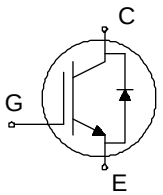
# IXYS IXSH15N120AU1

PRELIMINARY DATA SHEET

# IGBT with Diode

"S" Series - Improved SCSOA Capability

$I_{C25}$ = 30 A
$V_{CES}$ = 1200 V
$V_{CE(sat)}$ = 4.0 V

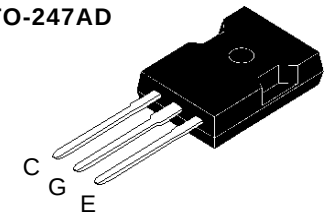





| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{CES}$ | $T_J$ = 25°C to 150°C | 1200 | V |
| $V_{CGR}$ | $T_J$ = 25°C to 150°C; $R_{GE}$ = 1 MΩ | 1200 | V |
| $V_{GES}$ | Continuous | ±20 | V |
| $V_{GEM}$ | Transient | ±30 | V |
| $I_{C25}$ | $T_C$ = 25°C | 30 | A |
| $I_{C90}$ | $T_C$ = 90°C | 15 | A |
| $I_{CM}$ | $T_C$ = 25°C, 1 ms | 60 | A |
| **SSOA (RBSOA)** | $V_{GE}$ = 15 V, $T_J$ = 125°C, $R_G$ = 82 Ω<br>Clamped inductive load, L = 100 µH | $I_{CM}$ = 30<br>@ 0.8 $V_{CES}$ | A |
| $t_{sc}$ | $T_J$ = 125ºC, $V_{CE}$ = 720 V; $V_{GE}$ = 15V, $R_G$ = 82Ω | 5 | µs |
| $P_C$ | $T_C$ = 25°C | 150 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{STG}$ | | -55 ... +150 | °C |
| $M_d$ | Mounting torque | 1.15/10 | Nm/lb-in. |
| **Weight** | | 6 | g |
| **Max. Lead Temperature for Soldering** (1.6mm from case for 10s) | | 300 | °C |

| Symbol | Test Conditions ($T_J$ = 25°C unless otherwise specified) | | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|---|
| $BV_{CES}$ | $I_C$ = 4.0 mA, $V_{GE}$ = 0 V | | 1200 | | | V |
| $V_{GE(th)}$ | $I_C$ = 1.5 mA, $V_{CE}$ = $V_{GE}$ | | 4 | | 8 | V |
| $I_{CES}$ | $V_{CE}$ = 0.8 $V_{CES}$, $V_{GE}$ = 0 V<br>Note 2 | $T_J$ = 25°C<br>$T_J$ = 125°C | | | 500<br>8 | µA<br>mA |
| $I_{GES}$ | $V_{CE}$ = 0 V, $V_{GE}$ = ±20 V | | | | ± 100 | nA |
| $V_{CE(sat)}$ | $I_C$ = $I_{C90}$, $V_{GE}$ = 15 V | | | | 4.0 | V |

**TO-247AD**




### Features

- High frequency IGBT with guaranteed Short Circuit SOA capability.
- IGBT with anti-parallel diode in one package
- 2nd generation HDMOS™ 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 drives
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- DC choppers

### Advantages

- Saves space (two devices in one package)
- Easy to mount (isolated mounting hole)
- Reduces assembly time and cost
- Operates cooler
- Easier to assemble





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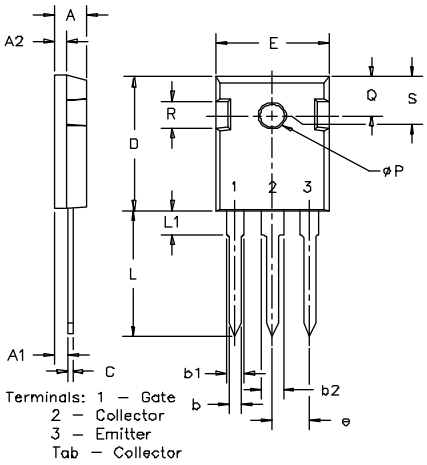
| Symbol | Test Conditions ($T_J$ = 25°C unless otherwise specified) | Characteristic Values Min | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $I_C = I_{C90}$, $V_{CE}$ = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 % | 6 | 7 | | S |
| $I_{C(on)}$ | $V_{GE}$ = 15V, $V_{CE}$ = 10 V | | 65 | | A |
| $C_{ies}$ | $V_{CE}$ = 25 V, $V_{GE}$ = 0 V, f = 1 MHz | | 1800 | | pF |
| $C_{oes}$ | | | 160 | | pF |
| $C_{res}$ | | | 45 | | pF |
| $Q_g$ | $I_C = I_{c90}$, $V_{GE}$ = 15 V, $V_{CE}$ = 0.5 $V_{CES}$ | | 75 | | nC |
| $Q_{ge}$ | | | 20 | | nC |
| $Q_{gc}$ | | | 35 | | nC |
| $t_{d(on)}$ | Inductive load, $T_J$ = 25°C | | 100 | | ns |
| $t_{ri}$ | $I_C = I_{C90}$, $V_{GE}$ = 15 V, L = 100µH | | 200 | | ns |
| $t_{d(off)}$ | $R_G$ = 82 Ω, $V_{CLAMP}$ = 0.8 $V_{CES}$ | | 450 | | ns |
| $t_{fi}$ | Note 1 | | 600 | | ns |
| $t_c$ | | | 750 | | ns |
| $E_{off}$ | | | 5.4 | | mJ |
| $t_{d(on)}$ | Inductive load, $T_J$ = 125°C | | 100 | | ns |
| $t_{ri}$ | $I_C = I_{C90}$, $V_{GE}$ = 15 V, L = 100µH | | 200 | | ns |
| $E_{(on)}$ | $R_G$ = 82 Ω | | TBD | | mJ |
| $t_{d(off)}$ | $V_{CLAMP}$ = 0.8 $V_{CES}$ | | | | ns |
| $t_{fi}$ | Note 1 | | 900 | | ns |
| $t_c$ | | | 1200 | | ns |
| $E_{off}$ | | | 14.5 | | mJ |
| $R_{thJC}$ | | | | 0.83 | K/W |
| $R_{thCK}$ | | | 0.25 | | K/W |

**TO-247AD (IXSH)**




| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX |
|---|---|---|---|---|
| A | .185 | .209 | 4.7 | 5.3 |
| $A_1$ | .087 | .102 | 2.2 | 2.54 |
| $A_2$ | .059 | .098 | 2.2 | 2.6 |
| b | .040 | .055 | 1.0 | 1.4 |
| $b_1$ | .065 | .084 | 1.65 | 2.13 |
| $b_2$ | .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 |
| øP | .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 | |

**Reverse Diode (FRED)** **Characteristic Values** (TJ = 25ºC unless otherwise specified)

| | | Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $V_F$ | $I_F = I_{C90}$, $V_{GE}$ = 0V<br>Pulse test, t< 300 µs, duty cycle < 2% $T_J$ = 125ºC | | | 2.3<br>2.1 | V |
| $t_{rr}$ | $I_F$ = 1A; di/dt = -100A/µs; $V_R$ = 30V; $T_J$ = 25ºC | | 40 | 60 | ns |
| $I_{RM}$ | $I_F = I_{C90}$, $V_{GE}$ = 0V, $-di_F/dt$ = 240 A/µs | | 16 | 18 | A |
| $t_{rr}$ | $T_J$ = 100ºC, $V_R$ = 540V | | 300 | | ns |
| $R_{thJC}$ | | | | 1.0 | K/W |

Notes:
1) Switching times may increase for $V_{CE}$ (Clamp) > 0.8 $V_{CES}$, higher $T_J$ or $R_G$ values.
2) Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.



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