

XPT IGBT

preliminary

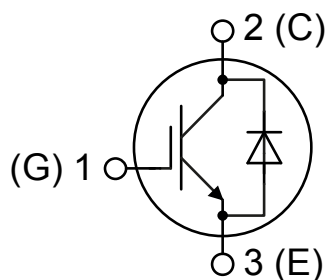
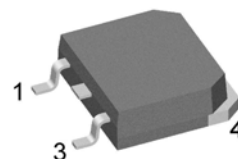
$$V_{CES} = 1200V$$

$$I_{C25} = 9A$$

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

Copack

Part number

IXA4IF1200TC


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 μ sec.
 - very low gate charge
 - low EMI
 - square RBSOA @ 3x I_C
- Thin wafer technology combined with the XPT design results in a competitive low $V_{CE(sat)}$
- 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

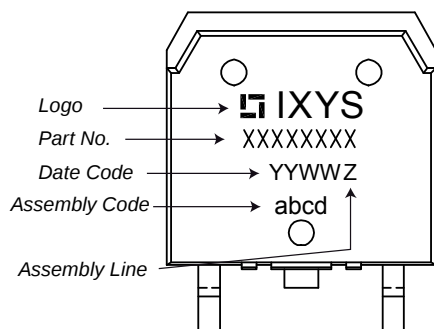
IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
V_{GES}	max. DC gate voltage					± 20	V
V_{GEM}	max. transient collector gate voltage					tbd	V
I_{C25}	collector current	$T_C = 25^{\circ}\text{C}$				9	A
I_{C100}		$T_C = 100^{\circ}\text{C}$				5	A
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				45	W
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 3\text{ A}; V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		1.8	2.1	V
			$T_{VJ} = 125^{\circ}\text{C}$		2.1		V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.1\text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}\text{C}$	5.4	5.9	6.5	V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			0.1	mA
			$T_{VJ} = 125^{\circ}\text{C}$		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 $V_{CE} = 600\text{ V}; I_C = 3\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 330\text{ }\Omega$	$T_{VJ} = 125^{\circ}\text{C}$		70		ns
t_r	current rise time				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
RBSOA	reverse bias safe operating area	$V_{GE} = \pm 15\text{ V}; R_G = 330\text{ }\Omega$	$T_{VJ} = 125^{\circ}\text{C}$				
I_{CM}		$V_{CEmax} = 1200\text{ V}$				9	A
SCSOA	short circuit safe operating area	$V_{CEmax} = 1200\text{ V}$					
t_{sc}	short circuit duration	$V_{CE} = 900\text{ V}; V_{GE} = \pm 15\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$			10	μs
I_{sc}	short circuit current	$R_G = 330\text{ }\Omega$; non-repetitive			12		A
R_{thJC}	thermal resistance junction to case					2.7	K/W
R_{thCH}	thermal resistance case to heatsink				0.2		K/W
Diode							
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	$I_F = 3\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			2.20	V
			$T_{VJ} = 125^{\circ}\text{C}$		1.90		V
I_R	reverse current	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$			*	mA
	* not applicable, see Ices value above		$T_{VJ} = 125^{\circ}\text{C}$		*		mA
Q_{rr}	reverse recovery charge	$V_R = 600\text{ V}$ $-di_F/dt = -150\text{ A}/\mu\text{s}$ $I_F = 3\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$		0.5		μC
I_{RM}	max. reverse recovery current				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				0.2		K/W

preliminary

Package TO-268AA (D3Pak)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			70	A
T_{stg}	storage temperature		-55		150	°C
T_{vj}	virtual junction temperature		-40		150	°C
Weight				5		g
F_c	mounting force with clip		20		120	N

0

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)

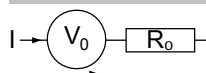
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	IXA4IF1200TC	IXA4IF1200TC	Tube	30	510224

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

Equivalent Circuits for Simulation

* on die level

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



$V_{0\max}$ threshold voltage

$R_{0\max}$ slope resistance *

IGBT

1.1

460

Diode

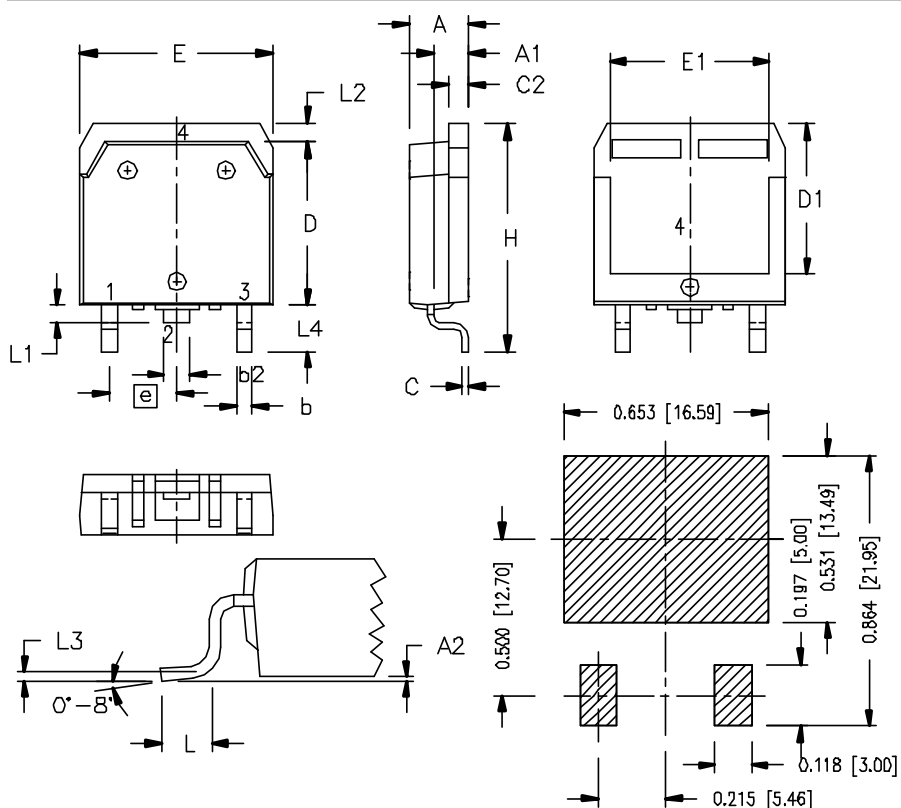
1.25

280

V

mΩ

Outlines TO-268AA (D3Pak)



RECOMMENDED MINIMUM FOOT PRINT FOR SMD

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

