

XPT IGBT

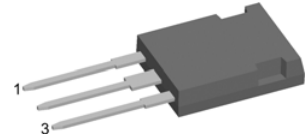
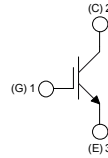
Single IGBT

$$I_{C25} = 84 \text{ A}$$

$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat)typ} = 1.8 \text{ V}$$

Part number

IXA55I1200HJ

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 $V_{CE(sat)}$

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

Package:

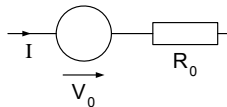
- Housing: ISOPLUS247
- Industry standard outline
- DCB isolated backside
- Isolation Voltage 3000 V
- Epoxy meets UL 94V-0
- RoHS compliant

IGBT

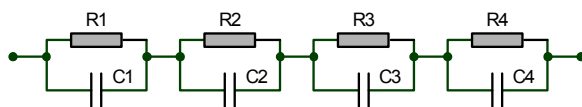
Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{CES}	Collector emitter voltage	$V_{GE} = 0 \text{ V}$			1200	V
V_{GES}	Maximum DC gate voltage				± 20	V
I_{C25}	Collector current				84	A
I_{C90}					54	A
P_{tot}	Total power dissipation				290	W
I_{CES}	Collector emitter leakage current	$V_{CE} = V_{CES} ; V_{GE} = 0 \text{ V}$			0.1	mA
				0.1		mA
I_{GES}	Gate emitter leakage current	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			500	nA
$V_{CE(sat)}$	Collector emitter saturation voltage	$I_C = 55 \text{ A}; V_{GE} = 15 \text{ V}$		1.8	2.1	V
				2.1		V
$V_{GE(th)}$	Gate emitter threshold voltage	$I_C = 2 \text{ mA}; V_{GE} = V_{CE}$	5.5	6	6.5	V
Q_{Gon}	Total gate charge	$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 50 \text{ A}$		190		nC
$t_{d(on)}$	Turn-on delay time			70		ns
t_r	Current rise time			40		ns
$t_{d(off)}$	Turn-off delay time	Inductive load		250		ns
t_f	Current fall time	$V_{CE} = 600 \text{ V}; I_C = 50 \text{ A}$		100		ns
E_{on}	Turn-on energy per pulse	$V_{GE} = \pm 15 \text{ V}; R_G = 15 \Omega$		4.5		mJ
E_{off}	Turn-off energy per pulse			5.5		mJ
RBSOA	Reverse bias safe operation area	$V_{GE} = 15 \text{ V}; R_G = 15 \Omega$ $V_{CEK} = 1200 \text{ V}$			150	A
SCSOA	Short circuit safe operation area					
t_{sc}	Short circuit duration	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}$			10	μ s
I_{sc}	Short circuit current	$R_G = 15 \Omega$; non-repetitive			200	A
R_{thJC}	Thermal resistance junction to case				0.43	K/W

Diode

Symbol	Definition	Conditions	Ratings			Unit	
			min.	typ.	max.		
I_{F25}	Forward current	$T_C = 25^\circ\text{C}$			n/a	A	
I_{F90}		$T_C = 90^\circ\text{C}$			n/a	A	
V_F	Forward voltage	$I_F = \quad \text{A}$		$T_{VJ} = 25^\circ\text{C}$		n/a	V
				$T_{VJ} = 125^\circ\text{C}$	n/a		V
Q_{rr}	Reverse recovery charge	$V_R = 600\text{V};$ $di_F/dt = - \quad \text{A}/\mu\text{s};$ $I_F = \quad \text{A}$		$T_{VJ} = 125^\circ\text{C}$	n/a		μC
I_{RM}	Maximum reverse recovery current				n/a		A
t_{rr}	Reverse recovery time				n/a		ns
$E_{rec(off)}$	Reverse recovery losses at turn-off				n/a		mJ
R_{thJC}	Thermal resistance junction to case				n/a	K/W	

Equivalent Circuits for Simulation


Symbol	Definition		Ratings			Unit
			min.	typ.	max.	
V_0	IGBT	$T_{VJ} = 150^\circ\text{C}$			1.1	V
R_0			28			m Ω
V_0	Diode	$T_{VJ} = 150^\circ\text{C}$			n/a	V
R_0			n/a			m Ω



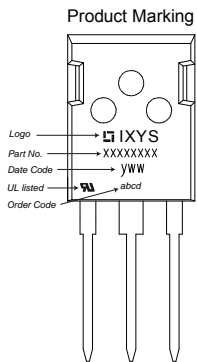
$$Z_{th}(t) = \sum_{i=1}^n \left[R_i \cdot \left(1 - \exp\left(-\frac{t}{\tau_i}\right) \right) \right]$$

$$\tau_i = R_i \cdot C_i$$

	IGBT	Diode
R_1	0.1	n/a
R_2	0.05	n/a
R_3	0.21	n/a
R_4	0.07	n/a
τ_1	0.0025	n/a
τ_2	0.03	n/a
τ_3	0.03	n/a
τ_4	0.08	n/a

Package ISOPLUS247

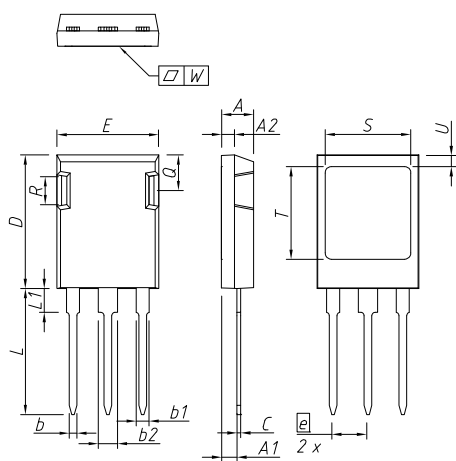
Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
T_{vj}	Virtual junction temperature		-55		150	°C
T_{stg}	Storage temperature		-55		150	°C
R_{thCH}	Thermal resistance case to heatsink			0.25		K/W
Weight				6		g
F_c	Mounting force with clip		20		120	N
V_{ISOL}	Isolation voltage	t = 1 second	3600			V
		t = 1 minute	3000			V
d_s	Creepage distance on surface					mm
d_A	Striking distance through air					mm



Part number

- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 55 = Current Rating [A]
- I = Single IGBT
- 1200 = Reverse Voltage [V]
- HJ = ISOPLUS247 (3)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	IXA 55 I 1200 HJ	IXA55I1200HJ			



DIM.	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	4,83	5,21	0,190	0,205
A1	2,29	2,54	0,090	0,100
A2	1,91	2,16	0,075	0,085
b	1,14	1,40	0,045	0,055
b1	1,91	2,15	0,075	0,085
b2	2,92	3,20	0,115	0,126
C	0,61	0,83	0,024	0,033
D	20,80	21,34	0,819	0,840
E	15,75	16,13	0,620	0,635
e	5,45 BSC		0,215 BSC	
L	19,81	20,60	0,780	0,811
L1	3,81	4,38	0,150	0,172
Q	5,59	6,20	0,220	0,244
R	4,32	4,85	0,170	0,191
S	13,21	13,72	0,520	0,540
T	15,75	16,26	0,620	0,640
U	1,65	2,03	0,065	0,080
W	-	0,10	-	0,004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite
 The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max} .
 This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except L_{max} .

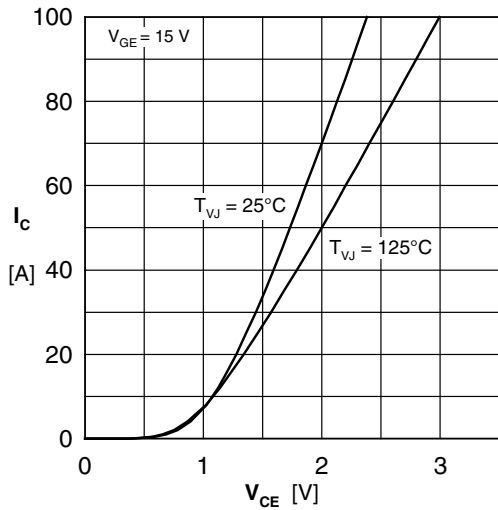


Fig. 1 Typ. output characteristics

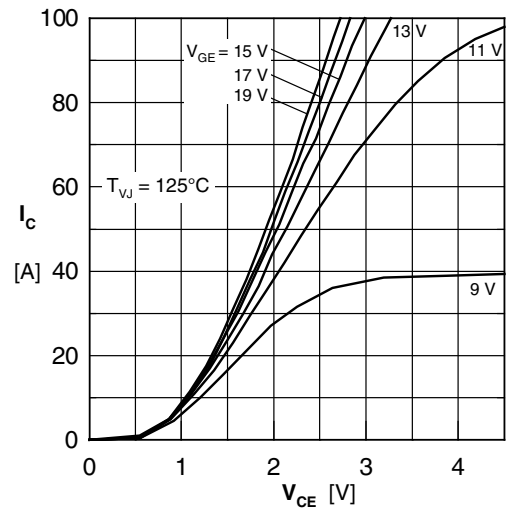


Fig. 2 Typ. output characteristics

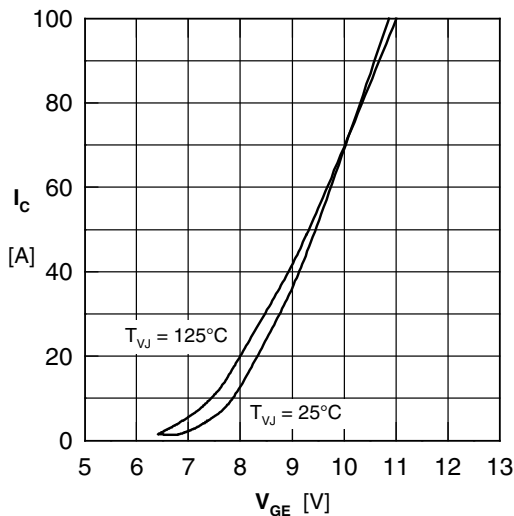


Fig. 3 Typ. transfer characteristics

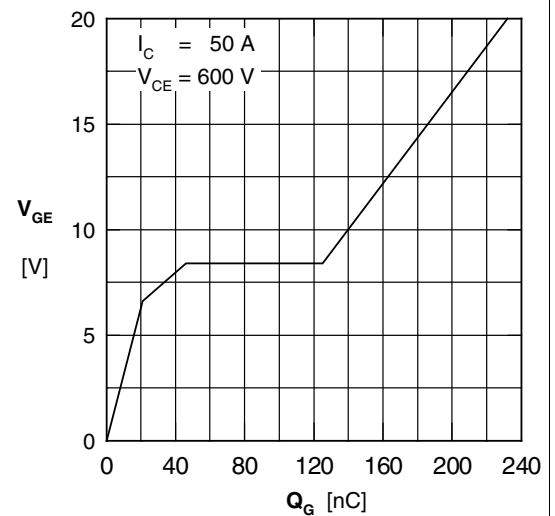


Fig. 4 Typ. turn-on gate charge

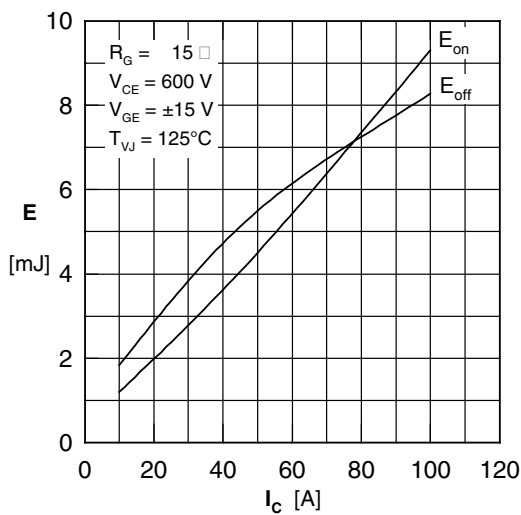


Fig. 5 Typ. switching energy vs. collector current

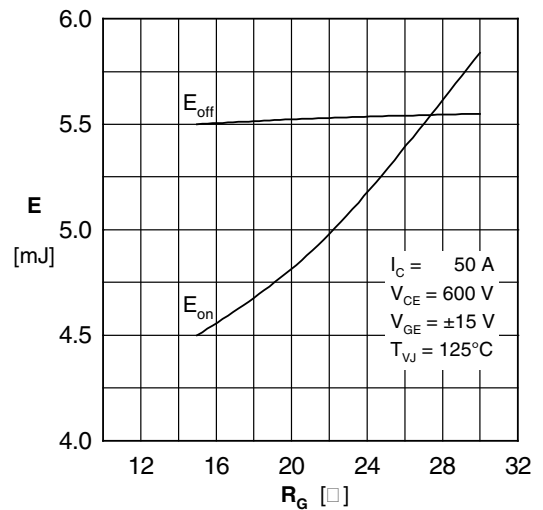


Fig. 6 Typ. switching energy vs. gate resistance

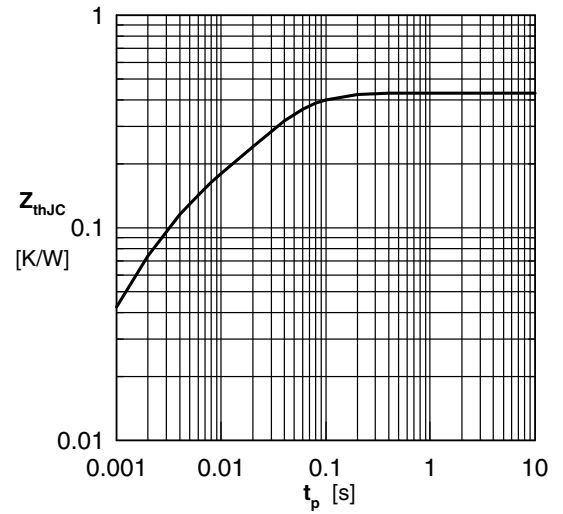


Fig. 8 Typ. transient thermal impedance