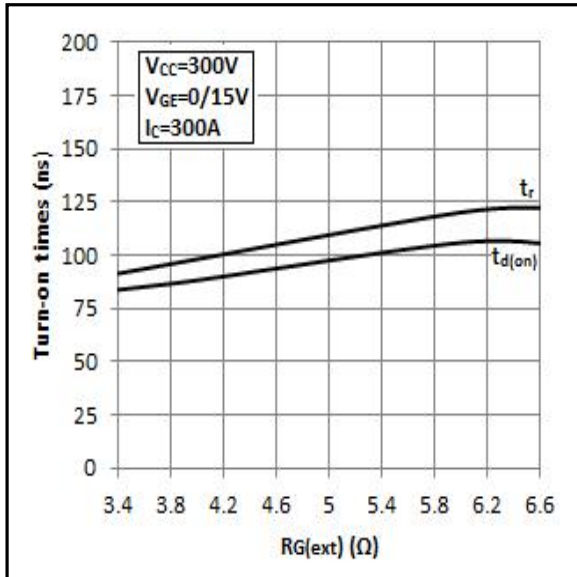


Figure 2: Typical IGBT turn-off switching times vs R_G , $T_j = 25^\circ\text{C}$

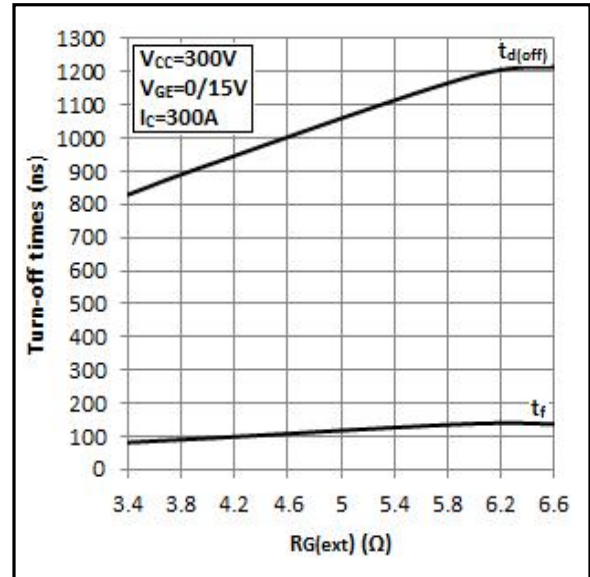


Figure 3: Typical IGBT turn-on switching times vs I_C , $T_j = 25^\circ\text{C}$

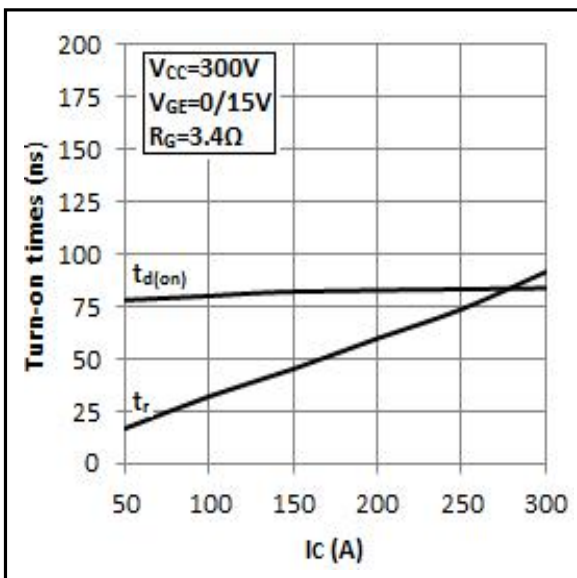


Figure 4: Typical IGBT turn-off switching times vs I_C , $T_j = 25^\circ\text{C}$

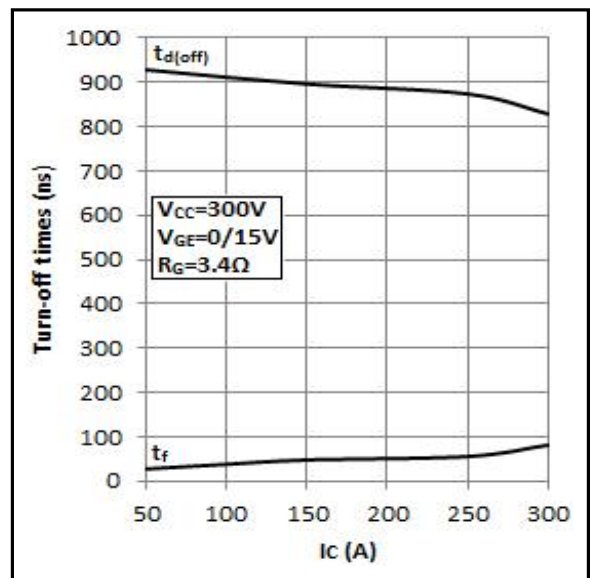


Figure 5: Typical IGBT switching losses vs R_G , $T_j = 25\text{ }^\circ\text{C}$

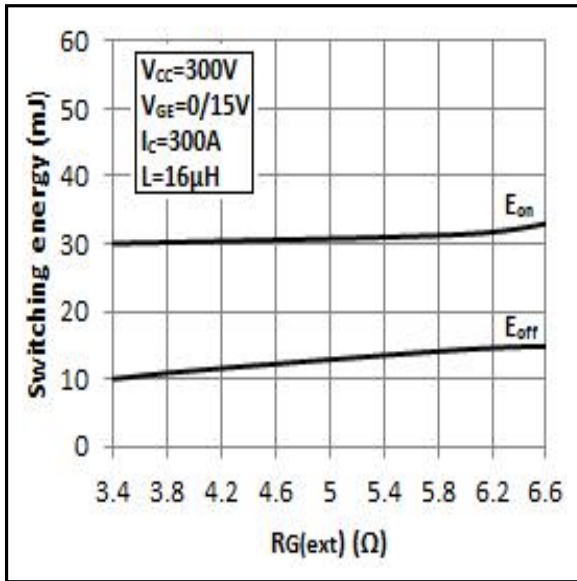
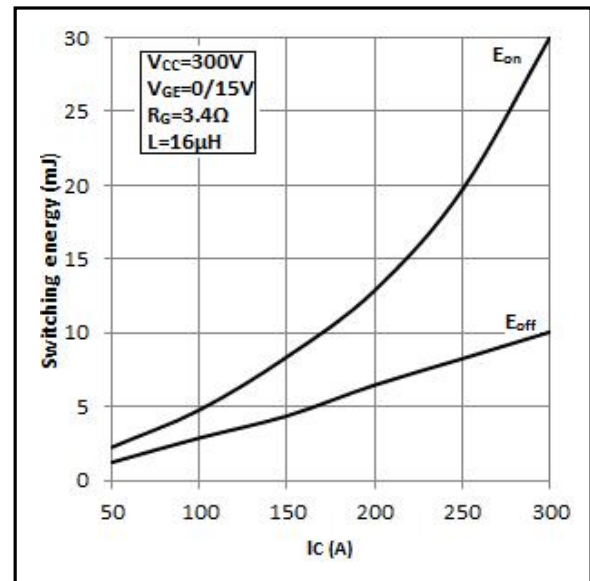
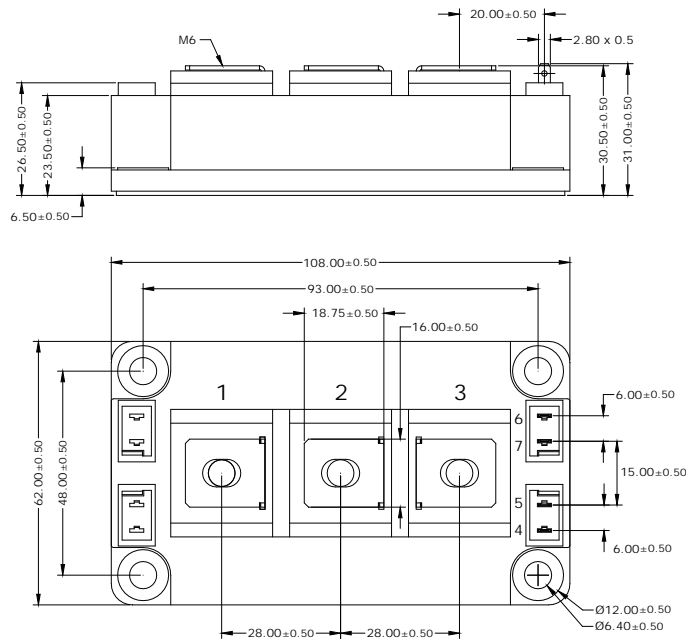


Figure 6: Typical IGBT switching losses vs I_C , $T_j = 25\text{ }^\circ\text{C}$



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.**