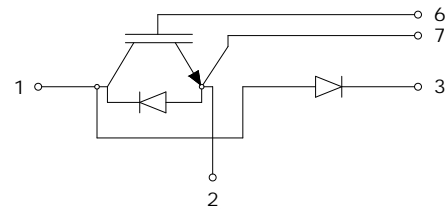


**PRELIMINARY DATASHEET**
**1200V 150A, Highly Rugged SPT+ IGBT in iQpak® 2 Module Package**
**APPLICATION**

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

**FEATURES**

- High speed switching
- Low turn-off losses
- Low conduction loss:  $V_{CE(sat)typ} = 1.9V$
- Fast & soft anti-parallel diode
- Pb free finished; **RoHS compliant**


**MAXIMUM RATINGS (per Leg)**

Parameter	Symbol	Value	Units
Collector-emitter voltage	$V_{CES}$	1200	V
DC collector current $T_C=80^\circ C$	$I_C$	150	A
Peak collector current	$I_{CM}$	300	
Diode forward current $T_C=80^\circ C$	$I_F$	100	
Peak forward current	$I_{FM}$	200	
Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
IGBT short circuit withstand time $V_{CC} = 1200V, V_{GE} = 15V, V_{CEM} \leq 1200V, T_{VJ} \leq 125^\circ C$	$t_{SC}$	10	$\mu s$
Operating junction and storage temperature	$T_j, T_{stg}$	-40... +150	$^\circ C$

**Thermal and Isolation Characteristics**

Parameter	Symbol	Max. Value	Units
<b>Characteristics</b>			
IGBT thermal resistance, junction to case, per Leg	$R_{thJC}$	0.17	K/W
Diode thermal resistance, junction to case, per Leg	$R_{thJCD}$	0.31	
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.	
<b>Static Characteristics</b>						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE} = 0\text{V}, I_C = 2\text{mA}$	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	$V_{GE} = 15\text{V}, I_C = 150\text{A}$	-	1.9	2.2	
Diode forward voltage	$V_F$	$V_{GE} = 0\text{V}, I_F = 100\text{A}$	-	1.8	2.2	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C = 6\text{mA}, V_{CE} = V_{GE}$	5	-	7	
Zero gate voltage collector current	$I_{CES}$	$V_{CE} = 1200\text{V}, V_{GE} = 0$ $T = 25^\circ\text{C}$	-	-	200	$\mu\text{A}$
Gate-emitter leakage current	$I_{GES}$	$V_{CE} = 0\text{V}, V_{GE} = \pm 20\text{V}$	-200	-	200	nA
Internal gate resistance	$R_{Gint}$		-	1.5	-	$\Omega$

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

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Dynamic Characteristics</b>						
Gate charge	$Q_g$	$I_C = 150\text{A}, V_{CE} = 600\text{V},$ $V_{GE} = \pm 15\text{V}$	-	1560	-	nC
Input capacitance	$C_{iss}$	$V_{CE} = 25\text{V},$ $V_{GE} = 0\text{V},$ $f = 1\text{MHz}$	-	11	-	nF
Output capacitance	$C_{oss}$		-	0.8	-	
Reverse transfer capacitance	$C_{rss}$		-	0.52	-	
Short circuit current	$I_{sc}$	$T_j = 125^\circ\text{C}$ $V_{CC} = 900\text{V}, V_{GE} = 15\text{V},$ $t_{psc} \leq 10\mu\text{s},$ $V_{CEM} \leq 1200\text{V}$	-	700	-	A

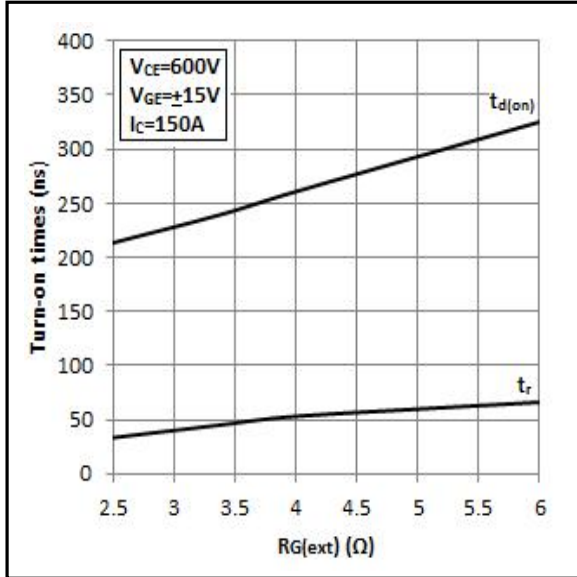
**Switching Characteristics (per Leg)**, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>IGBT Characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{CC} = 600\text{V}, I_C = 150\text{A},$ $V_{GE} = \pm 15\text{V},$ $R_G = 3.4\Omega,$ Inductive load.	-	240	-	ns
Rise time	$t_r$		-	46	-	
Turn-off delay time	$t_{d(off)}$		-	328	-	
Fall time	$t_f$		-	59	-	
Turn-ON energy	$E_{on}$		mJ	-	25	-
Turn-OFF energy	$E_{off}$			-	6.6	-

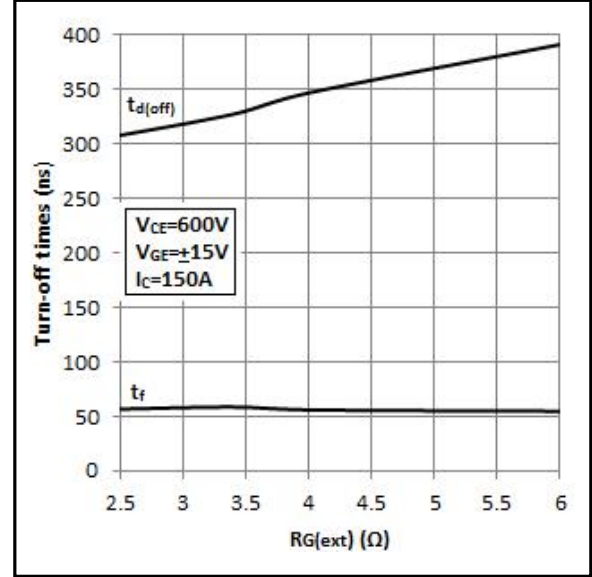
**Anti-Parallel Diode Characteristics (per Leg)**, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified

Diode reverse recovery time	$t_{rr}$	$V_R = 600\text{V}, I_F = 150\text{A}$ $di/dt = -1000\text{A}/\mu\text{s}$ Inductive load	-	497	-	ns
Diode reverse recovery charge	$Q_{rr}$		-	15.4	-	$\mu\text{C}$
Diode peak reverse recovery current	$I_{rrm}$		-	57	-	A

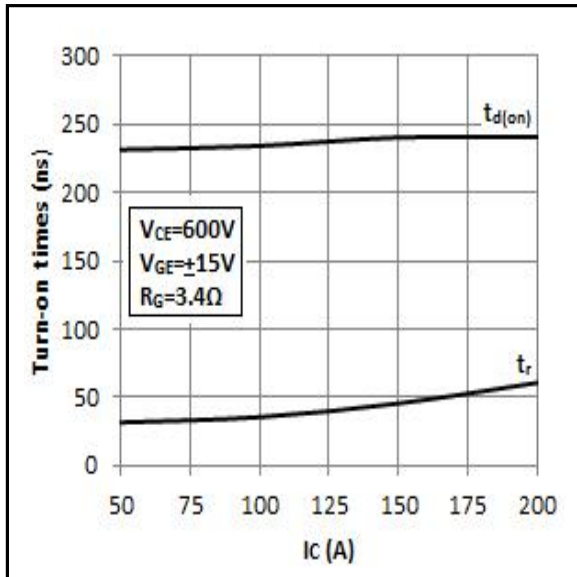
**Figure 1: Typical IGBT turn-on switching times vs  $R_G$ ,  $T_j = 25^\circ\text{C}$**



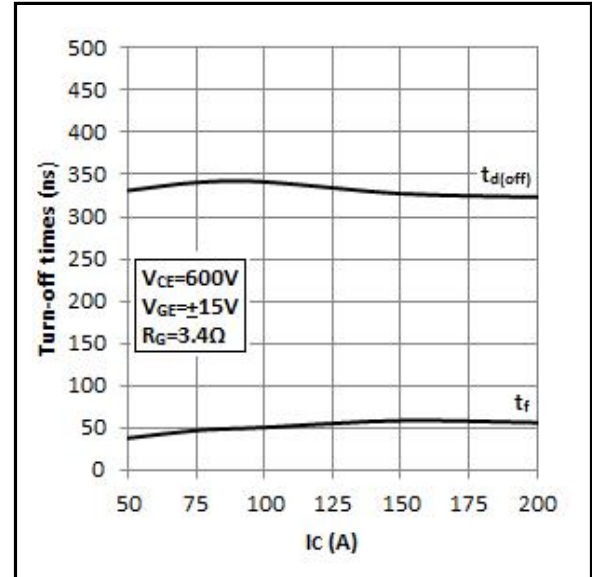
**Figure 2: Typical IGBT turn-off switching times vs  $R_G$ ,  $T_j = 25^\circ\text{C}$**



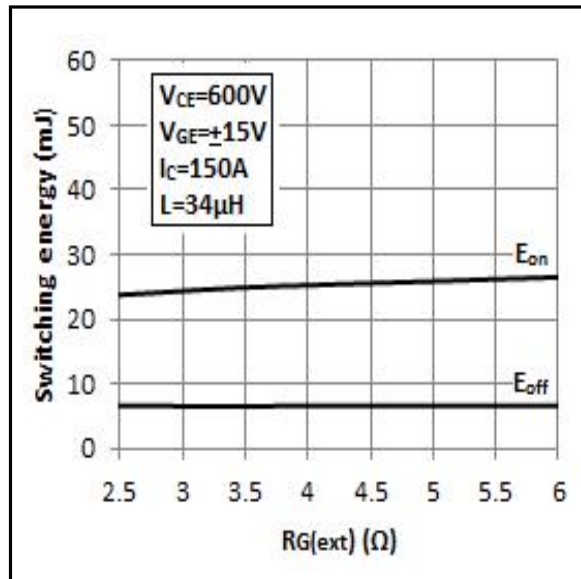
**Figure 3: Typical IGBT turn-on switching times vs  $I_C$ ,  $T_j = 25^\circ\text{C}$**



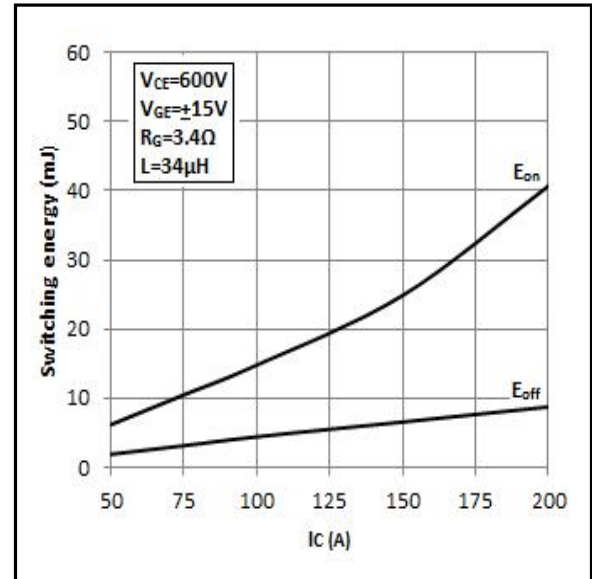
**Figure 4: Typical IGBT turn-off switching times vs  $I_C$ ,  $T_j = 25^\circ\text{C}$**



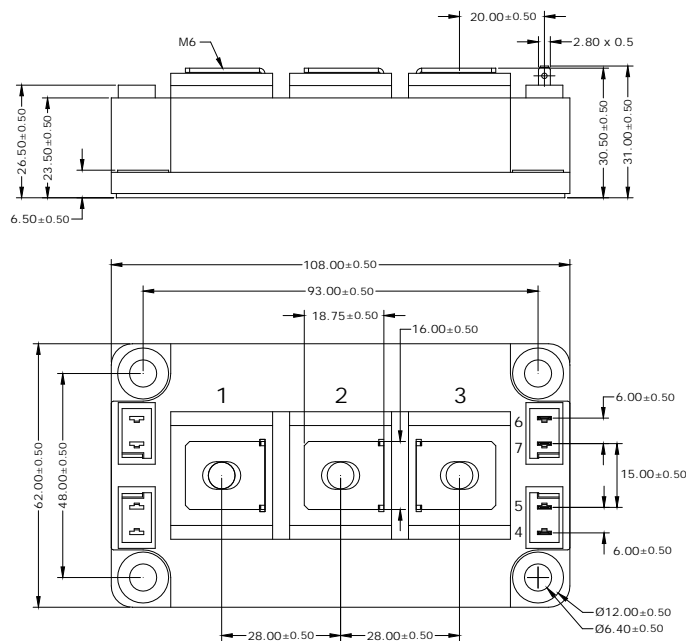
**Figure 5: Typical IGBT switching losses vs  $R_G$ ,  $T_j = 25^\circ\text{C}$**



**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.**