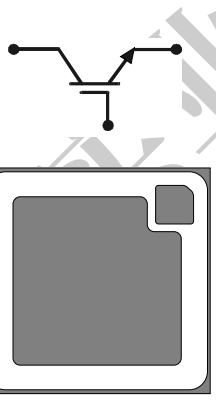
preliminary

XPT IGBT Chip



Type	V_{CE} [V]	I_C [A]	Chip Size [mm] x [mm]	Package	Ordering Code
IX44X12A	1200	35	6.7 6.7	sawn on foil ☐	-
				unsawn wafer ☐	-
				in waffle pack ☑	tbd

Features / Advantages:

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - square RBSOA @ 2x Ic
  - low EMI
- Thin wafer technology combined with the XPT design results in a competitive low Vce(sat)

Applications:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment

Mechanical Parameters

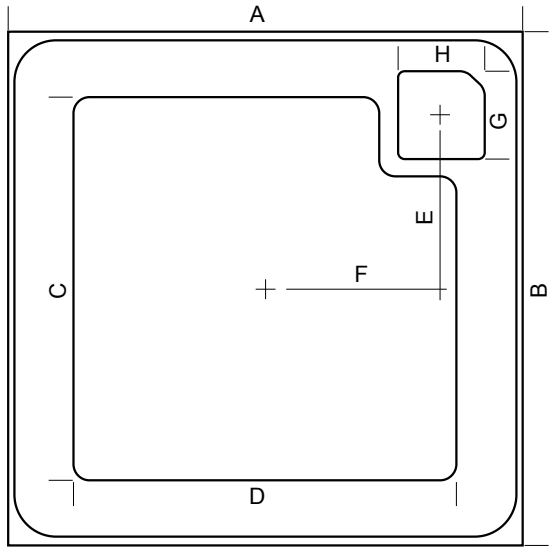
Parameters	Conditions		Ratings	Unit
Area active			29.98	mm^2
Area total			44.89	mm^2
Wafer size Ø			150	mm
Thickness			130	µm
Material	SiFZ	Orientation	<100>	
Max. possible chips	per wafer			
Passivation	front side		SiN	
Metalization	top side		AlSi	
	backside		Al / Ti / Ni / Ag	
Recom. wire bonds (Al)	Emitter	Number / Ø	4 / 300	- / µm
	Gate	Number / Ø	1 / 300	- / µm
Reject Ink Dot Size	Ø		0.4-1.0	mm
Recom. Storage Environment	in orig. container, in dry nitrogen		< 6	month
	Storage Temperature (Tstg)		-40 ... 40	°C
Soldering temperature (5 min.)			max. tbd	°C
Virtual junction temperature T_{VJ}			-40 ... 150	°C

Electrical Parameters

Symbol	Definition	Conditions			Ratings min.	typ.	max.	Unit
V_{CES}	*Collector emitter voltage*	V_{GE} = 0 V	I_C = 1 mA	T_{VJ} = 25°C			1200	V
V_{GES}	*Maximum DC gate voltage*						±20	V
I_C	*Collector current* *(depending on thermal properties of assembly)*						35	A
$V_{CE\ sat}$	*Collector emitter saturation voltage*	V_{GE} = 15 V	I_C = 35 A	T_{VJ} = 25°C		1.8	2.1	V
				T_{VJ} = 125°C		2.1		V
V_{TO}	*Threshold voltage*	V_{GE} = 15 V;	T_{VJ} = 150 °C				1.1	V
r_T	*(for power loss calculation)*						40	m Ω
I_{CES}	*Collector emitter leakage current*	V_{CE} = 1200 V	V_{GE} = 0 V	T_{VJ} = 25°C		10	100	µA
				T_{VJ} = 125°C		100		µA
I_{GES}	*Gate emitter leakage current*	V_{CE} = 0 V	V_{GE} = ±20 V				500	nA
$V_{GE(th)}$	*Gate emitter threshold voltage*	I_C = 1.5 mA	V_{CE} = V_{GE}	T_{VJ} = 25°C	5.4	5.8	6.5	V
Q_{Gon}	*Total gate charge*	I_C = 35 A	V_{CE} = 600 V	V_{GE} = 15 V		106		nC
C_{ies}	*Input capacitance*	V_{CE} = 25 V	V_{GE} = 0 V	T_{VJ} = 25°C		1.97		pF
C_{oes}	*Output capacitance*	f = 1 MHz				192		pF
C_{res}	*Reverse transfer capacitance*					70		pF
$t_{d(on)}$	*Turn-on delay time*					70		ns
t_r	*Current rise time*					40		ns
$t_{d(off)}$	*Turn-off delay time*	V_G = 600 V	I_C = 35 A			250		ns
t_f	*Current fall time*	R_G = 27 Ω	V_{GE} = ±15 V	T_{VJ} = 125°C		100		ns
E_{on}	*Turn-on energy per pulse*	measured with: DWHP 23-12B				3.8		mJ
E_{off}	*Turn-off energy per pulse*					4.1		mJ
RBSOA	*Reverse bias safe operation area*	V_{GE} = 15 V	R_G = 27 Ω	T_{VJ} = 125°C				
				V_{CE} = 1200 V			105	A
SCSOA	*Short circuit safe operation area*							
t_{SC}	*Short circuit duration*	V_{CE} = 900 V	V_{GE} = ±15 V	T_{VJ} = 125°C			10	µs
I_{SC}	*Short circuit current*	R_G = 27 Ω	non-repetitive			140		A

Data according to IEC 60747

Dimensions (1 mm = 0.0394")



A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
6.7	6.7	5	5	2.3

F [mm]	G [mm]	H [mm]	I [mm]	J [mm]
2.3	1.3	1.3	n/a	n/a

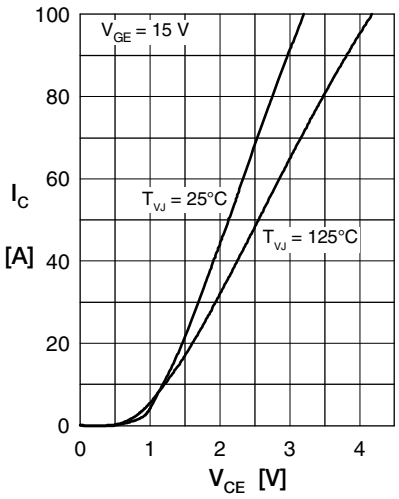


Fig. 1 Typ. output characteristics

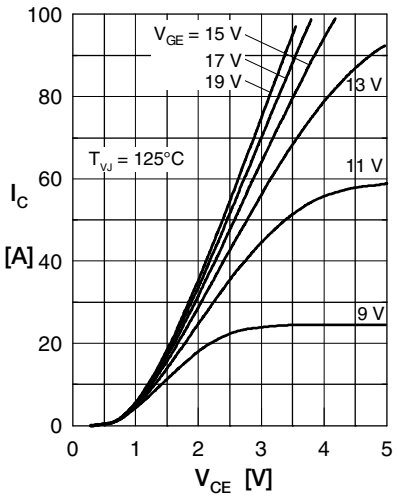


Fig. 2 Typ. output characteristics

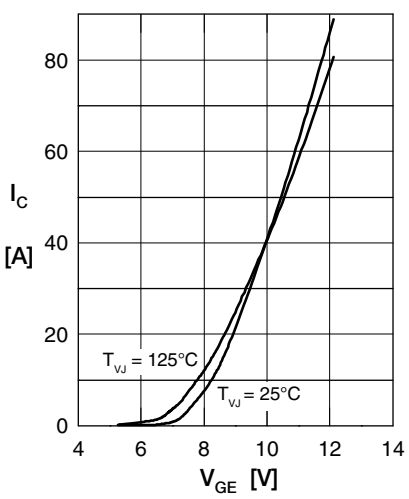


Fig. 3 Typ. tranfer characteristics

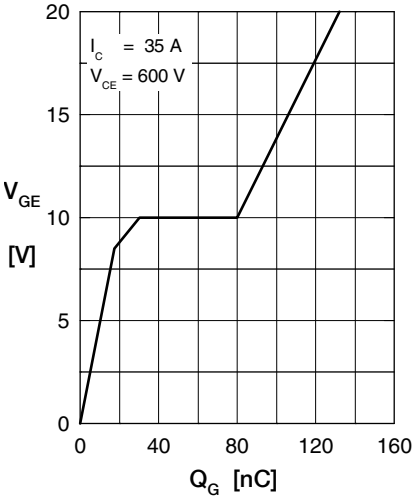


Fig. 4 Typ. turn-on gate charge

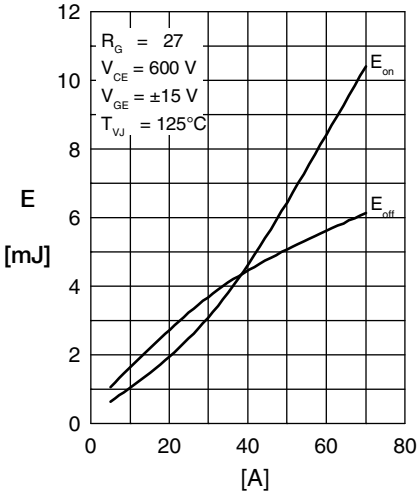


Fig. 5 Typ. switching energy versus collector current

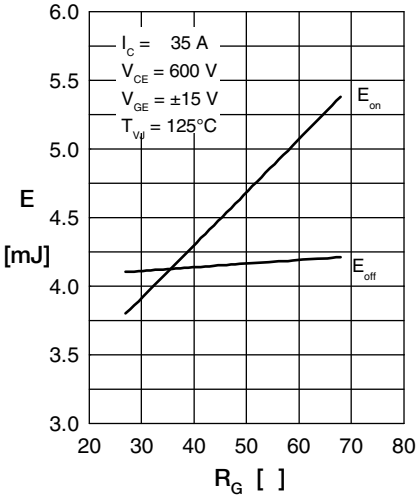


Fig. 6 Typ. switching energy versus gate resistance

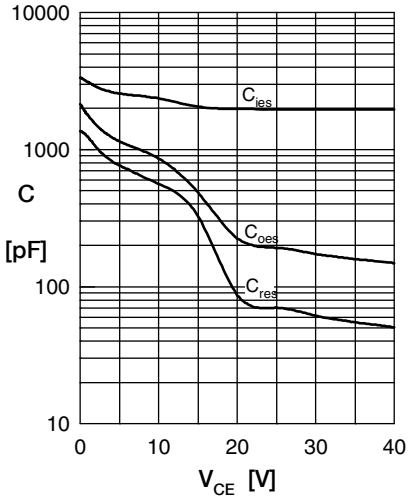


Fig. 7 Capacitance