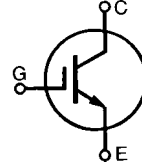


High Voltage, High speed IGBT

Short Circuit SOA Capability

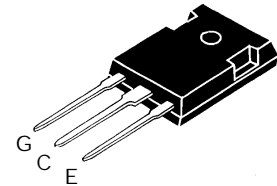
IXSH 35N140A
IXSH 35N135A

| V_{CES} | I_{C25} | $V_{CE(sat)}$ |
|---------------|-------------|---------------|
| 1400 V | 70 A | 4 V |
| 1350 V | 70 A | 4 V |



| Symbol | Test Conditions | Maximum Ratings | |
|------------------------------------|---|------------------------|------------------|
| V_{CES} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 35N140A 1400 | V |
| | | 35N135A 1350 | V |
| V_{GGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$ | 35N140A 1400 | V |
| | | 35N135A 1350 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ\text{C}$ | 70 | A |
| I_{C90} | $T_C = 90^\circ\text{C}$ | 35 | A |
| I_{CM} | $T_C = 25^\circ\text{C}, 1 \text{ ms}$ | 140 | A |
| SSOA (RBSOA) | $V_{GE} = 15 \text{ V}, T_J = 125^\circ\text{C}, R_G = 22 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$ | $I_{CM} = 70$ @ 960 | A V |
| t_{SC} (SCSOA) | $V_{GE} = 15 \text{ V}, V_{CE} = 840 \text{ V}, T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$, non repetitive | 10 | μs |
| P_c | $T_C = 25^\circ\text{C}$ | 300 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| M_d | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | | 6 | g |
| | Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |

TO-247 AD



G = Gate, C = Collector,
E = Emitter, TAB = Collector

Features

- International standard package JEDEC TO-247
- High frequency IGBT with guaranteed Short Circuit SOA capability
- Fast Fall Time for switching speeds up to 20 kHz
- 2nd generation HD MOS™ process
- Low $V_{CE(sat)}$
 - for minimum on-state conduction losses
- MOS Gate turn-on
 - drive simplicity

Applications

- AC motor speed control
- DC servo and robot drive
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies
- Welding

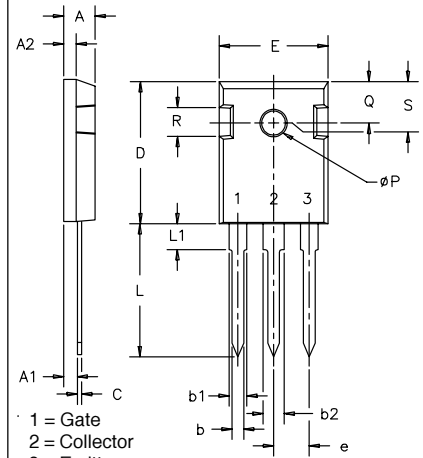
Advantages

- Easy to mount with 1 screw (isolated mounting screw hole)
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|---|---|------|----------------------|
| | | min. | typ. | max. |
| BV_{CES} | $I_C = 3 \text{ mA}, V_{GE} = 0 \text{ V}$ | 35N140A 1400 35N135A 1350 | | V |
| $V_{GE(th)}$ | $I_C = 4 \text{ mA}, V_{CE} = V_{GE}$ | 4 | | 8 V |
| I_{CES} | $V_{CE} = 0.8 V_{CES}$ $V_{GE} = 0 \text{ V}$ | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | | 400 mA 2 mA |
| I_{GES} | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{C90}, V_{GE} = 15 \text{ V}$ | 3.4 | 4 | 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, $t \leq 300\text{ ms}$, duty cycle $d \leq 2\%$ | | 26 | S | |
| $I_{C(on)}$ | $V_{GE} = 15\text{ V}$, $V_{CE} = 10\text{ V}$ | | 210 | A | |
| C_{ies} | $V_{CE} = 25\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1\text{ MHz}$ | | 4150 | pF | |
| C_{oes} | | | 235 | pF | |
| C_{res} | | | 55 | pF | |
| Q_g | $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $V_{CE} = 0.5 V_{CES}$ | | 165 | nC | |
| Q_{ge} | | | 45 | nC | |
| Q_{gc} | | | 75 | nC | |
| $t_{d(on)}$ | Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$ $V_{CE} = 960\text{ V}$, $R_G = 2.7\ \Omega$ Switching times may increase for $V_{CE}(\text{Clamp}) > 960\text{ V}$, higher T_J or increased R_G | | 40 | ns | |
| t_{ri} | | | 60 | ns | |
| $t_{d(off)}$ | | | 200 | 400 | ns |
| t_{fi} | | | 400 | 750 | ns |
| E_{off} | | | 12 | mJ | |
| $t_{d(on)}$ | Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$, $L = 100\ \mu\text{H}$ $V_{CE} = 960\text{ V}$, $R_G = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 960\text{ V}$, higher T_J or increased R_G | | 40 | ns | |
| t_{ri} | | | 65 | ns | |
| E_{on} | | | 4 | mJ | |
| $t_{d(off)}$ | | | 200 | ns | |
| t_{fi} | | | 800 | ns | |
| E_{off} | | | 18 | mJ | |
| R_{thJC} | | | 0.42 | K/W | |
| R_{thCK} | | 0.25 | | K/W | |

TO-247 AD Outline



| SYM | INCHES | | MILLIMETERS | |
|-------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .209 | 4.7 | 5.3 |
| A1 | .087 | .102 | 2.2 | 2.54 |
| A2 | .059 | .098 | 2.2 | 2.6 |
| b | .040 | .055 | 1.0 | 1.4 |
| b1 | .065 | .084 | 1.65 | 2.13 |
| b2 | .113 | .123 | 2.87 | 3.12 |
| C | .016 | .031 | .4 | .8 |
| D | .819 | .845 | 20.80 | 21.46 |
| E | .610 | .640 | 15.75 | 16.26 |
| e | .215 BSC | | 5.45 BSC | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | | .177 | | 4.50 |
| phi P | .140 | .144 | 3.55 | 3.65 |
| Q | .212 | .244 | 5.4 | 6.2 |
| R | .170 | .216 | 4.32 | 5.49 |
| S | .242 BSC | | 6.15 BSC | |

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

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025