

XPT IGBT

$V_{CES} = 1200V$

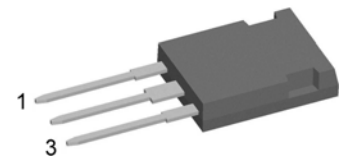
$I_{C25} = 58A$

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

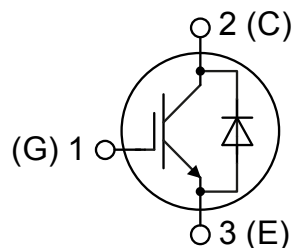
Copack

Part number

IXA37IF1200HJ



Backside: isolated

**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 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

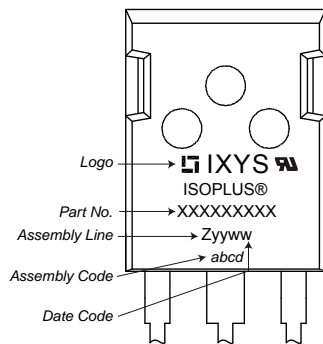
Package: ISOPLUS247

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

| IGBT | | | | Ratings | | | |
|---------------|--|--|-------------------------|---------|----------|---------|----|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit | |
| V_{CES} | collector emitter voltage | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V | |
| V_{GES} | max. DC gate voltage | | | | ± 20 | V | |
| V_{GEM} | max. transient gate emitter voltage | | | | ± 30 | V | |
| I_{C25} | collector current | $T_C = 25^{\circ}C$ | | | 58 | A | |
| I_{C80} | | $T_C = 80^{\circ}C$ | | | 37 | A | |
| P_{tot} | total power dissipation | $T_C = 25^{\circ}C$ | | | 195 | W | |
| $V_{CE(sat)}$ | collector emitter saturation voltage | $I_C = 35A; V_{GE} = 15V$ | | 1.8 | 2.1 | V | |
| | | | | 2.1 | | V | |
| $V_{GE(th)}$ | gate emitter threshold voltage | $I_C = 1.5mA; V_{CE} = V_{CE}$ | 5.4 | 5.9 | 6.5 | V | |
| I_{CES} | collector emitter leakage current | $V_{CE} = V_{CES}; V_{GE} = 0V$ | | | 0.1 | mA | |
| | | | | 0.1 | | mA | |
| I_{GES} | gate emitter leakage current | $V_{GE} = \pm 20V$ | | | 500 | nA | |
| $Q_{G(on)}$ | total gate charge | $V_{CE} = 600V; V_{GE} = 15V; I_C = 35A$ | | 106 | | nC | |
| $t_{d(on)}$ | turn-on delay time | inductive load $V_{CE} = 600V; I_C = 35A$ $V_{GE} = \pm 15V; R_G = 27\Omega$ | | 70 | | ns | |
| t_r | current rise time | | $T_{VJ} = 125^{\circ}C$ | | 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 | | | | 3.8 | | mJ |
| E_{off} | turn-off energy per pulse | | | | 4.1 | | mJ |
| RBSOA | reverse bias safe operating area | $V_{GE} = \pm 15V; R_G = 27\Omega$ | | | | | |
| I_{CM} | | $V_{CEmax} = 1200V$ | | | 105 | A | |
| SCSOA | short circuit safe operating area | $V_{CEmax} = 900V$ | | | | | |
| t_{sc} | short circuit duration | $V_{CE} = 900V; V_{GE} = \pm 15V$ | | | 10 | μs | |
| I_{sc} | short circuit current | $R_G = 27\Omega; \text{non-repetitive}$ | | 140 | | A | |
| R_{thJC} | thermal resistance junction to case | | | | 0.64 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.25 | | K/W | |
| Diode | | | | | | | |
| V_{RRM} | max. repetitive reverse voltage | $T_{VJ} = 25^{\circ}C$ | | | 1200 | V | |
| I_{F25} | forward current | $T_C = 25^{\circ}C$ | | | 42 | A | |
| I_{F80} | | $T_C = 80^{\circ}C$ | | | 25 | A | |
| V_F | forward voltage | $I_F = 30A$ | | | 2.20 | V | |
| | | | | 1.95 | | V | |
| I_R | reverse current | $V_R = V_{RRM}$ | | | * | mA | |
| | * not applicable, see Ices value above | | | | * | mA | |
| Q_{rr} | reverse recovery charge | $V_R = 600V$ $-di_F/dt = -600A/\mu s$ $I_F = 30A; V_{GE} = 0V$ | | 3.5 | | μC | |
| I_{RM} | max. reverse recovery current | | $T_{VJ} = 125^{\circ}C$ | | 30 | | A |
| t_{rr} | reverse recovery time | | | | 350 | | ns |
| E_{rec} | reverse recovery energy | | | | 0.9 | | mJ |
| R_{thJC} | thermal resistance junction to case | | | | 1.2 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.25 | | K/W | |

| Package ISOPLUS247 | | 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 |
| Weight | | | | 6 | | g |
| F_C | mounting force with clip | | 20 | | 120 | N |
| $d_{Spp/App}$ | creepage distance on surface striking distance through air | terminal to terminal | 2.7 | | | mm |
| $d_{Spbl/Apb}$ | | terminal to backside | 4.1 | | | mm |
| V_{ISOL} | isolation voltage | t = 1 second | 3600 | | | V |
| | | t = 1 minute | 3000 | | | V |

Product Marking



Part number

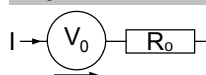
- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 37 = Current Rating [A]
- IF = Copack
- 1200 = Reverse Voltage [V]
- HJ = ISOPLUS247 (3)

| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|---------------|--------------------|---------------|----------|----------|
| Standard | IXA37IF1200HJ | IXA37IF1200HJ | Tube | 30 | 507993 |

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150\text{ °C}$

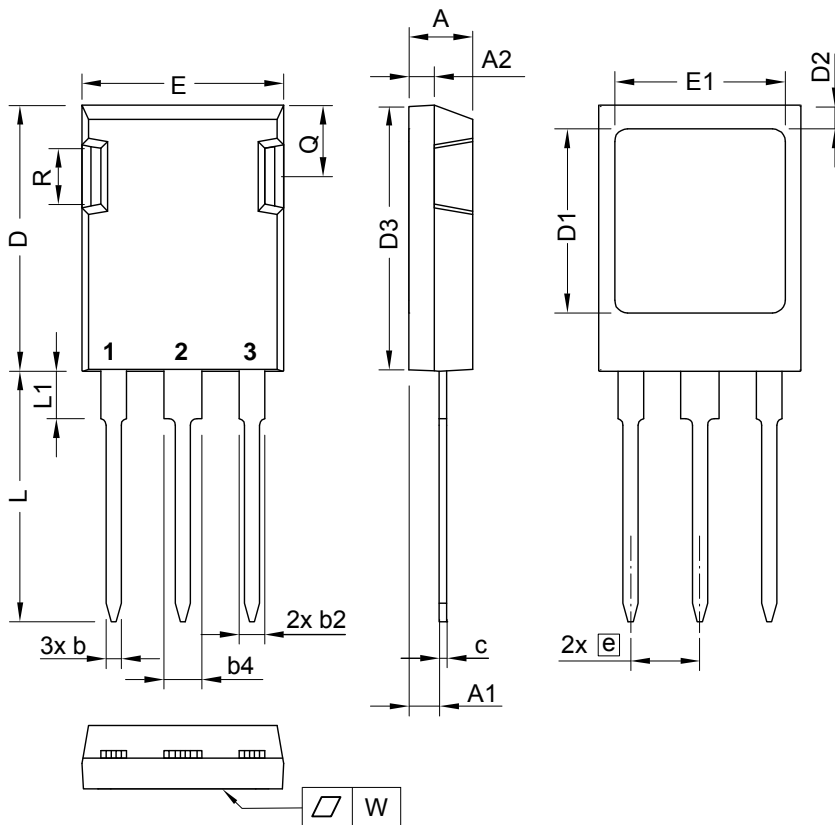


$V_{0\max}$ threshold voltage

$R_{0\max}$ slope resistance *

| | IGBT | Diode | |
|-------------|------|-------|----|
| $V_{0\max}$ | 1.1 | 1.25 | V |
| $R_{0\max}$ | 39 | 28.3 | mΩ |

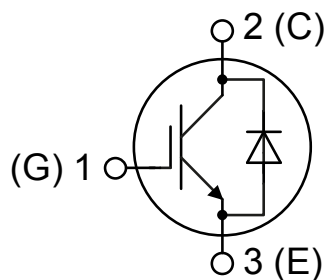
Outlines ISOPLUS247



| 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 |
| b2 | 1.91 | 2.20 | 0.075 | 0.087 |
| b4 | 2.92 | 3.24 | 0.115 | 0.128 |
| c | 0.61 | 0.83 | 0.024 | 0.033 |
| D | 20.80 | 21.34 | 0.819 | 0.840 |
| D1 | 15.75 | 16.26 | 0.620 | 0.640 |
| D2 | 1.65 | 2.15 | 0.065 | 0.085 |
| D3 | 20.30 | 20.70 | 0.799 | 0.815 |
| E | 15.75 | 16.13 | 0.620 | 0.635 |
| E1 | 13.21 | 13.72 | 0.520 | 0.540 |
| 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 | 4.25 | 5.50 | 0.167 | 0.217 |
| 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} .



IGBT

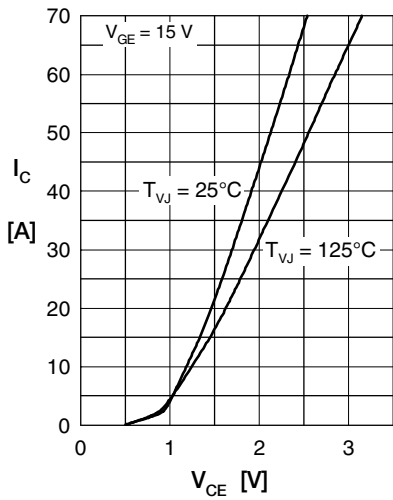


Fig. 1 Typ. output characteristics

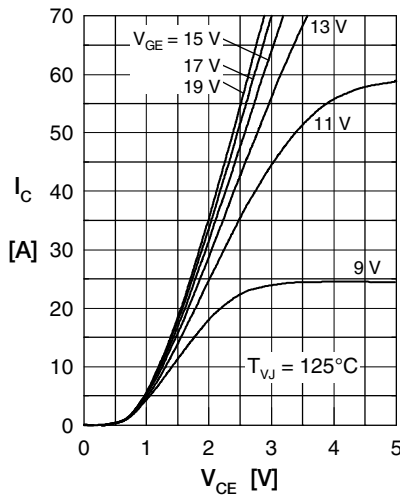


Fig. 2 Typ. output characteristics

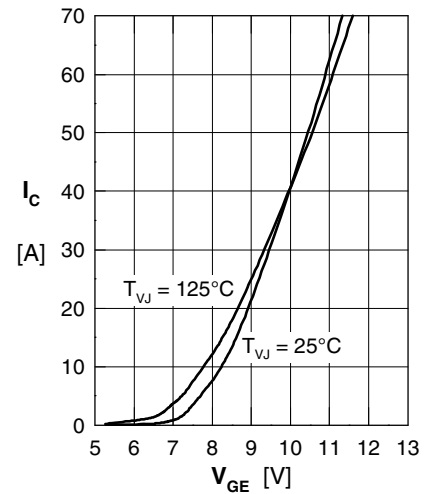


Fig. 3 Typ. transfer characteristics

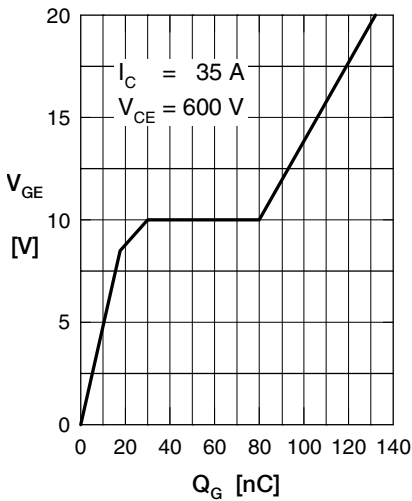


Fig. 4 Typ. turn-on gate charge

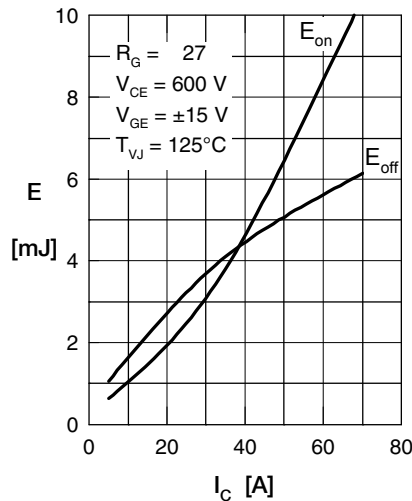


Fig. 5 Typ. switching energy vs. collector current

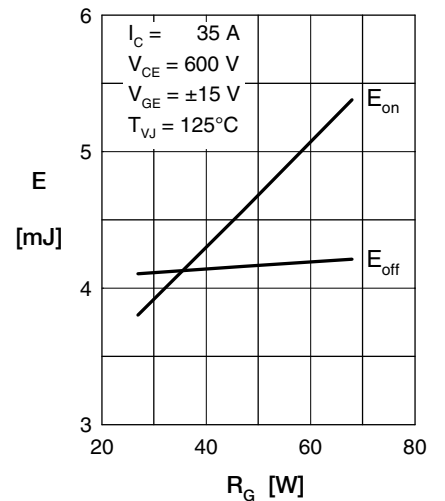


Fig. 6 Typ. switching energy vs. gate resistance

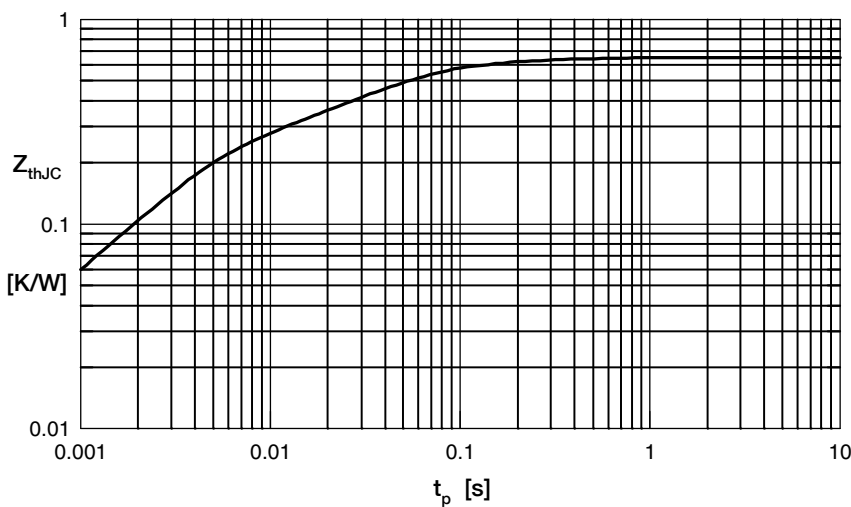


Fig. 7 Typ. transient thermal impedance junction to case

Diode

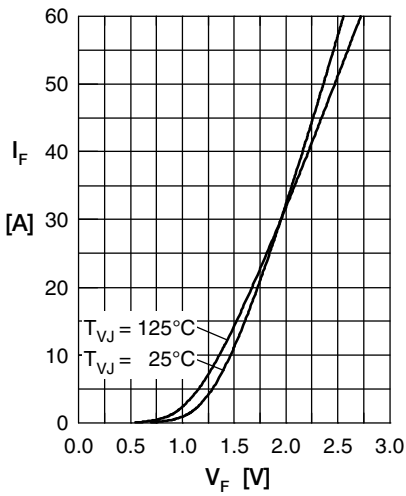


Fig. 1 Typ. Forward current versus V_F

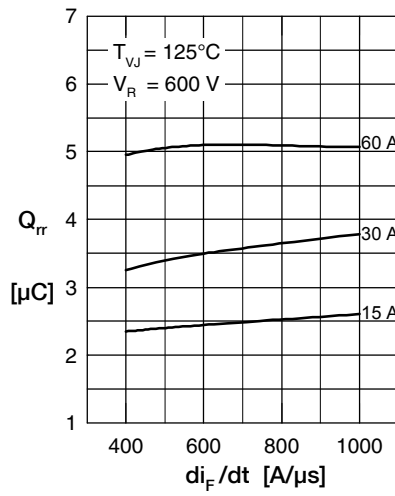


Fig. 2 Typ. reverse recov. charge Q_{rr} versus di/dt

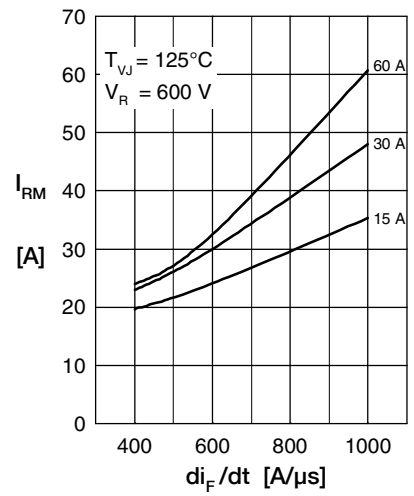


Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

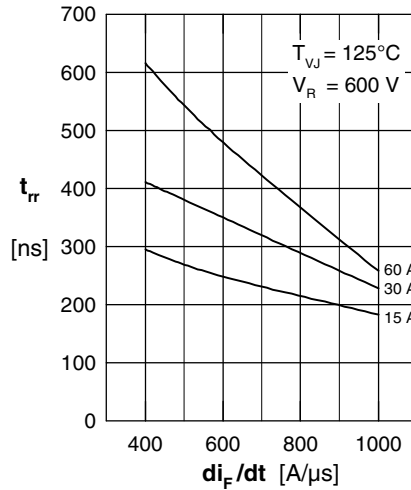


Fig. 4 Dynamic parameters Q_{rr} , I_{RM} versus di/dt

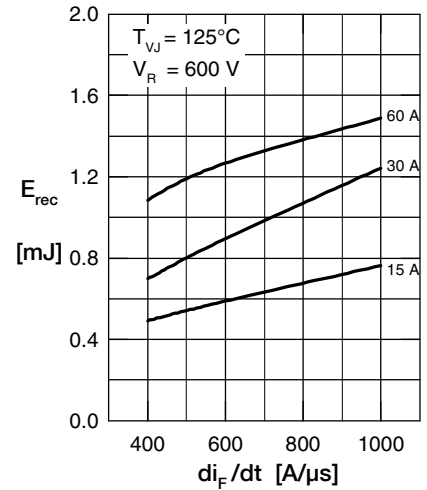


Fig. 5 Typ. recovery time t_{rr} versus di/dt

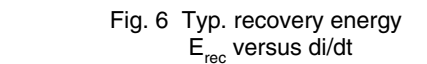


Fig. 6 Typ. recovery energy E_{rec} versus di/dt

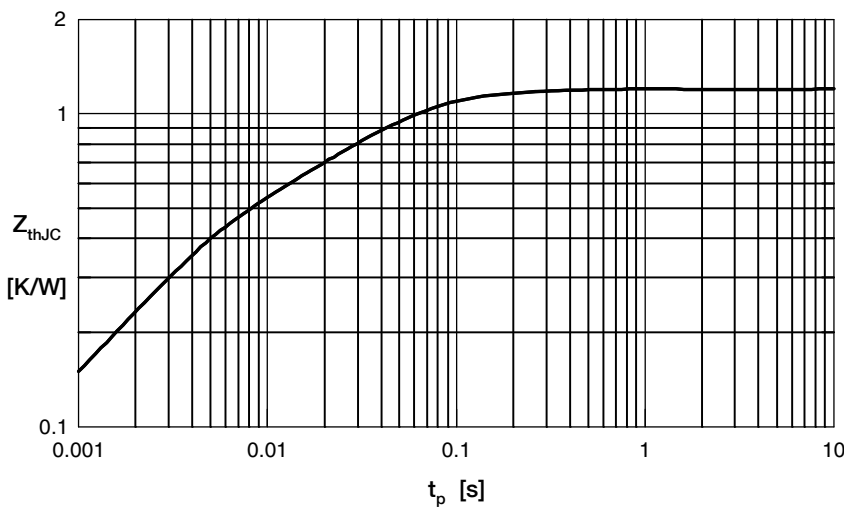


Fig. 7 Typ. transient thermal impedance junction to case