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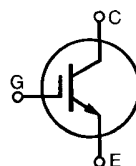
High Speed IGBT

IXSP 24N60B

$V_{CES} = 600 \text{ V}$
 $I_{C25} = 48 \text{ A}$
 $V_{CE(sat)} = 2.5 \text{ V}$
 $t_{fi \text{ typ}} = 170 \text{ ns}$

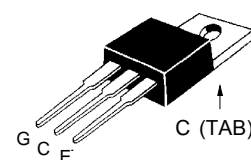
Short Circuit SOA Capability

Preliminary Data Sheet



| Symbol | Test Conditions | Maximum Ratings | |
|---|---|----------------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C}$ to 150°C | 600 | V |
| V_{CGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 1 \text{ M}\Omega$ | 600 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 48 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 24 | A |
| I_{CM} | $T_C = 25^\circ\text{C}$, 1 ms | 96 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 33 \Omega$ Clamped inductive load, $V_{CC} = 0.8 V_{CES}$ | $I_{CM} = 48$ @ $0.8 V_{CES}$ | A |
| t_{SC} (SCSOA) | $V_{GE} = 15 \text{ V}$, $V_{CE} = 360 \text{ V}$, $T_J = 125^\circ\text{C}$ $R_G = 33 \Omega$, non repetitive | 10 | μs |
| P_c | $T_C = 25^\circ\text{C}$ | 150 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| Weight | | 2 | g |
| Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | | 300 | $^\circ\text{C}$ |

TO-220 (IXSP)



G = Gate
E = Emitter

TAB = Collector

Features

- International standard packages
- Guaranteed Short Circuit SOA capability
- Low $V_{CE(sat)}$ - for low on-state conduction losses
- High current handling capability
- MOS Gate turn-on - drive simplicity
- Fast Fall Time for switching speeds up to 50 kHz

Applications

- AC and DC motor speed control
- Uninterruptible power supplies (UPS)
- Welding

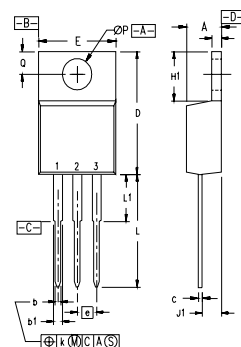
Advantages

- Easy to mount with 1 screw
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|---|---|------|--------------------------|
| | | min. | typ. | max. |
| BV_{CES} | $I_C = 250 \mu\text{A}$, $V_{GE} = 0 \text{ V}$ | 600 | | V |
| $V_{GE(th)}$ | $I_C = 1.5 \text{ mA}$, $V_{CE} = V_{GE}$ | 3.5 | | 6.5 V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$, $T_J = 25^\circ\text{C}$ $V_{GE} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$ | | | 25 μA 1 mA |
| I_{GES} | $V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{C90}$, $V_{GE} = 15 \text{ V}$ | | | 2.5 V |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | | |
|--------------|--|---|------|----------|----|
| | | min. | typ. | max. | |
| g_{fs} | $I_C = I_{C90}$; $V_{CE} = 10\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$ | 9 | 13 | S | |
| C_{ies} | $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 1450 | pF | |
| C_{oes} | | | 130 | pF | |
| C_{res} | | | 37 | pF | |
| Q_g | $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$ | | 41 | nC | |
| Q_{ge} | | | 18 | nC | |
| Q_{gc} | | | 18 | nC | |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}$, $R_G = 33\ \Omega$ | | 50 | ns | |
| t_{ri} | | | 50 | ns | |
| $t_{d(off)}$ | | | 150 | 250 | ns |
| t_{fi} | | | 170 | 300 | ns |
| E_{off} | | | 1.3 | 2.6 | mJ |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.8 V_{CES}$, $R_G = 33\ \Omega$ | | 55 | ns | |
| t_{ri} | | | 75 | ns | |
| E_{on} | | | 1.2 | mJ | |
| $t_{d(off)}$ | | | 190 | ns | |
| t_{fi} | | | 280 | ns | |
| E_{off} | | 2.4 | mJ | | |
| R_{thJC} | | | | 0.83 K/W | |
| R_{thCK} | | 0.25 | | K/W | |

TO-220 Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .170 | .190 | 4.32 | 4.83 |
| b | .025 | .040 | 0.64 | 1.02 |
| b1 | .045 | .065 | 1.15 | 1.65 |
| c | .014 | .022 | 0.35 | 0.56 |
| D | .580 | .630 | 14.73 | 16.00 |
| E | .390 | .420 | 9.91 | 10.66 |
| e | .100 BSC | | 2.54 BSC | |
| F | .045 | .055 | 1.14 | 1.40 |
| H1 | .230 | .270 | 5.85 | 6.85 |
| J1 | .090 | .110 | 2.29 | 2.79 |
| k | 0 | .015 | 0 | 0.38 |
| L | .500 | .550 | 12.70 | 13.97 |
| L1 | .110 | .230 | 2.79 | 5.84 |
| ØP | .139 | .161 | 3.53 | 4.08 |
| Q | .100 | .125 | 2.54 | 3.18 |

IXYS reserves the right to change limits, test conditions, and dimensions.