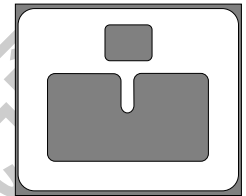
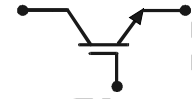


# XPT IGBT Chip



Type	V <sub>CE</sub> [V]	I <sub>C</sub> [A]	Chip Size [mm] x [mm]	Package	Ordering Code
IX22X12A	1200	15	5.2 4.4	sawn on foil <input type="checkbox"/>	-
				unsawn wafer <input type="checkbox"/>	-
				in waffle pack <input checked="" type="checkbox"/>	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 I<sub>C</sub>
  - low EMI
- Thin wafer technology combined with the XPT design results in a competitive low V<sub>ce(sat)</sub>

**Applications:**

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

**Mechanical Parameters**

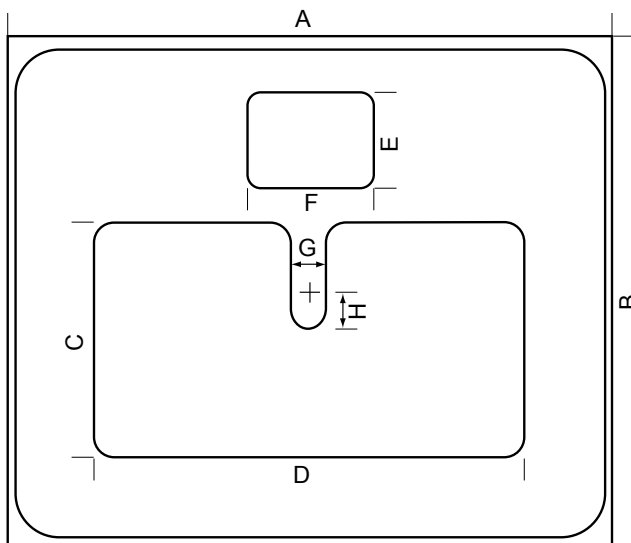
Parameters	Conditions	Orientation	Rating s	Unit
Area active			13.46	mm <sup>2</sup>
Area total			22.88	mm <sup>2</sup>
Wafer size Ø			150	mm
Thickness			130	µm
Material	SiFZ	Orientation	<100>	
Max. possible chips	per wafer			
Passivation	front side		SiN	
Metalization	top side		AlSi	
	backside		Al / Ti / Ni / Ag	
Recom. wire bonds (Al)	Emitter	Number / Ø	2 / 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 (T <sub>stg</sub> )		-40 ... 40	°C
Soldering temperature (5 min.)			max. tbd	°C
Virtual junction temperature T <sub>vj</sub>			-40 ... 150	°C

## Electrical Parameters

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$V_{CES}$	Collector emitter voltage	$V_{GE} = 0\text{ V}$ $I_C = 1\text{ mA}$ $T_{VJ} = 25^\circ\text{C}$			1200	V
$V_{GES}$	Maximum DC gate voltage				$\pm 20$	V
$I_C$	Collector current (depending on thermal properties of assembly)				15	A
$V_{CE\text{ sat}}$	Collector emitter saturation voltage	$V_{GE} = 15\text{ V}$ $I_C = 16\text{ A}$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		1.8 2.1	2.1	V
$V_{TO}$	Threshold voltage	$V_{GE} = 15\text{ V};$ $T_{VJ} = 150^\circ\text{C}$			1.1	V
$r_T$	(for power loss calculation)				87.5	m $\Omega$
$I_{CES}$	Collector emitter leakage current	$V_{CE} = 1200\text{ V}$ $V_{GE} = 0\text{ V}$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		10 100	100	$\mu\text{A}$
$I_{GES}$	Gate emitter leakage current	$V_{CE} = 0\text{ V}$ $V_{GE} = \pm 20\text{ V}$			500	nA
$V_{GE(th)}$	Gate emitter threshold voltage	$I_C = 0.6\text{ mA}$ $V_{CE} = V_{GE}$ $T_{VJ} = 25^\circ\text{C}$	5.4	6	6.5	V
$Q_{Gon}$	Total gate charge	$I_C = 15\text{ A}$ $V_{CE} = 600\text{ V}$ $V_{GE} = 15\text{ V}$		47		nC
$C_{ies}$	Input capacitance			935		pF
$C_{oes}$	Output capacitance	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$ $T_{VJ} = 25^\circ\text{C}$		102		pF
$C_{res}$	Reverse transfer capacitance	$f = 1\text{ MHz}$		34		pF
$t_{d(on)}$	Turn-on delay time			70		ns
$t_r$	Current rise time			40		ns
$t_{d(off)}$	Turn-off delay time	$V_G = 600\text{ V}$ $I_C = 15\text{ A}$		250		ns
$t_f$	Current fall time	$R_G = 56\ \Omega$ $V_{GE} = \pm 15\text{ V}$ $T_{VJ} = 125^\circ\text{C}$		100		ns
$E_{on}$	Turn-on energy per pulse	measured with: DWHP 16-12B		1.55		mJ
$E_{off}$	Turn-off energy per pulse			1.7		mJ
<b>RBSOA</b>	<b>Reverse bias safe operation area</b>	$V_{GE} = 15\text{ V}$ $R_G = 56\ \Omega$ $T_{VJ} = 125^\circ\text{C}$ $V_{CE} = 1200\text{ V}$			45	A
<b>SCSOA</b>	<b>Short circuit safe operation area</b>					
$t_{sc}$	Short circuit duration	$V_{CE} = 900\text{ V}$ $V_{GE} = \pm 15\text{ V}$ $T_{VJ} = 125^\circ\text{C}$			10	$\mu\text{s}$
$I_{sc}$	Short circuit current	$R_G = 56\ \Omega$ non-repetitive		60		A

Data according to IEC 60747

## Dimensions (1 mm = 0.0394")



A	B	C	D	E
[mm]	[mm]	[mm]	[mm]	[mm]
5.2	4.4	2	3.7	0.83

F	G	H	I	J
[mm]	[mm]	[mm]	[mm]	[mm]
1.08	0.3	0.3	n/a	n/a

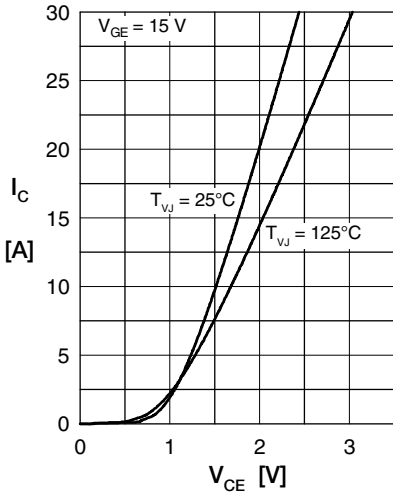


Fig. 1 Typ. output characteristics

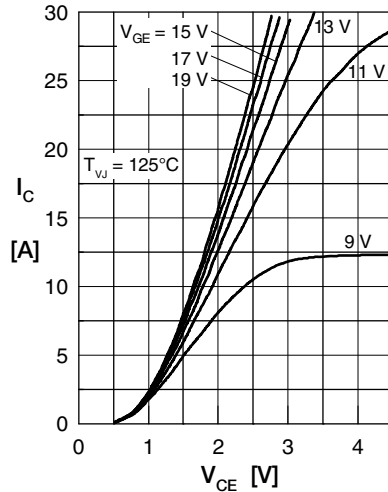


Fig. 2 Typ. output characteristics

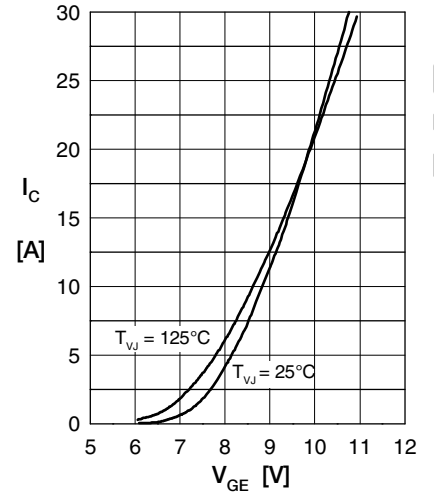


Fig. 3 Typ. transfer characteristics

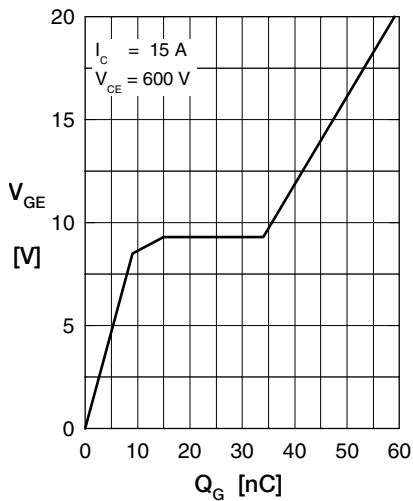


Fig. 4 Typ. turn-on gate charge

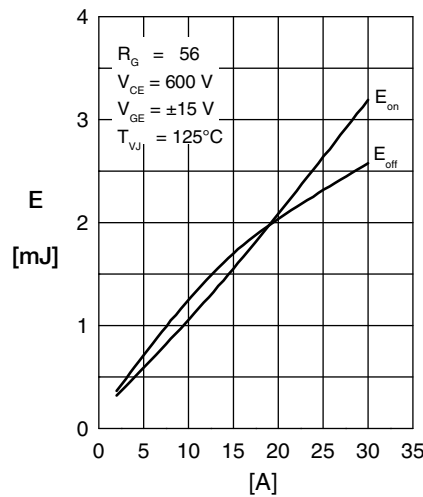


Fig. 5 Typ. switching energy versus collector current

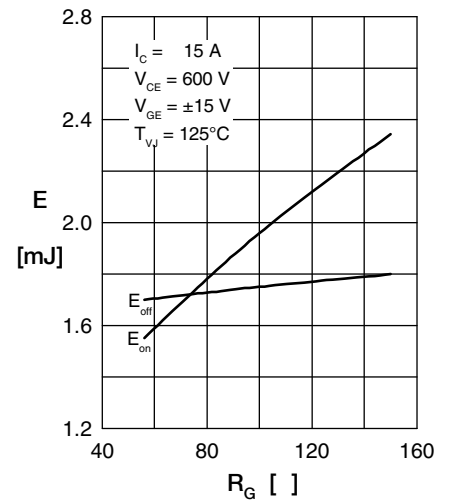


Fig. 6 Typ. switching energy versus gate resistance

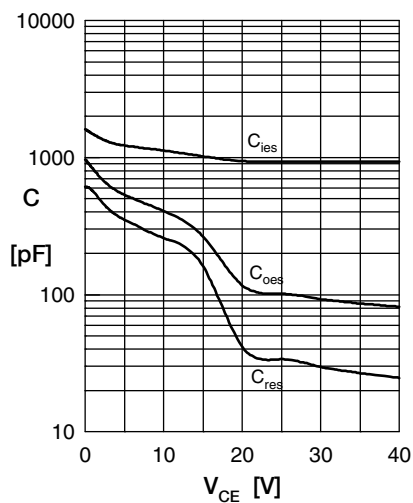


Fig. 7 Capacitance