

XPT IGBT

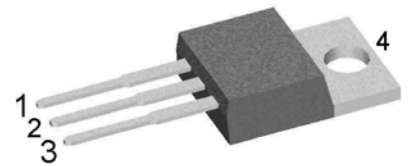
preliminary

$$V_{CES} = 1200V$$

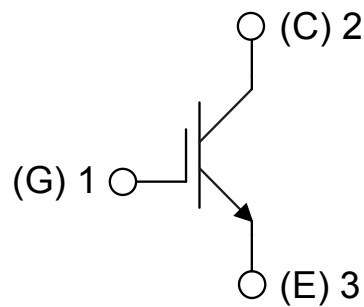
$$I_{C25} = 38A$$

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

Single IGBT

Part number
IXA20I1200PB


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 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
- Pumps, Fans

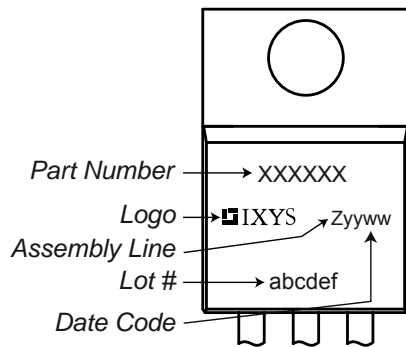
Package: TO-220

- 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 | $T_C = 25^{\circ}\text{C}$ | | | 38 | A | | | |
| I_{C80} | | $T_C = 80^{\circ}\text{C}$ | | | 22 | A | | | |
| P_{tot} | total power dissipation | $T_C = 25^{\circ}\text{C}$ | | | 165 | W | | | |
| $V_{CE(sat)}$ | collector emitter saturation voltage | $I_C = 15\text{A}; V_{GE} = 15\text{V}$ | | 1.8 | 2.1 | V | | | |
| | | | | 2.1 | | V | | | |
| $V_{GE(th)}$ | gate emitter threshold voltage | $I_C = 0.6\text{mA}; V_{GE} = V_{CE}$ | 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 | $V_{CE} = 600\text{V}; V_{GE} = 15\text{V}; I_C = 15\text{A}$ | | 47 | | nC | | | |
| $t_{d(on)}$ | turn-on delay time | inductive load $V_{CE} = 600\text{V}; I_C = 15\text{A}$ $V_{GE} = \pm 15\text{V}; R_G = 56\ \Omega$ | | | | | | | |
| t_r | current rise time | | | | | | $T_{VJ} = 125^{\circ}\text{C}$ | 70 | ns |
| $t_{d(off)}$ | turn-off delay time | | | | | | 40 | ns | |
| t_f | current fall time | | | | | | 250 | ns | |
| E_{on} | turn-on energy per pulse | | | | | | 100 | ns | |
| E_{off} | turn-off energy per pulse | | | | | | 1.65 | mJ | |
| E_{off} | | 1.7 | mJ | | | | | | |
| RBSOA | reverse bias safe operating area | $V_{GE} = \pm 15\text{V}; R_G = 56\ \Omega$ | | | | | | | |
| I_{CM} | | $V_{CEmax} = 1200\text{V}$ | | | 45 | 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 | $R_G = 56\ \Omega; \text{non-repetitive}$ | | | 60 | A | | | |
| R_{thJC} | thermal resistance junction to case | | | | 0.76 | K/W | | | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.50 | | K/W | | | |

preliminary

| Package TO-220 | | | Ratings | | | |
|----------------|------------------------------|--------------|---------|------|------|------|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit |
| I_{RMS} | RMS current | per terminal | | | 35 | A |
| T_{VJ} | virtual junction temperature | | -40 | | 150 | °C |
| T_{op} | operation temperature | | -40 | | 125 | °C |
| T_{stg} | storage temperature | | -40 | | 150 | °C |
| Weight | | | | 2 | | g |
| M_D | mounting torque | | 0.4 | | 0.6 | Nm |
| F_C | mounting force with clip | | 20 | | 60 | N |

Product Marking

Part number

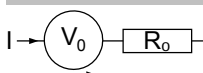
I = IGBT
 X = XPT IGBT
 A = Gen 1 / std
 20 = Current Rating [A]
 I = Single IGBT
 1200 = Reverse Voltage [V]
 PB = TO-220AB (3)

| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|--------------|--------------------|---------------|----------|----------|
| Standard | IXA20I1200PB | IXA20I1200PB | Tube | 50 | 507929 |

| Similar Part | Package | Voltage class |
|---------------|--------------|---------------|
| IXA20IF1200HB | TO-247AD (3) | 1200 |

Equivalent Circuits for Simulation

* on die level

 $T_{VJ} = 150\text{ °C}$

IGBT
 $V_{0\ max}$ threshold voltage

1.1

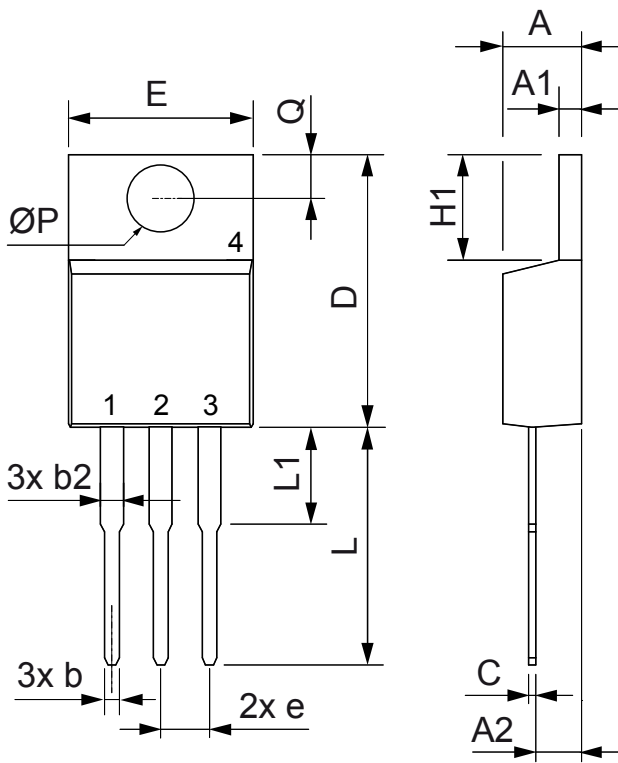
V

 $R_{0\ max}$ slope resistance *

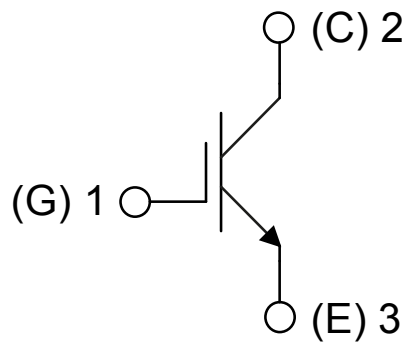
86

mΩ

Outlines TO-220



| Dim. | Millimeter | | Inches | |
|-----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.32 | 4.82 | 0.170 | 0.190 |
| A1 | 1.14 | 1.39 | 0.045 | 0.055 |
| A2 | 2.29 | 2.79 | 0.090 | 0.110 |
| b | 0.64 | 1.01 | 0.025 | 0.040 |
| b2 | 1.15 | 1.65 | 0.045 | 0.065 |
| C | 0.35 | 0.56 | 0.014 | 0.022 |
| D | 14.73 | 16.00 | 0.580 | 0.630 |
| E | 9.91 | 10.66 | 0.390 | 0.420 |
| e | 2.54 | BSC | 0.100 | BSC |
| H1 | 5.85 | 6.85 | 0.230 | 0.270 |
| L | 12.70 | 13.97 | 0.500 | 0.550 |
| L1 | 2.79 | 5.84 | 0.110 | 0.230 |
| $\varnothing P$ | 3.54 | 4.08 | 0.139 | 0.161 |
| Q | 2.54 | 3.18 | 0.100 | 0.125 |





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