

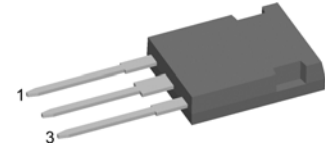
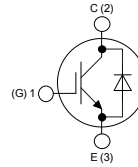
# XPT IGBT

Copack

$I_{C25} = 58 \text{ A}$   
 $V_{CES} = 1200 \text{ V}$   
 $V_{CE(sat)typ} = 1.8 \text{ V}$

Part number

**IXA37IF1200HJ**



### 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  $\mu\text{sec}$ .
  - 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

### Package:

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

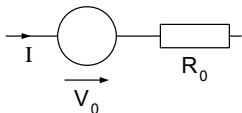
## IGBT

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				$\pm 20$	V
$I_{C25}$	Collector current				58	A
$I_{C90}$					37	A
$P_{tot}$	Total power dissipation				195	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	$I_C = 35 \text{ A}; V_{GE} = 15 \text{ V}$		1.8	2.1	V
				2.1		V
$V_{GE(th)}$	Gate emitter threshold voltage	$I_C = 1.5 \text{ mA}; V_{GE} = V_{CE}$	5.4	6	6.5	V
$Q_{Gon}$	Total gate charge	$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 35 \text{ A}$		106		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	$V_{CE} = 600 \text{ V}; I_C = 35 \text{ A}$		100		ns
$E_{on}$	Turn-on energy per pulse	$V_{GE} = \pm 15 \text{ V}; R_G = 27 \Omega$	$T_{VJ} = 125^\circ\text{C}$	3.8		mJ
$E_{off}$	Turn-off energy per pulse			4.1		mJ
<b>RBSOA</b>	Reverse bias safe operation area	$V_{GE} = 15 \text{ V}; R_G = 27 \Omega$ $V_{CEK} = 1200 \text{ V}$	$T_{VJ} = 125^\circ\text{C}$		105	A
<b>SCSOA</b>	Short circuit safe operation area					
$t_{sc}$	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	$R_G = 27 \Omega$ ; non-repetitive			140	A
$R_{thJC}$	Thermal resistance junction to case				0.64	K/W

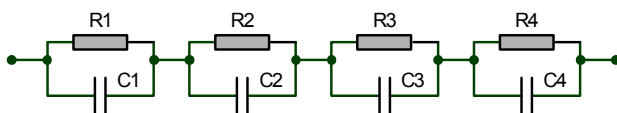
## Diode

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{F25}$	Forward current	$T_C = 25^\circ\text{C}$			42	A
$I_{F90}$		$T_C = 90^\circ\text{C}$			25	A
$V_F$	Forward voltage	$I_F = 30\text{ A}$	$T_{VJ} = 25^\circ\text{C}$	1.95	2.2	V
			$T_{VJ} = 125^\circ\text{C}$	1.95		V
$Q_{rr}$	Reverse recovery charge	$V_R = 600\text{ V}$ $di_F/dt = - 600\text{ A}/\mu\text{s};$ $I_F = 30\text{ A}$	$T_{VJ} = 125^\circ\text{C}$	3.5		$\mu\text{C}$
$I_{RM}$	Maximum reverse recovery current			30		A
$t_{rr}$	Reverse recovery time			350		ns
$E_{rec(off)}$	Reverse recovery losses at turn-off			0.9		mJ
$R_{thJC}$	Thermal resistance junction to case				1.2	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
$R_0$					39	m $\Omega$
$V_0$	Diode	$T_{VJ} = 150^\circ\text{C}$			1.25	V
$R_0$					28.3	m $\Omega$



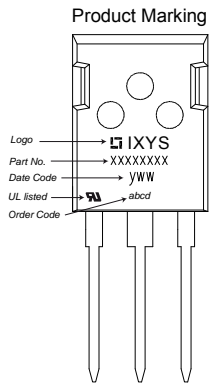
$$Z_{th}(t) = \sum_{i=1}^n \left[ R_i \cdot \left( 1 - \exp\left(-\frac{t}{\tau_i}\right) \right) \right]$$

$$\tau_i = R_i \cdot C_i$$

	IGBT	Diode
$R_1$	0.152	0.3413
$R_2$	0.0724	0.2171
$R_3$	0.3078	0.3475
$R_4$	0.1078	0.2941
$\tau_1$	0.0025	0.0025
$\tau_2$	0.03	0.03
$\tau_3$	0.03	0.03
$\tau_4$	0.08	0.08

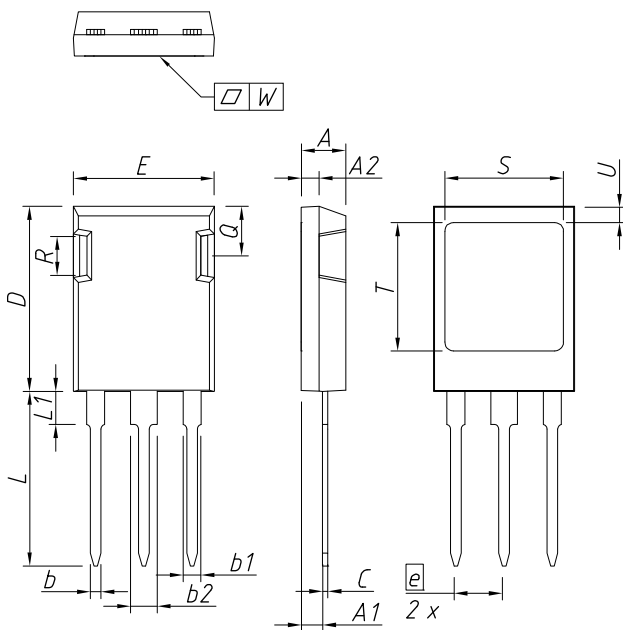
**Package ISOPLUS247**

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
<b>Weight</b>				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  
 37 = Current Rating [A]  
 IF = Copack  
 1200 = Reverse Voltage [V]  
 HJ = ISOPLUS247 (3)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	IXA 37 IF 1200 HJ	IXA37IF1200HJ	Tube	30	507993



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<sub>max</sub>.  
 This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except L<sub>max</sub>.

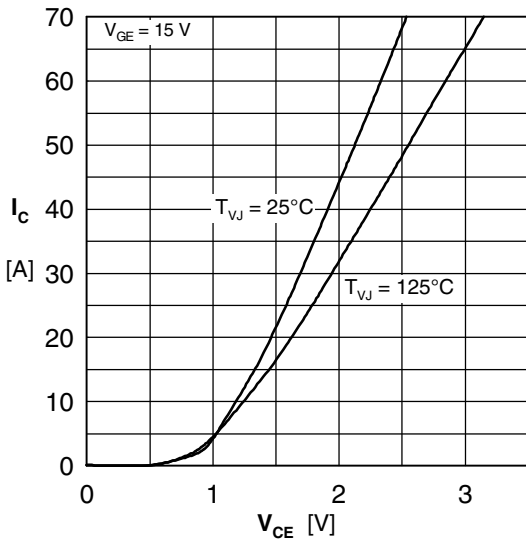


Fig. 1 Typ. output characteristics

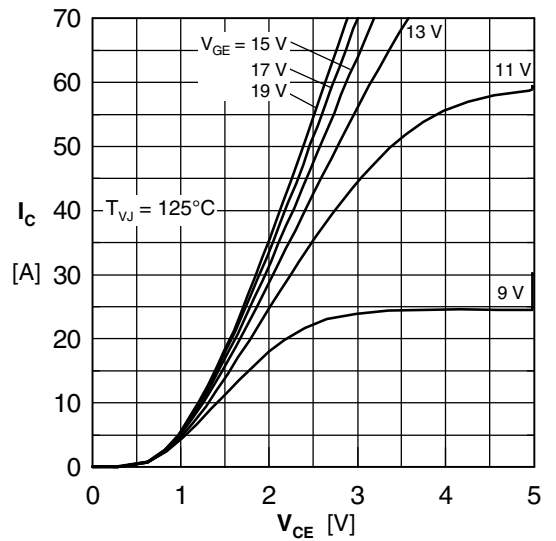


Fig. 2 Typ. output characteristics

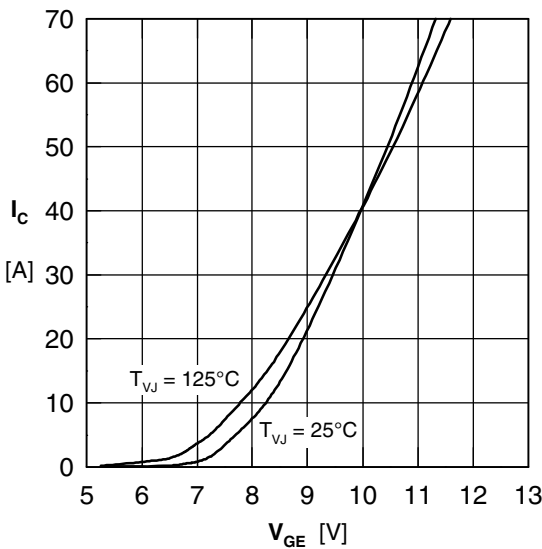


Fig. 3 Typ. transfer characteristics

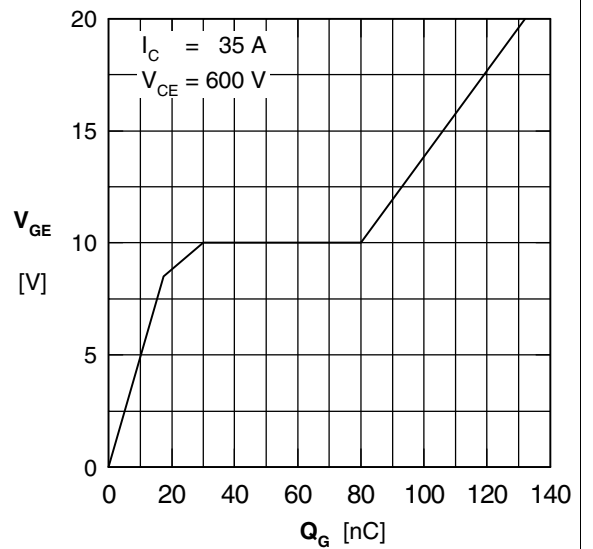


Fig. 4 Typ. turn-on gate charge

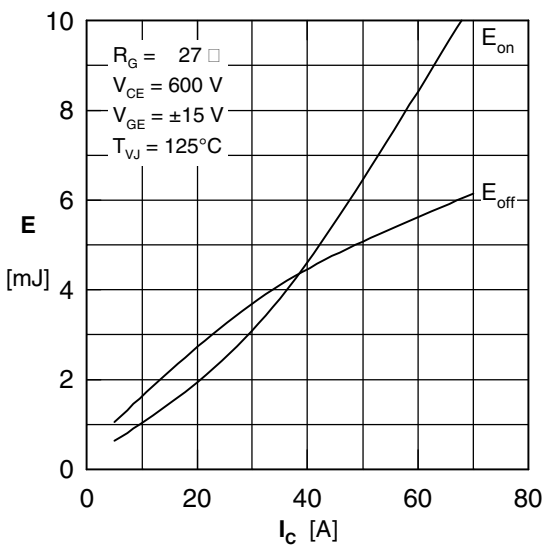


Fig. 5 Typ. switching energy vs. collector current

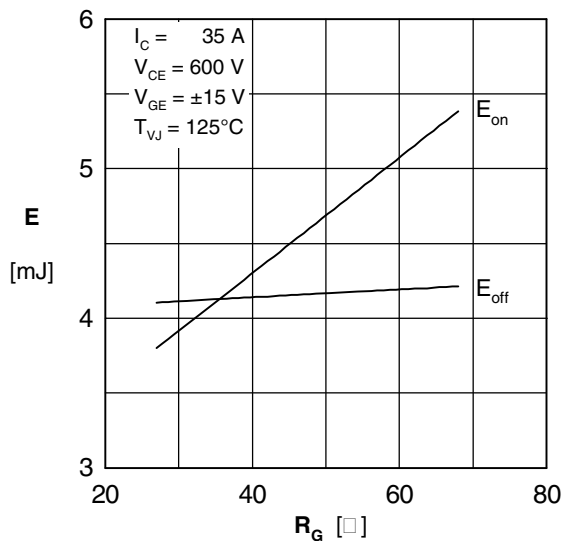


Fig. 6 Typ. switching energy vs. gate resistance

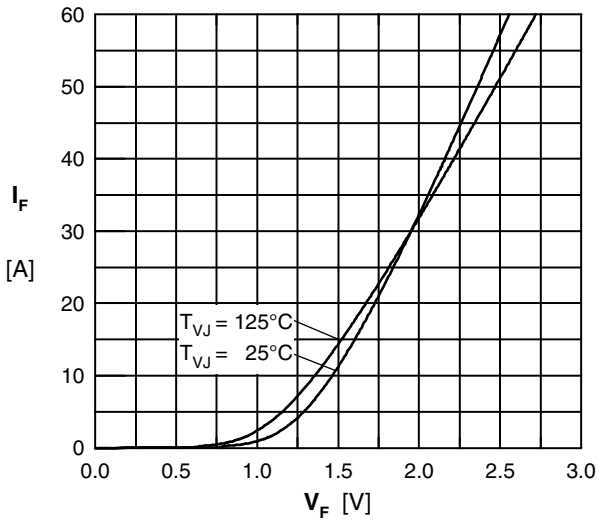


Fig. 7 Typ. Forward current versus  $V_F$

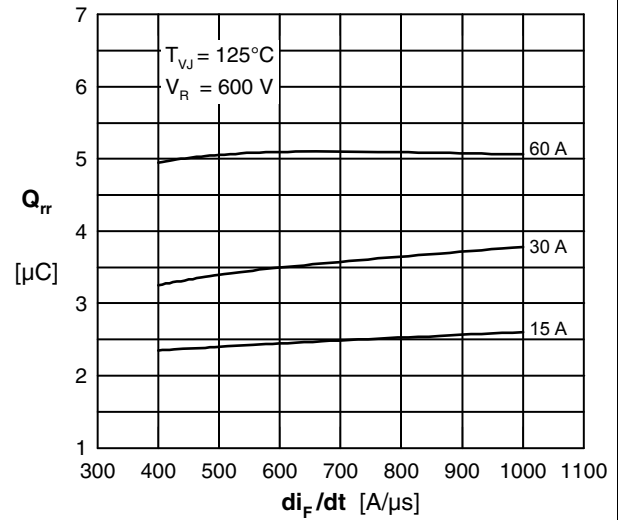


Fig. 8 Typ. reverse recov.charge  $Q_{rr}$  vs.  $di/dt$

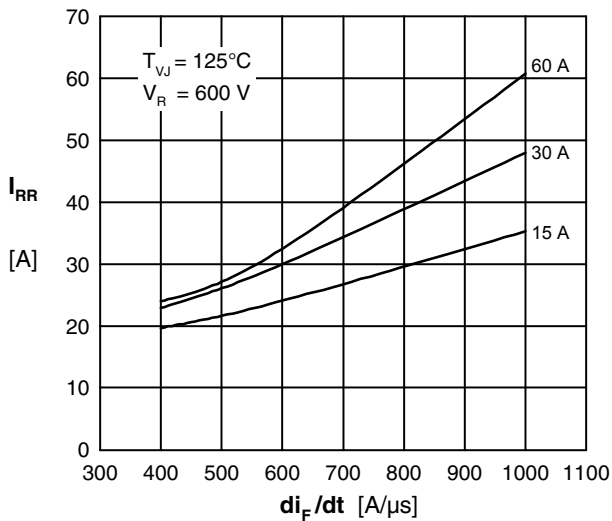


Fig. 9 Typ. peak reverse current  $I_{RM}$  vs.  $di/dt$

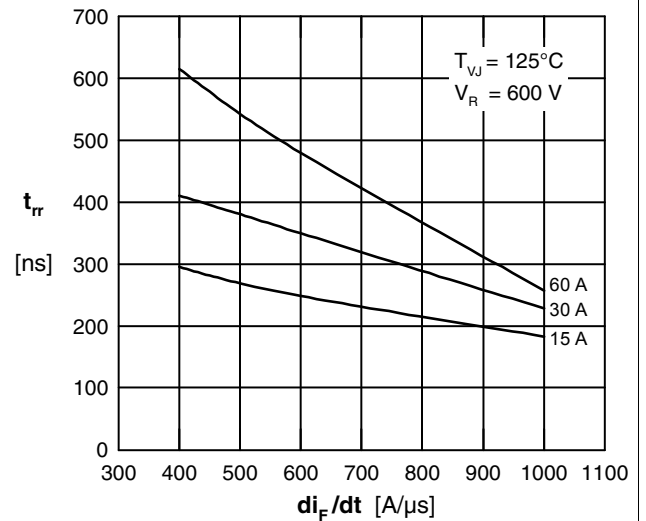


Fig. 10 Typ. recovery time  $t_{tr}$  versus  $di/dt$

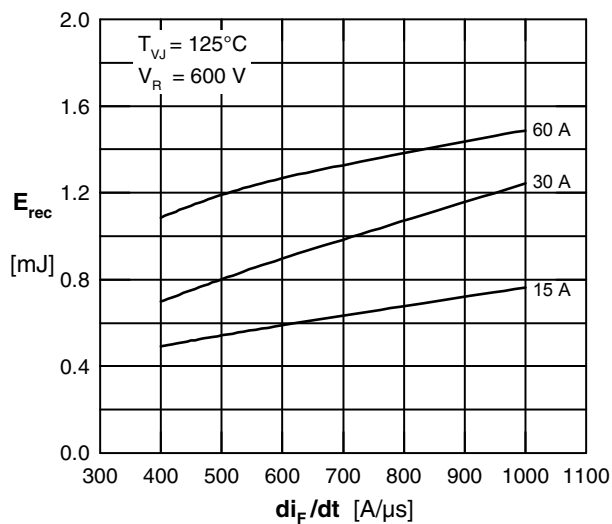


Fig. 5 Typ. recovery energy  $E_{rec}$  versus  $di/dt$

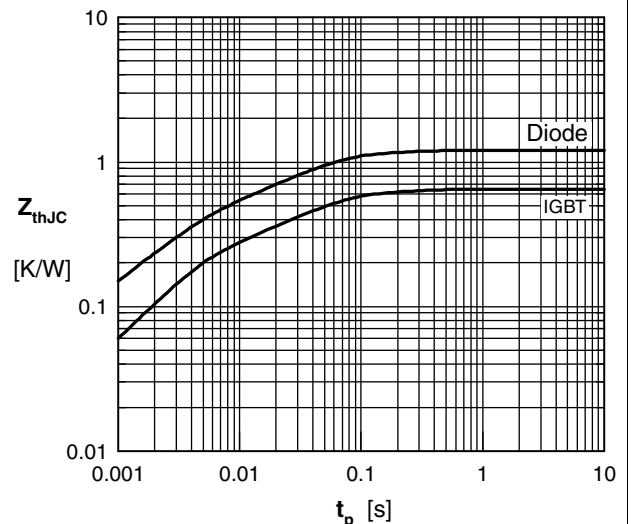


Fig. 12 Typ. transient thermal impedance