

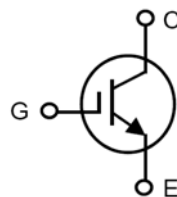
### High Voltage XPT™ IGBT

### IXYT30N450HV IXYH30N450HV

$$V_{CES} = 4500V$$

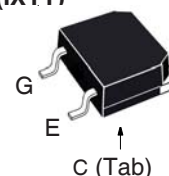
$$I_{C110} = 30A$$

$$V_{CE(sat)} \leq 3.9V$$

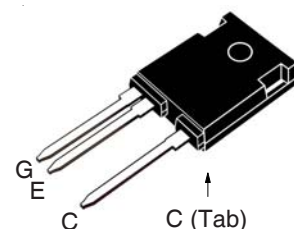


| Symbol                  | Test Conditions                                                                      | Maximum Ratings |            |
|-------------------------|--------------------------------------------------------------------------------------|-----------------|------------|
| $V_{CES}$               | $T_C = 25^\circ C$ to $150^\circ C$                                                  | 4500            | V          |
| $V_{CGR}$               | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$                            | 4500            | V          |
| $V_{GES}$               | Continuous                                                                           | $\pm 20$        | V          |
| $V_{GEM}$               | Transient                                                                            | $\pm 30$        | V          |
| $I_{C25}$               | $T_C = 25^\circ C$                                                                   | 60              | A          |
| $I_{C110}$              | $T_C = 110^\circ C$                                                                  | 30              | A          |
| $I_{CM}$                | $T_C = 25^\circ C$ , 1ms                                                             | 200             | A          |
| <b>SSOA<br/>(RBSOA)</b> | $V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 10\Omega$<br>Clamped Inductive Load | $I_{CM} = 90$   | A          |
|                         |                                                                                      | 3600            | V          |
| $P_C$                   | $T_C = 25^\circ C$                                                                   | 430             | W          |
| $T_J$                   |                                                                                      | -55 ... +150    | $^\circ C$ |
| $T_{JM}$                |                                                                                      | 150             | $^\circ C$ |
| $T_{stg}$               |                                                                                      | -55 ... +150    | $^\circ C$ |
| $T_L$                   | Maximum Lead Temperature for Soldering                                               | 300             | $^\circ C$ |
| $T_{SOLD}$              | 1.6 mm (0.062in.) from Case for 10s                                                  | 260             | $^\circ C$ |
| $M_d$                   | Mounting Torque (TO-247HV)                                                           | 1.13/10         | Nm/lb.in   |
| <b>Weight</b>           | TO-268HV                                                                             | 4.0             | g          |
|                         | TO-247HV                                                                             | 6.0             | g          |

TO-268HV (IXYT)



TO-247HV (IXYH)



G = Gate      C = Collector  
E = Emitter    Tab = Collector

#### Features

- High Voltage Packages
- High Blocking Voltage
- High Peak Current Capability
- Low Saturation Voltage

#### Advantages

- Low Gate Drive Requirement
- High Power Density

#### Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Laser Generators
- Capacitor Discharge Circuits
- AC Switches

| Symbol        | Test Conditions<br>( $T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values |            |                    |
|---------------|---------------------------------------------------------------------|-----------------------|------------|--------------------|
|               |                                                                     | Min.                  | Typ.       | Max.               |
| $BV_{CES}$    | $I_C = 250\mu A$ , $V_{GE} = 0V$                                    | 4500                  |            | V                  |
| $V_{GE(th)}$  | $I_C = 250\mu A$ , $V_{CE} = V_{GE}$                                | 3.0                   |            | 5.0 V              |
| $I_{CES}$     | $V_{CE} = V_{CES}$ , $V_{GE} = 0V$<br>$T_J = 125^\circ C$           |                       |            | 25 $\mu A$<br>1 mA |
| $I_{GES}$     | $V_{CE} = 0V$ , $V_{GE} = \pm 20V$                                  |                       |            | $\pm 200$ nA       |
| $V_{CE(sat)}$ | $I_C = 30A$ , $V_{GE} = 15V$ , Note 1<br>$T_J = 125^\circ C$        |                       | 3.2<br>4.5 | 3.9 V<br>V         |

## Symbol Test Conditions

( $T_J = 25^\circ\text{C}$  Unless Otherwise Specified)

## Characteristic Values

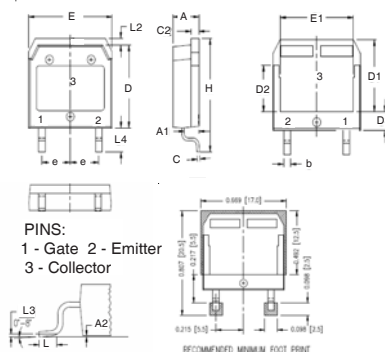
|              |                                                                                                                                                             | Min. | Typ. | Max.                    |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|-------------------------|
| $g_{fs}$     | $I_C = 30\text{A}, V_{CE} = 10\text{V}$ , Note 1                                                                                                            | 11   | 18   | S                       |
| $C_{ies}$    | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$                                                                                                  |      | 1840 | pF                      |
| $C_{oes}$    |                                                                                                                                                             |      | 83   | pF                      |
| $C_{res}$    |                                                                                                                                                             |      | 35   | pF                      |
| $Q_g$        | $I_C = 30\text{A}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$                                                                                              |      | 88   | nC                      |
| $Q_{ge}$     |                                                                                                                                                             |      | 11   | nC                      |
| $Q_{gc}$     |                                                                                                                                                             |      | 40   | nC                      |
| $t_{d(on)}$  | <b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = 30\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 960\text{V}, R_G = 10\Omega$  |      | 38   | ns                      |
| $t_r$        |                                                                                                                                                             |      | 318  | ns                      |
| $t_{d(off)}$ |                                                                                                                                                             |      | 168  | ns                      |
| $t_f$        |                                                                                                                                                             |      | 1220 | ns                      |
| $t_{d(on)}$  | <b>Resistive Switching Times, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = 30\text{A}, V_{GE} = 15\text{V}$<br>$V_{CE} = 960\text{V}, R_G = 10\Omega$ |      | 42   | ns                      |
| $t_r$        |                                                                                                                                                             |      | 590  | ns                      |
| $t_{d(off)}$ |                                                                                                                                                             |      | 180  | ns                      |
| $t_f$        |                                                                                                                                                             |      | 1365 | ns                      |
| $R_{thJC}$   |                                                                                                                                                             |      |      | 0.29 $^\circ\text{C/W}$ |
| $R_{thCS}$   | TO-247HV                                                                                                                                                    |      | 0.21 | $^\circ\text{C/W}$      |

Note: 1. Pulse test,  $t < 300\mu\text{s}$ , duty cycle,  $d < 2\%$ .

## ADVANCE 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.

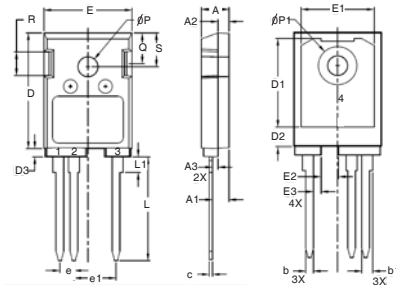
## TO-268HV Outline



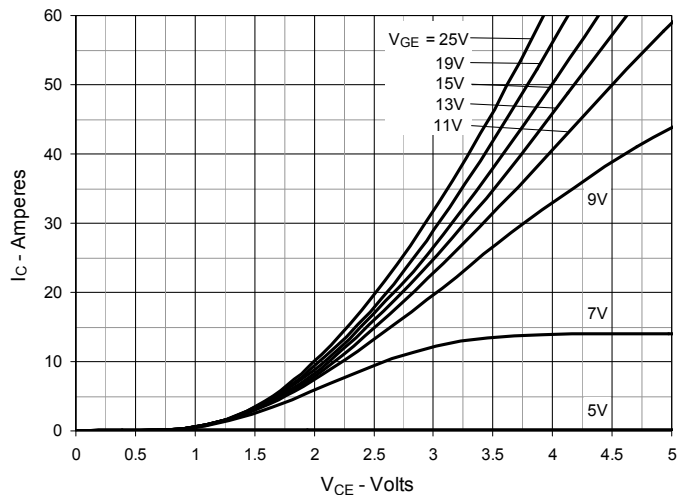
PINS:  
1 - Gate 2 - Emitter  
3 - Collector

| SYM | INCHES |      | MILLIMETER |       |
|-----|--------|------|------------|-------|
|     | MIN    | MAX  | MIN        | MAX   |
| A   | .193   | .201 | 4.90       | 5.10  |
| A1  | .106   | .114 | 2.70       | 2.90  |
| A2  | .001   | .010 | 0.02       | 0.25  |
| b   | .045   | .057 | 1.15       | 1.45  |
| C   | .016   | .026 | 0.40       | 0.65  |
| C2  | .057   | .063 | 1.45       | 1.60  |
| D   | .543   | .551 | 13.80      | 14.00 |
| D1  | .465   | .476 | 11.80      | 12.10 |
| D2  | .295   | .307 | 7.50       | 7.80  |
| D3  | .114   | .126 | 2.90       | 3.20  |
| E   | .624   | .632 | 15.85      | 16.05 |
| E1  | .524   | .535 | 13.30      | 13.60 |
| e   | .215   | BSC  | 5.45       | BSC   |
| H   | .736   | .752 | 18.70      | 19.10 |
| L   | .067   | .079 | 1.70       | 2.00  |
| L2  | .039   | .045 | 1.00       | 1.15  |
| L3  | .010   | BSC  | 0.25       | BSC   |
| L4  | .150   | .161 | 3.80       | 4.10  |

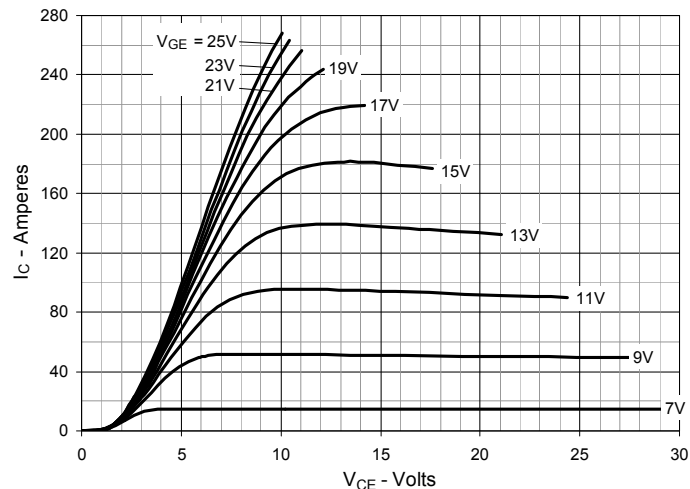
## TO-247HV Outline



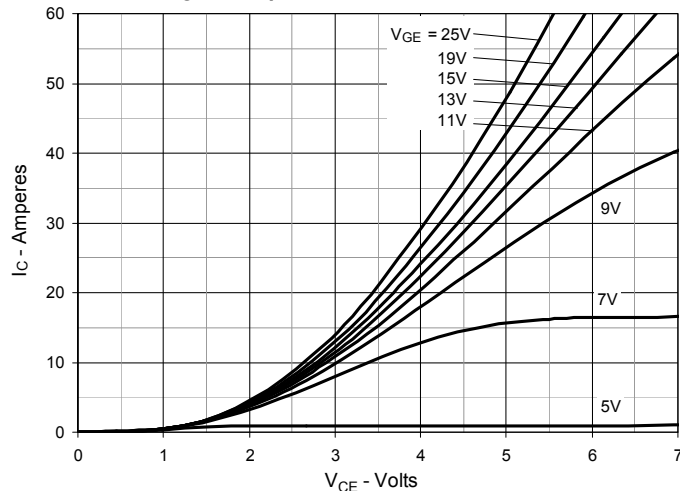
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



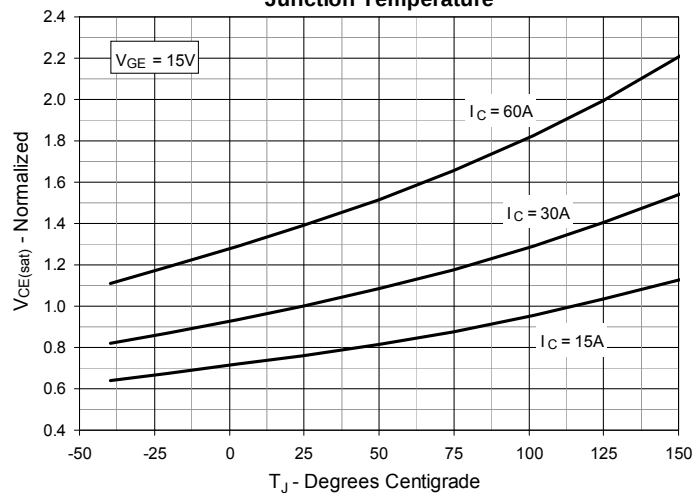
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



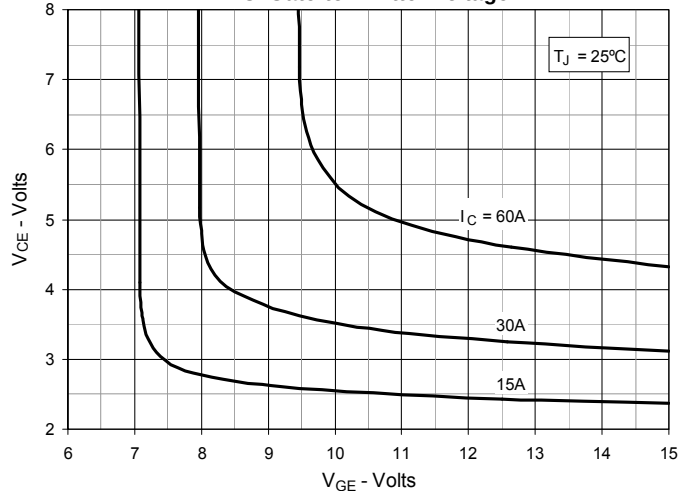
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



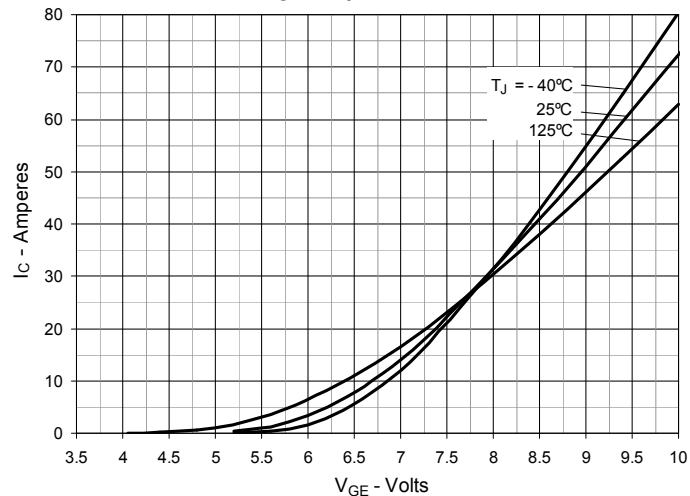
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



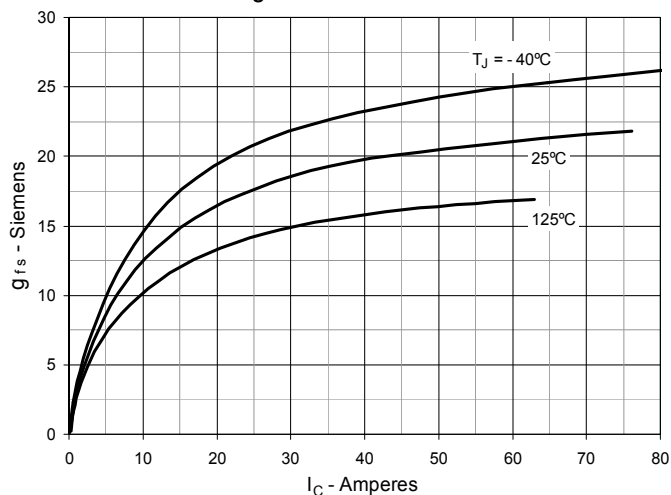
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



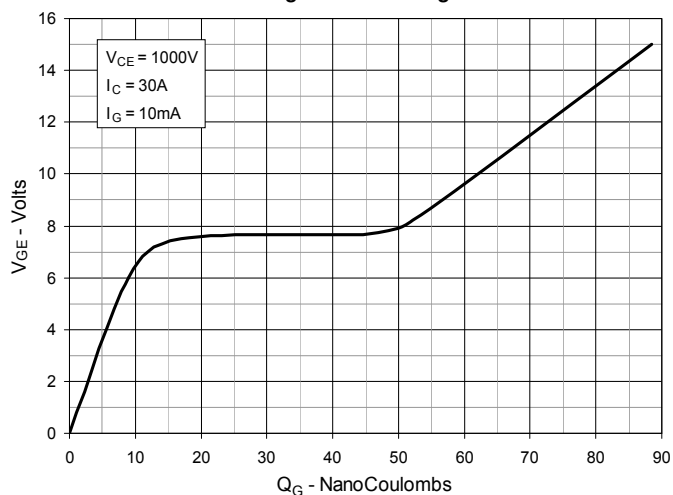
**Fig. 6. Input Admittance**



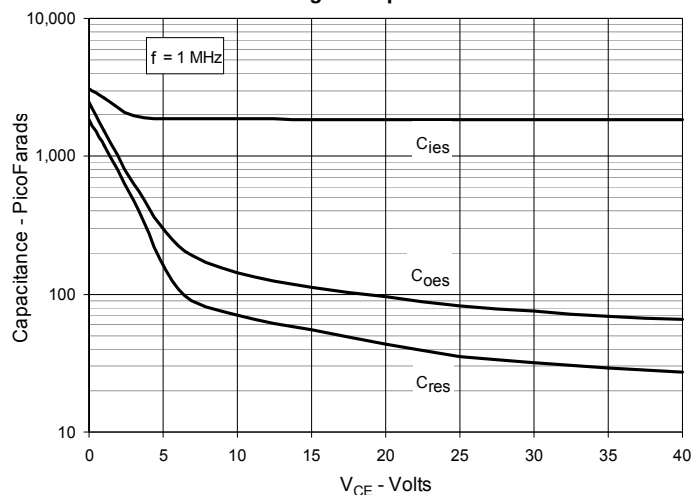
**Fig. 7. Transconductance**



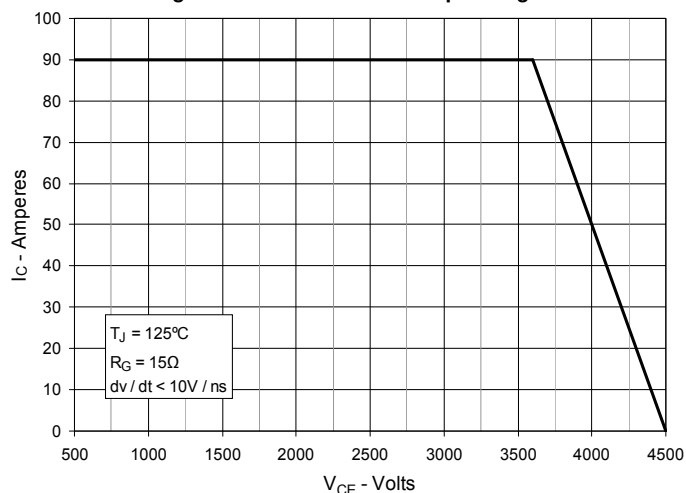
**Fig. 8. Gate Charge**



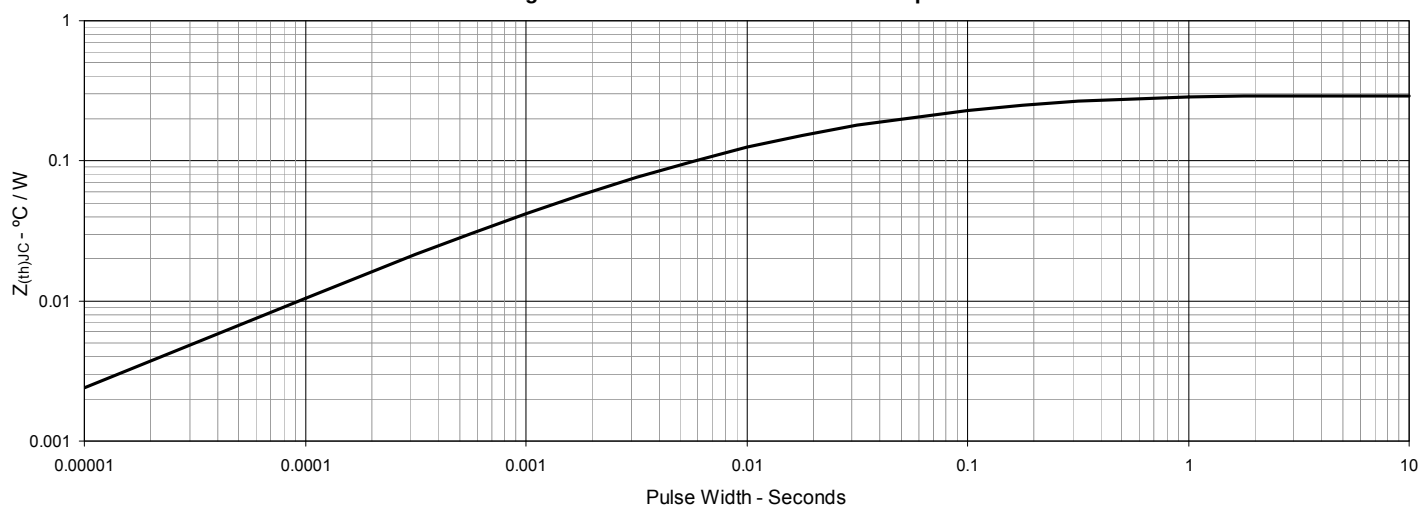
**Fig. 9. Capacitance**



**Fig. 10. Reverse-Bias Safe Operating Area**



**Fig. 11. Maximum Transient Thermal Impedance**



IXYS Reserves the Right to Change Limits, Test Conditions and Dimensions.



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