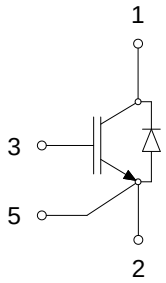
PRELIMINARY DATASHEET

1200V 456A, 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°C T_C=80°C	I_C	456	A
Peak collector current	I_{CM}	912	
Diode forward current, T_{jmax}=150°C T_C=80°C	I_F	400	
Gate-emitter voltage	V_{GE}	± 20	V
IGBT short circuit SOA V_{CC} =1200V , V_{GE} = 15V, V_{CEM} ≤1200V, T_{VJ} ≤ 125°C	t_{SC}	10	µs
Operating junction and storage temperature	T_j, T_{stg}	-40… +150	°C

Thermal and Isolation Characteristics

Parameter	Symbol	Max. Value	Units
Characteristics			
IGBT thermal resistance, junction to case	R_{thJC}	0.054	K/W
Diode thermal resistance, junction to case	R_{thJCD}	0.078	
Isolation voltage, RMS (measured between terminals and mounting base, 50-60 Hz, for 1-3 seconds)	V_{iso}	3000	V

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ELECTRICAL CHARACTERISTICS, at T_j = 25°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 = 1mA	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C = 456A	-	1.9	2.2	
Diode forward voltage	V_F	V_{GE} = 0V, I_F = 400A	-	1.9	2.2	
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C = 16 mA, V_{CE} = V_{GE}	5	-	7	
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0	-	-	800	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ±20V,	-	-	1.6	µA
Internal gate resistance	R_{Gint}		-	1.25	-	Ω

ELECTRICAL CHARACTERISTICS, at T_j = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
Gate charge	Q_{ge}	I_C = 456A, V_{CE} = 600V, V_{GE} = ±15V	-	4888	-	nC
Input capacitance	C_{iss}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	34.3	-	nF
Output capacitance	C_{oss}		-	2.4	-	
Reverse transfer capacitance	C_{rss}		-	1.6	-	
Short circuit current	I_{SC}	T_C=125°C , V_{CC}=900V, V_{GE}=15V, t_{psc}≤10µs, V_{CEM}=≤1200V	-	2160	-	A

SWITCHING CHARACTERISTICS, at T_j = 25°C, unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
IGBT Characteristics						
Turn-on delay time	$t_{d(on)}$	V_{CC}=600 V I_C=456 A V_{GE}=-15V to +18V R_G=1.4 Ω Inductive load	-	398	-	ns
Rise time	t_r		-	60	-	
Turn-off delay time	$t_{d(off)}$		-	522	-	
Fall time	t_f		-	76	-	
Turn-ON energy	E_{on}	V_{CC}=600 V I_C=456 A V_{GE}=-15 to +18 V R_G=1.4 Ω Inductive load	-	42	-	mJ
Turn-OFF energy	E_{off}		-	32	-	

Anti-Parallel Diode Characteristics, at T_j = 25°C, unless otherwise specified

Diode reverse recovery time	t_{rr}	V_R=600V, I_F=400A di_F/dt = 2200A/µs Inductive load	-	553	-	ns
Diode reverse recovery charge	Q_{rr}		-	50	-	µC
Diode peak reverse recovery current	I_{rrm}		-	199	-	A

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Figure 1: Typical IGBT turn-on switching times vs R_G, T_j = 25 °C

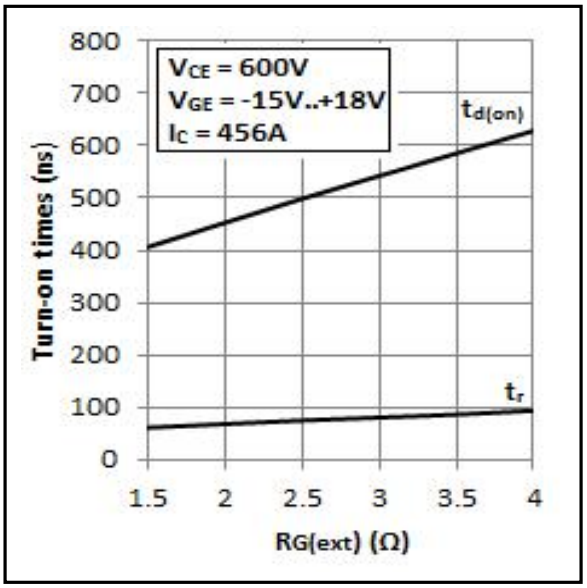

Figure 2: Typical IGBT turn-off switching times vs R_G, T_j = 25 °C

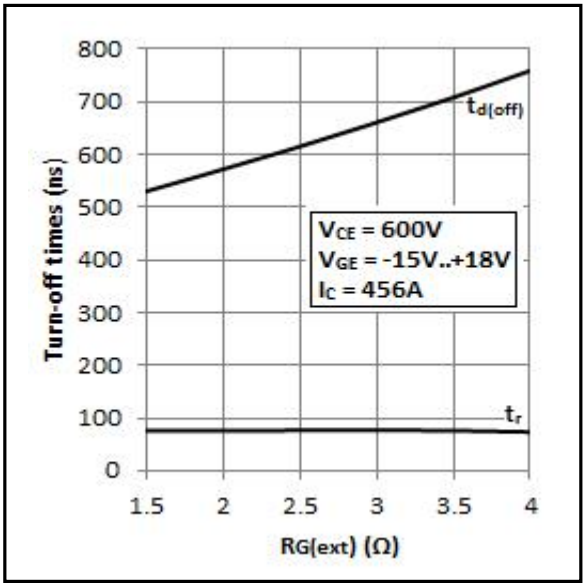

Figure 3: Typical IGBT turn-on switching times vs I_C, T_j = 25 °C

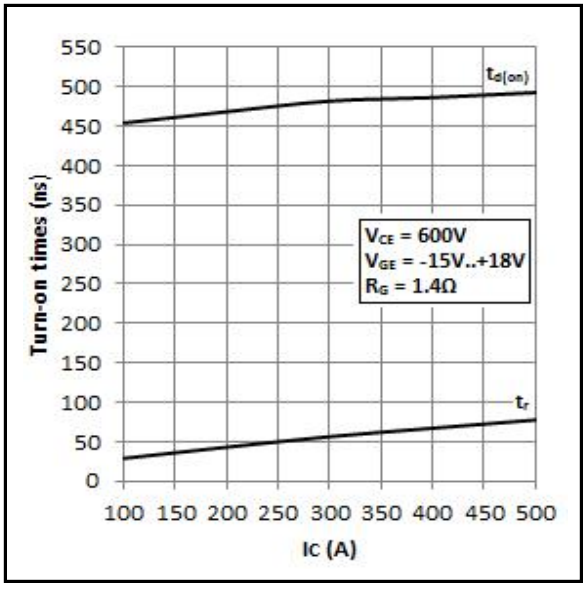

Figure 4: Typical IGBT turn-off switching times vs I_C, T_j = 25 °C

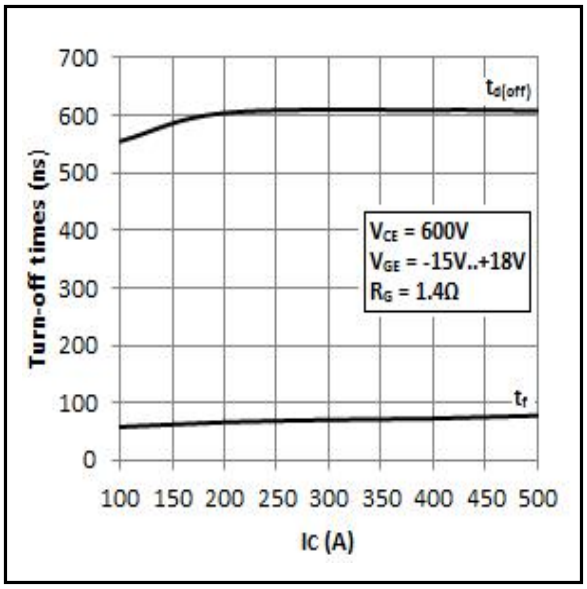

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Figure 5: Typical IGBT switching losses vs R_G, T_j = 25 °C

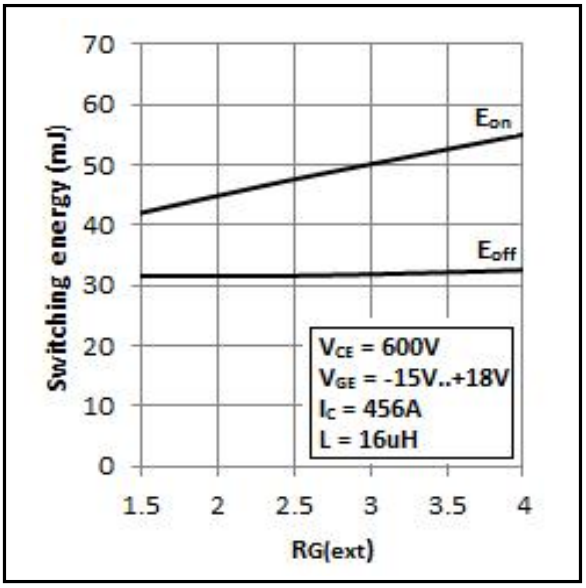
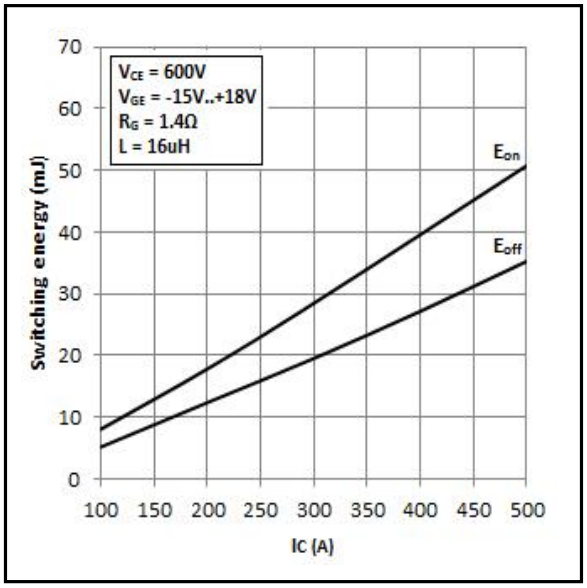
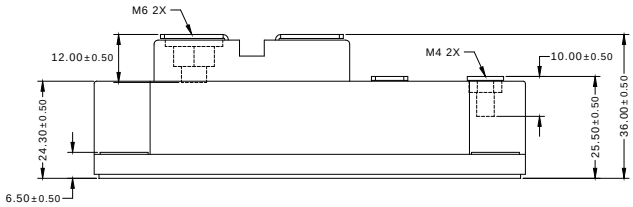
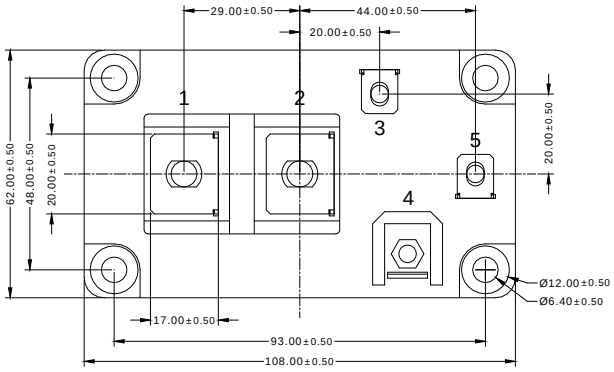


Figure 6: Typical IGBT switching losses vs I_C, T_j = 25 °C



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.**

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