

XPT IGBT

preliminary

$$V_{CES} = 1200V$$

$$I_{C25} = 9A$$

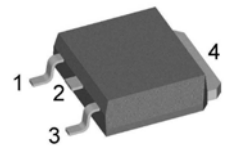
$$V_{CE(sat)} = 1.8V$$

Copack

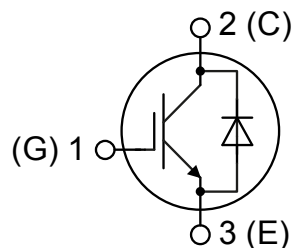
Part number

IXA4IF1200UC

Marking on Product: X4TAUF



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 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: TO-252 (DPak)

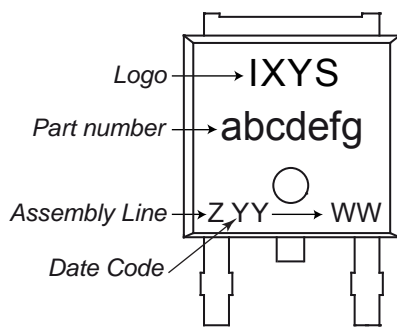
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

| 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 gate emitter voltage | | | | ± 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 | | |
| RBSOA | reverse bias safe operating area | $V_{GE} = \pm 15\text{V}; R_G = 330\Omega$ | | | | | |
| I_{CM} | | $V_{CEmax} = 1200\text{V}$ | | | 9 | A | |
| SCSOA | 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 | μs | |
| 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 | | | 0.50 | | 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 | $I_F = 3\text{A}$ | | | 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 | | μC | |
| 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 | | | 0.50 | | K/W | |

preliminary

| Package TO-252 (DPak) | | | Ratings | | | |
|-----------------------|------------------------------|--------------|---------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 20 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 150 | °C |
| Weight | | | | 0.3 | | g |
| F_C | mounting force with clip | | 20 | | 60 | N |

Product Marking



Part number

- I = IGBT
- X = XPT IGBT
- A = Gen 1 / std
- 4 = Current Rating [A]
- IF = Copack
- 1200 = Reverse Voltage [V]
- UC = TO-252AA (DPak)

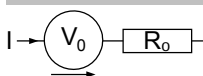
| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|--------------|--------------------|---------------|----------|----------|
| Standard | IXA4IF1200UC | X4TAUF | Tape & Reel | 2500 | 510217 |

| Similar Part | Package | Voltage class |
|--------------|----------------------|---------------|
| IXA4IF1200TC | TO-268AA (D3Pak) (2) | 1200 |

Equivalent Circuits for Simulation

* on die level

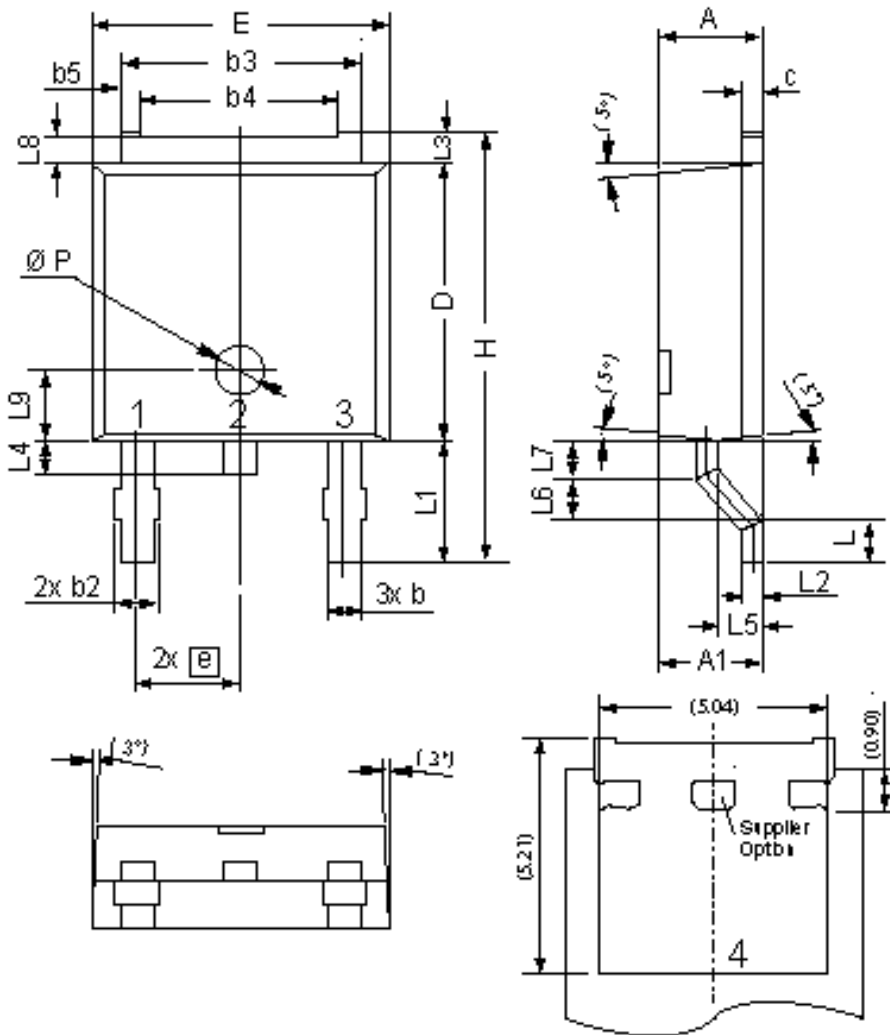
$T_{VJ} = 150\text{ °C}$



$V_{0\ max}$ threshold voltage
 $R_{0\ max}$ slope resistance *

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

Outlines TO-252 (DPak)



| Dim | Millimeters | | Inches | |
|-----|-------------|-------|-----------|-------|
| | min | max | min | max |
| A | 2.20 | 2.40 | 0.087 | 0.094 |
| A1 | 2.10 | 2.50 | 0.083 | 0.098 |
| b | 0.66 | 0.86 | 0.026 | 0.034 |
| b2 | - | 0.96 | - | 0.038 |
| b3 | 5.04 | 5.64 | 0.198 | 0.222 |
| b4 | 4.34 BSC | | 0.171 BSC | |
| b5 | 0.50 BSC | | 0.020 BSC | |
| c | 0.40 | 0.86 | 0.016 | 0.034 |
| D | 5.90 | 6.30 | 0.232 | 0.248 |
| E | 6.40 | 6.80 | 0.252 | 0.268 |
| e | 2.10 | 2.50 | 0.083 | 0.098 |
| H | 9.20 | 10.10 | 0.362 | 0.398 |
| L | 0.55 | 1.28 | 0.022 | 0.050 |
| L1 | 2.50 | 2.90 | 0.098 | 0.114 |
| L2 | 0.40 | 0.60 | 0.016 | 0.024 |
| L3 | 0.50 | 0.90 | 0.020 | 0.035 |
| L4 | 0.60 | 1.00 | 0.024 | 0.039 |
| L5 | 0.82 | 1.22 | 0.032 | 0.048 |
| L6 | 0.79 | 0.99 | 0.031 | 0.039 |
| L7 | 0.81 | 1.01 | 0.032 | 0.040 |
| L8 | 0.40 | 0.80 | 0.016 | 0.031 |
| L9 | 1.50 BSC | | 0.059 BSC | |
| Ø P | 1.00 BSC | | 0.039 BSC | |

