

1500V MOS Gated Thyristor

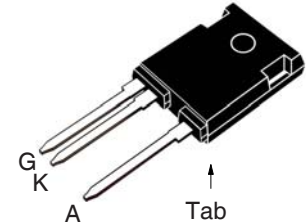
IXHH40N150HV

$V_{DM} = 1500V$



| Symbol | Test Conditions | Maximum Ratings | |
|------------|--|-----------------|------------------|
| V_{DM} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 1500 | V |
| V_{GK} | Continuous | ± 30 | V |
| V_{GK} | Transient | ± 40 | V |
| I_{TSM} | $T_C = 25^\circ\text{C}, 1\mu\text{s}$ | 7.6 | kA |
| | $T_C = 25^\circ\text{C}, 10\mu\text{s}$ | 3.5 | kA |
| P_D | $T_C = 25^\circ\text{C}$ | 695 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| T_L | Maximum Lead Temperature for Soldering | 300 | $^\circ\text{C}$ |
| T_{SOLD} | 1.6 mm (0.062 in.) from Case for 10s | 260 | $^\circ\text{C}$ |
| M_d | Mounting Torque | 1.13/10 | Nm/lb.in |
| Weight | | 6 | g |

TO-247HV



G = Gate K = Cathode
A = Anode Tab = Anode

Features

- Very High Voltage Package
- Very High Current Capability

Advantages

- High Power Density
- Low Gate Drive Requirement

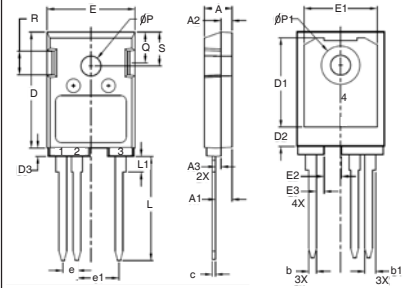
Applications

- Capacitive Discharge Circuits
- Ignition Circuits
- Solid State Surge Protection

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------------|---|-----------------------|------|------------------|
| | | Min. | Typ. | Max. |
| V_{BR} | $I_A = 250\mu\text{A}, V_{GK} = 0V$ | 1500 | | V |
| $V_{GK(th)}$ | $I_A = 250\mu\text{A}, V_{AK} = V_{GK}$ | 2.5 | | 5.0 V |
| V_T | $I_T = 1000A, V_{GK} = 15V$ | | 5.95 | 7.5 V |
| r_T | $I_T > I_L, V_{GK} = 15V$ | | 1.20 | m Ω |
| V_{BO} | $V_{GK} = 15V$ | | 6.45 | V |
| I_D | $V_{AK} = 1500V, V_{GK} = 0V$ $T_J = 125^\circ\text{C}$ | | | 15 μA |
| | | | | 1 mA |
| I_L I_H | | | 250 | A |
| | | | 200 | A |
| I_{GKS} | $V_{AK} = 0V, V_{GK} = \pm 30V$ | | | ± 200 nA |

| Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | | Characteristic Values | | |
|--|---|--|------|-----------|
| | | Min. | Typ. | Max. |
| C_{iks} | } $V_{AK} = 25\text{V}, V_{GK} = 0\text{V}, f = 1\text{MHz}$ | | 2825 | pF |
| C_{oks} | | | 164 | pF |
| C_{rks} | | | 50 | pF |
| $Q_{g(on)}$ | } $I_C = 40\text{A}, V_{GK} = 15\text{V}, V_{AK} = 600\text{V}$ | | 99 | nC |
| Q_{gk} | | | 22 | nC |
| Q_{ga} | | | 36 | nC |
| t_{ri} | } Capacitive Discharge, $T_J = 25^\circ\text{C}$ | | 100 | ns |
| t_d | | $I_A = 2000\text{A}, V_{GK} = 15\text{V}, R_G = 1\Omega$ $V_{AK} = 1000\text{V}, L < 20\text{nH}$, Notes 2 & 3 | | 50 |
| t_{ri} | } Capacitive Discharge, $T_J = 125^\circ\text{C}$ | | 100 | ns |
| t_d | | $I_A = 2000\text{A}, V_{GK} = 15\text{V}, R_G = 1\Omega$ $V_{AK} = 1000\text{V}, L < 20\text{nH}$, Notes 2 & 3 | | 50 |
| R_{thJC} | | | | 0.18 °C/W |
| R_{thCS} | | 0.21 | | °C/W |

TO-247HV Outline



PINS:
1 - Gate 2 - Cathode
3, 4 - Anode

| SYM | INCHES | | MILLIMETERS | |
|-----|--------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .114 | .122 | 2.90 | 3.10 |
| A2 | .075 | .083 | 1.90 | 2.10 |
| A3 | .035 | .043 | 0.90 | 1.10 |
| b | .053 | .059 | 1.35 | 1.50 |
| b1 | .075 | .083 | 1.90 | 2.10 |
| c | .022 | .030 | 0.55 | 0.75 |
| D | .819 | .843 | 20.80 | 21.40 |
| D1 | .638 | .646 | 16.20 | 16.40 |
| D2 | .134 | .146 | 3.40 | 3.70 |
| D3 | .055 | .063 | 1.40 | 1.60 |
| E | .622 | .638 | 15.80 | 16.20 |
| E1 | .520 | .528 | 13.20 | 13.40 |
| E2 | .118 | .126 | 3.00 | 3.20 |
| E3 | .051 | .059 | 1.30 | 1.50 |
| e | .100 | BSC | 2.54 | BSC |
| e1 | .300 | BSC | 7.62 | BSC |
| L | .732 | .748 | 18.60 | 19.00 |
| L1 | .106 | .118 | 2.70 | 3.00 |
| øP | .138 | .142 | 3.50 | 3.60 |
| øP1 | .272 | .280 | 6.90 | 7.10 |
| Q | .216 | .224 | 5.50 | 5.70 |
| R | .165 | .169 | 4.20 | 4.30 |
| S | .240 | .248 | 6.10 | 6.30 |

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. It is recommended to use a gate driver capable of supplying more than 4Amps and $\geq 15\text{V}$ gate voltage.
3. Refer to fig. 8 & 9.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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| | | | | | | | | | | |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665 | 6,404,065 B1 | 6,683,344 | 6,727,585 | 7,005,734 B2 | 7,157,338B2 |
| | 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343 | 6,710,405 B2 | 6,759,692 | 7,063,975 B2 | |
| | 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505 | 6,710,463 | 6,771,478 B2 | 7,071,537 | |

Fig. 1. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

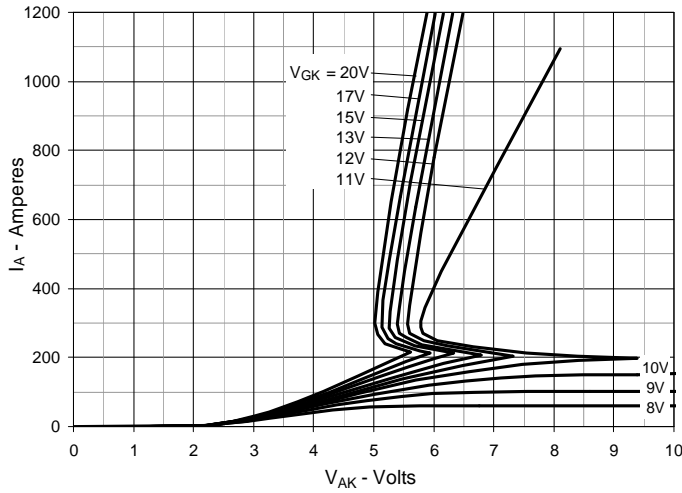


Fig. 2. Extended Output Characteristics @ $T_J = 125^\circ\text{C}$

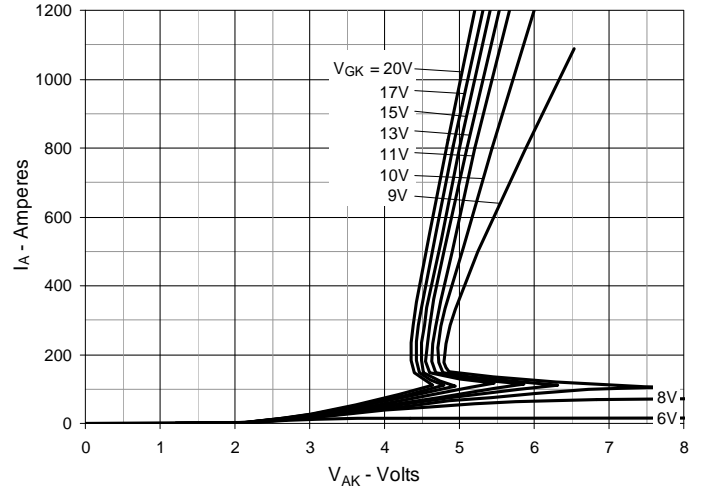


Fig. 3. Extended Output Characteristics @ $T_J = -40^\circ\text{C}$

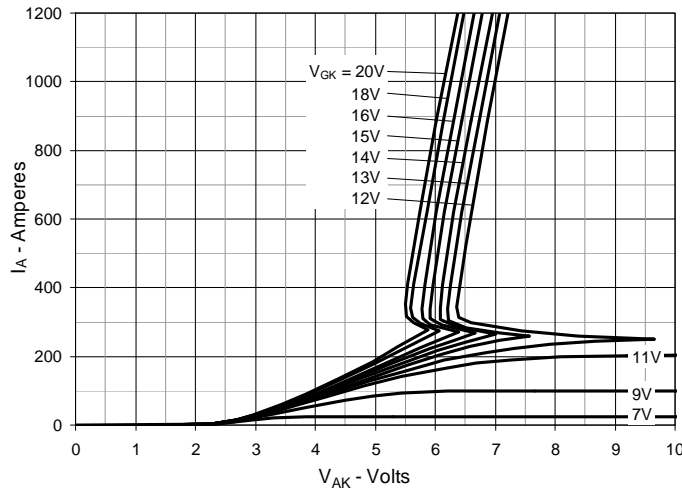


Fig. 4. Gate Charge

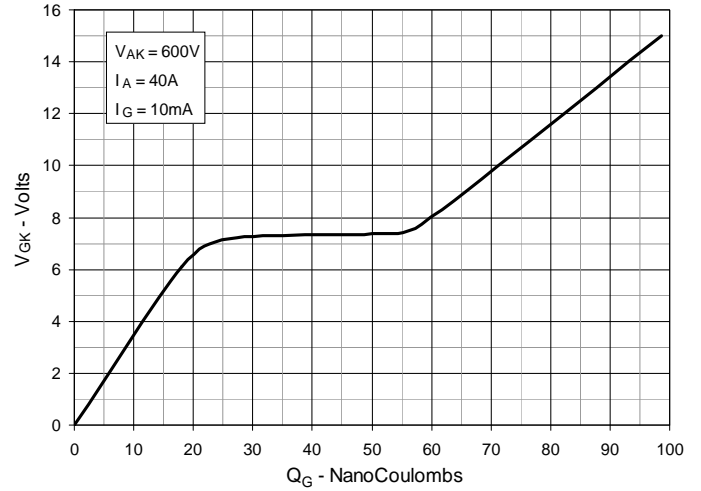


Fig. 5. Capacitance

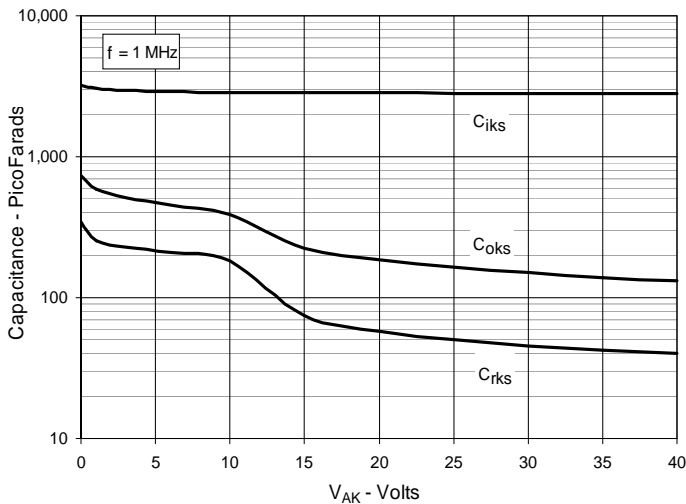


Fig. 6. Maximum Transient Thermal Impedance

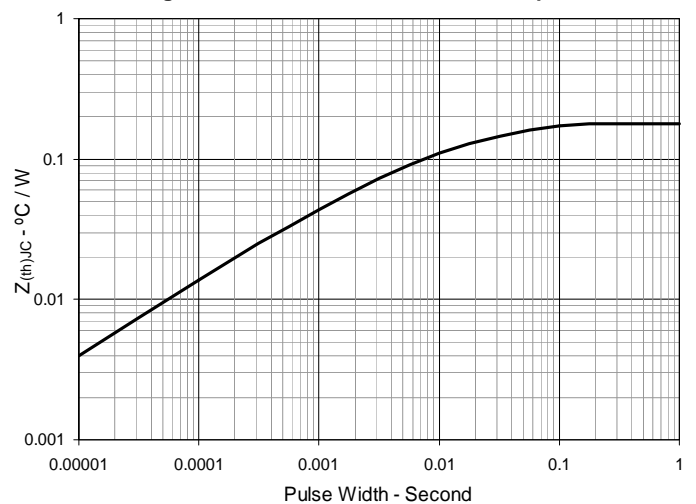
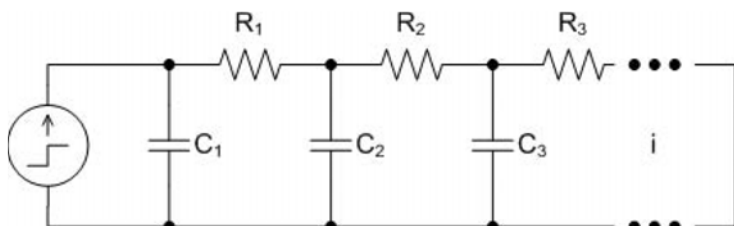


Fig. 7. Cauer Thermal Network



| i | Ri (Ω) | Ci (F) |
|---|-----------------|----------|
| 1 | 0.015004 | 0.005397 |
| 2 | 0.071079 | 0.028026 |
| 3 | 0.051007 | 0.121930 |
| 4 | 0.002310 | 2.500000 |

Fig. 8. Capacitive Discharge

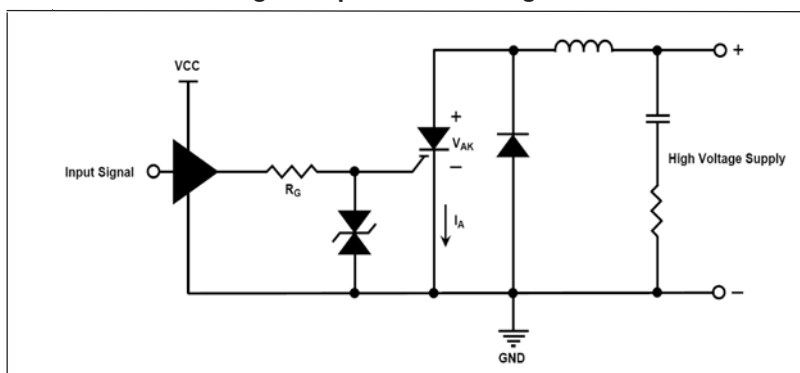
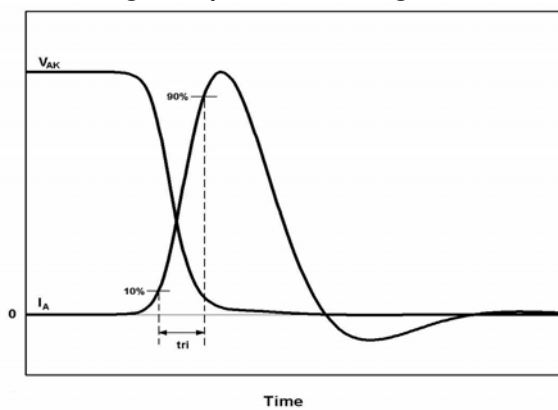


Fig. 9. Capacitive Discharge Waveform





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