

# XPT IGBT

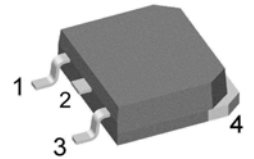
preliminary

$$V_{CES} = 1200V$$

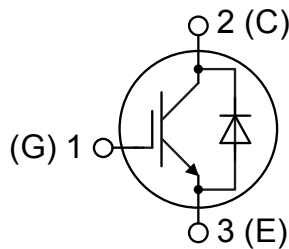
$$I_{C25} = 9A$$

$$V_{CE(sat)} = 1.8V$$

Copack

**Part number**
**IXA4IF1200TC**


Backside: collector


**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  $\mu$ sec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 3x Ic
- Thin wafer technology combined with the XPT design results in a competitive low VCE(sat)
- SONIC™ diode
  - fast and soft reverse recovery
  - low operating forward voltage

**Applications:**

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

**Package:** TO-268AA (D3Pak)

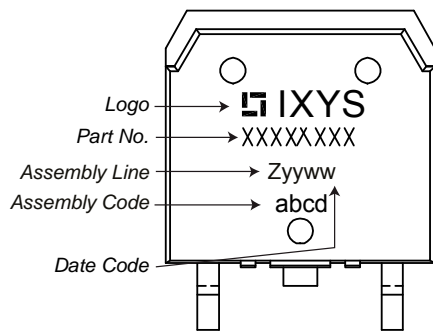
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

IGBT				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{CES}$	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
$V_{GES}$	max. DC gate voltage				$\pm 20$	V	
$V_{GEM}$	max. transient gate emitter voltage				$\pm 30$	V	
$I_{C25}$	collector current	$T_C = 25^{\circ}\text{C}$			9	A	
$I_{C100}$		$T_C = 100^{\circ}\text{C}$			5	A	
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}\text{C}$			45	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 3\text{A}; V_{GE} = 15\text{V}$		1.8	2.1	V	
				2.1		V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.1\text{mA}; V_{GE} = V_{CE}$	5.4	5.9	6.5	V	
$I_{CES}$	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{V}$			0.1	mA	
				0.1		mA	
$I_{GES}$	gate emitter leakage current	$V_{GE} = \pm 20\text{V}$			500	nA	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{V}; V_{GE} = 15\text{V}; I_C = 3\text{A}$		12		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600\text{V}; I_C = 3\text{A}$ $V_{GE} = \pm 15\text{V}; R_G = 330\Omega$		70		ns	
$t_r$	current rise time		$T_{VJ} = 125^{\circ}\text{C}$	40		ns	
$t_{d(off)}$	turn-off delay time		250			ns	
$t_f$	current fall time		100			ns	
$E_{on}$	turn-on energy per pulse		0.4			mJ	
$E_{off}$	turn-off energy per pulse		0.3			mJ	
<b>RBSOA</b>	reverse bias safe operating area	$V_{GE} = \pm 15\text{V}; R_G = 330\Omega$					
$I_{CM}$		$V_{CEmax} = 1200\text{V}$			9	A	
<b>SCSOA</b>	short circuit safe operating area	$V_{CEmax} = 900\text{V}$					
$t_{sc}$	short circuit duration	$V_{CE} = 900\text{V}; V_{GE} = \pm 15\text{V}$			10	$\mu\text{s}$	
$I_{sc}$	short circuit current	$R_G = 330\Omega; \text{non-repetitive}$		12		A	
$R_{thJC}$	thermal resistance junction to case				2.7	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.15		K/W	
<b>Diode</b>							
$V_{RRM}$	max. repetitive reverse voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
$I_{F25}$	forward current	$T_C = 25^{\circ}\text{C}$			10	A	
$I_{F100}$		$T_C = 100^{\circ}\text{C}$			6	A	
$V_F$	forward voltage	$I_F = 3\text{A}$			2.20	V	
				1.90		V	
$I_R$	reverse current	$V_R = V_{RRM}$			*	mA	
	* not applicable, see Ices value above				*	mA	
$Q_{rr}$	reverse recovery charge	$V_R = 600\text{V}$ $-di_F/dt = -150\text{A}/\mu\text{s}$ $I_F = 3\text{A}; V_{GE} = 0\text{V}$		0.5		$\mu\text{C}$	
$I_{RM}$	max. reverse recovery current		$T_{VJ} = 125^{\circ}\text{C}$	5		A	
$t_{rr}$	reverse recovery time		350			ns	
$E_{rec}$	reverse recovery energy		0.1			mJ	
$R_{thJC}$	thermal resistance junction to case				3	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.15		K/W	

preliminary

Package TO-268AA (D3Pak)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		150	°C
<b>Weight</b>				5		g
$F_C$	mounting force with clip		20		120	N

## Product Marking



## Part number

- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 4 = Current Rating [A]
- IF = Copack
- 1200 = Reverse Voltage [V]
- TC = TO-268AA (D3Pak) (2)

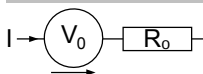
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA4IF1200TC	IXA4IF1200TC	Tube	30	510224

Similar Part	Package	Voltage class
IXA4IF1200UC	TO-252AA (DPak)	1200

## Equivalent Circuits for Simulation

\* on die level

$T_{VJ} = 150\text{ }^{\circ}\text{C}$

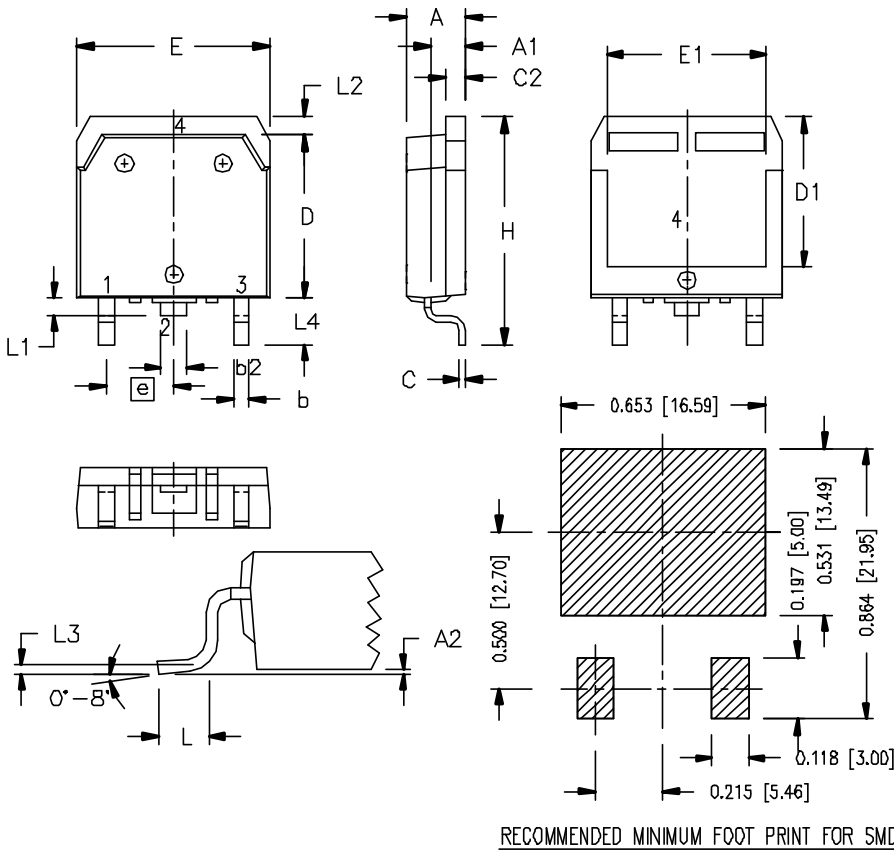


$V_{0\text{ max}}$  threshold voltage

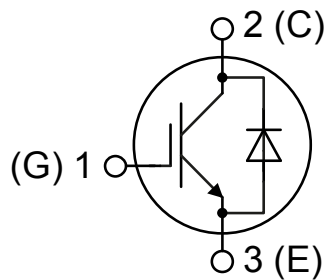
$R_{0\text{ max}}$  slope resistance \*

	IGBT	Diode	
$V_{0\text{ max}}$	1.1	1.25	V
$R_{0\text{ max}}$	460	280	mΩ

Outlines TO-268AA (D3Pak)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.100
b	1.15	1.45	0.045	0.057
b2	1.90	2.10	0.075	0.083
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	12.40	12.70	0.488	0.500
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.45 BSC		0.215 BSC	
H	18.70	19.10	0.736	0.752
L	2.40	2.70	0.094	0.106
L1	1.20	1.40	0.047	0.055
L2	1.00	1.15	0.039	0.045
L3	0.25 BSC		0.100 BSC	
L4	3.80	4.10	0.150	0.161





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