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[IXYS Corporation](#)

[IXSH24N60AU1](#)

For any questions, you can email us directly:

sales@integrated-circuit.com

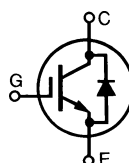
IXYS

HiPerFAST™ IGBT with Diode

Short Circuit SOA Capability

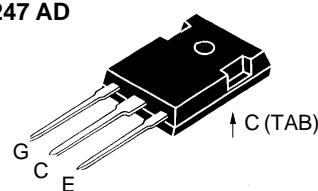
IXSH 24N60U1
IXSH24N60AU1

| V_{CES} | I_{C25} | $V_{CE(sat)}$ |
|--------------|-------------|---------------|
| 600 V | 48 A | 2.2 V |
| 600 V | 48 A | 2.7 V |



| 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) | $V_{GE} = 15\text{ V}$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 10\ \Omega$ Clamped inductive load, $L = 100\ \mu\text{H}$ | $I_{CM} = 48$ @ $0.8 V_{CES}$ | A |
| t_{SC} (SCSOA) | $V_{GE} = 15\text{ V}$, $V_{CE} = 360\text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 82\ \Omega$, 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 | $^\circ\text{C}$ |
| Maximum Lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | | 300 | $^\circ\text{C}$ |
| Maximum Tab temperature for soldering SMD devices for 10 s | | 260 | $^\circ\text{C}$ |
| M_d | Mounting torque, TO-247 | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 AD | 6 | g |

TO-247 AD



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

Features

- International standard package JEDEC TO-247 AD
- High frequency IGBT and anti-parallel FRED in one package
- 2nd generation HDMOS™ process
- Low $V_{CE(sat)}$
 - for minimum on-state conduction losses
- MOS Gate turn-on
 - drive simplicity
- Fast Recovery Epitaxial Diode (FRED)
 - soft recovery with low I_{RM}

Applications

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

Advantages

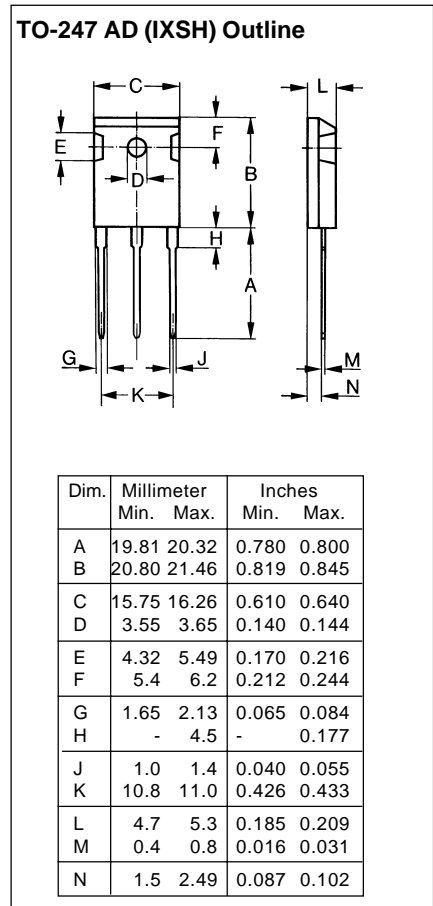
- Space savings (two devices in one package)
- Suitable for surface mounting
- Easy to mount with 1 screw, TO-247 (isolated mounting screw hole)
- Reduces assembly time and cost

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|---------------|--|---|------------|---------------------|
| | | min. | typ. | max. |
| BV_{CES} | $I_C = 750\ \mu\text{A}$, $V_{GE} = 0\text{ V}$ | 600 | | V |
| $V_{GE(th)}$ | $I_C = 1.5\text{ mA}$, $V_{CE} = V_{GE}$ | 3.5 | | V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$, $T_J = 25^\circ\text{C}$ $V_{GE} = 0\text{ V}$, $T_J = 125^\circ\text{C}$ | | 500 8 | μA mA |
| I_{GES} | $V_{CE} = 0\text{ V}$, $V_{GE} = \pm 20\text{ V}$ | | ± 100 | nA |
| $V_{CE(sat)}$ | $I_C = I_{C90}$, $V_{GE} = 15\text{ V}$ | IXSH 24N60U1 IXSH 24N60AU1 | 2.2 2.7 | V V |

IXYS

IXSH 24N60U1 IXSH 24N60AU1

| Symbol | Test Conditions | Characteristic Values | | | |
|--|---|---|----------|-----------------|----|
| | | (T _J = 25°C, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| g_{fs} | I _C = I _{C90} ; V _{CE} = 10 V, Pulse test, t ≤ 300 μs, duty cycle ≤ 2 % | 9 | 13 | S | |
| I_{C(on)} | V _{GE} = 15 V, V _{CE} = 10 V | | 65 | A | |
| C_{ies} C_{oes} C_{res} | V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz | | 1800 | pF | |
| | | | 200 | pF | |
| | | | 45 | pF | |
| Q_g Q_{ge} Q_{gc} | I _C = I _{C90} , V _{GE} = 15 V, V _{CE} = 0.5 V _{CES} | | 75 | 90 nC | |
| | | | 20 | 30 nC | |
| | | | 35 | 50 nC | |
| t_{d(on)} t_{ri} t_{d(off)} t_{fi} E_{off} | Inductive load, T_J = 25°C I _C = I _{C90} , V _{GE} = 15 V, L = 100 μH, V _{CE} = 0.8 V _{CES} , R _G = R _{off} = 10 Ω Remarks: Switching times may increase for V _{CE} (Clamp) > 0.8 • V _{CES} , higher T _J or increased R _G | | 100 | ns | |
| | | | | 200 | ns |
| | | | | 450 | ns |
| | | | 24N60U1 | 500 | ns |
| | | | 24N60AU1 | 275 | ns |
| | | 24N60AU1 | 2 | mJ | |
| t_{d(on)} t_{ri} E_{on} t_{d(off)} t_{fi} E_{off} | Inductive load, T_J = 125°C I _C = I _{C90} , V _{GE} = 15 V, L = 100 μH, V _{CE} = 0.8 V _{CES} , R _G = R _{off} = 10 Ω Remarks: Switching times may increase for V _{CE} (Clamp) > 0.8 • V _{CES} , higher T _J or increased R _G | | 100 | ns | |
| | | | | 200 | ns |
| | | | | 1.8 | mJ |
| | | | | 475 | ns |
| | | | 24N60U1 | 600 | ns |
| | | | 24N60AU1 | 450 | ns |
| | | 24N60U1 | 4 | mJ | |
| | | 24N60AU1 | 3 | mJ | |
| R_{thJC} R_{thCK} | | | | 0.83 K/W K/W | |
| | | 0.25 | | | |



| Symbol | Test Conditions | Characteristic Values | | | |
|--|--|---|------|-------|-------|
| | | (T _J = 25°C, unless otherwise specified) | | | |
| | | min. | typ. | max. | |
| V_F | I _F = I _{C90} , V _{GE} = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % | | | 1.6 V | |
| I_{RM} t_{rr} | I _F = I _{C90} , V _{GE} = 0 V, -di _F /dt = 240 A/μs V _R = 360 V I _F = 1 A; -di/dt = 100 A/μs; V _R = 30 V | | 10 | 15 A | |
| | | | | 150 | ns |
| | | | | 35 | 50 ns |
| R_{thJC} | | | | 1 K/W | |