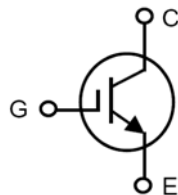


**High Voltage XPT™  
IGBT**
**IXYT30N450HV  
IXYH30N450HV**

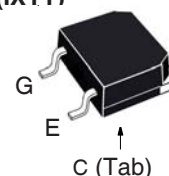
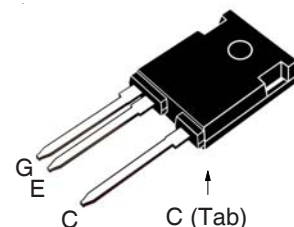
$$V_{CES} = 4500V$$

$$I_{C110} = 30A$$

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



| 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 | $I_{CM} = 90$<br>3600 | A<br>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 | V<br>V             |

| Symbol Test Conditions<br>( $T_J = 25^\circ\text{C}$ 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,  $d < 2\%$ .

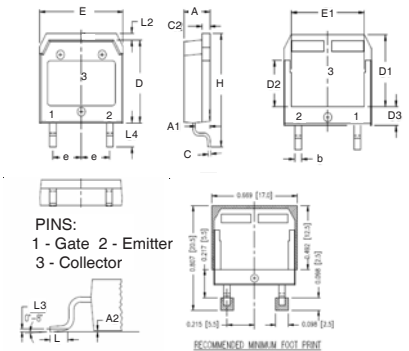
### ADVANCE TECHNICAL INFORMATION

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.

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

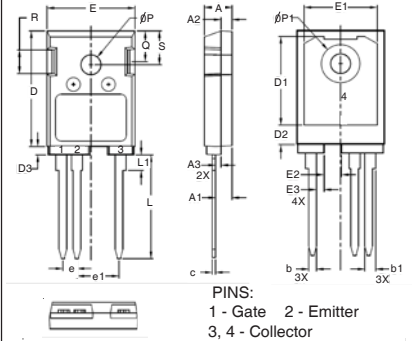
|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: | 4,835,592 | 4,931,844 | 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    |             |

### TO-268HV Outline



| 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



| 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  |

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

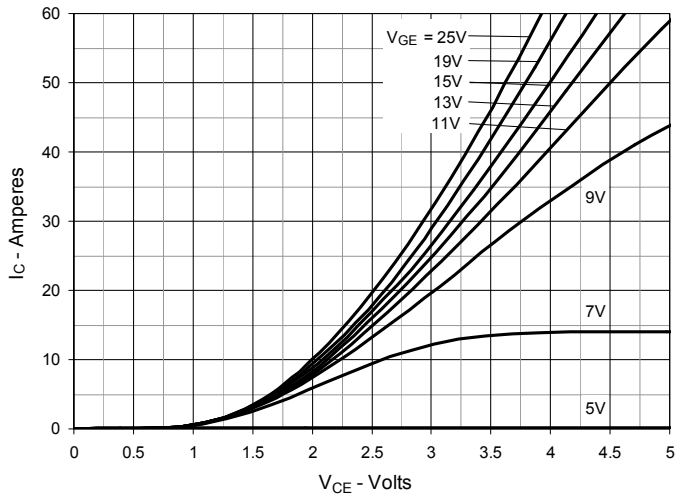


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

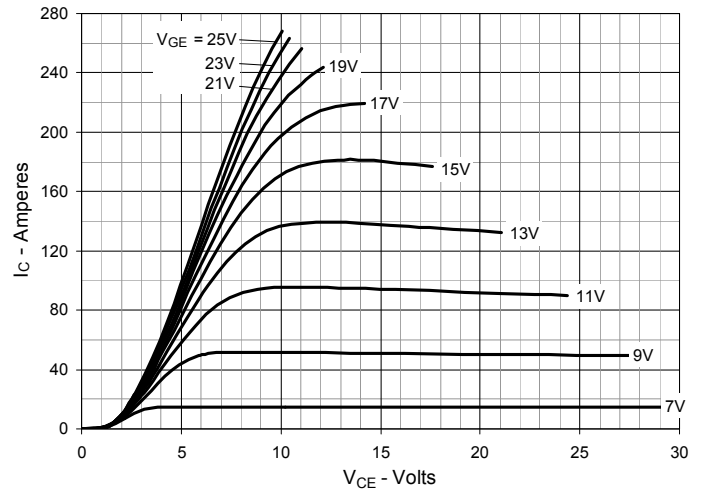


Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$

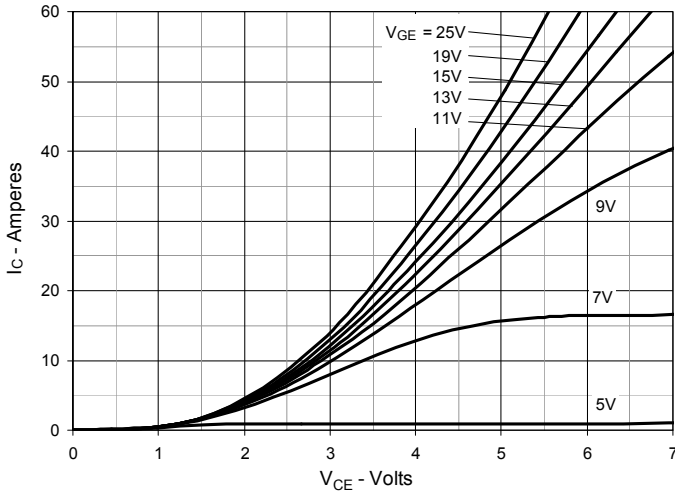


Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature

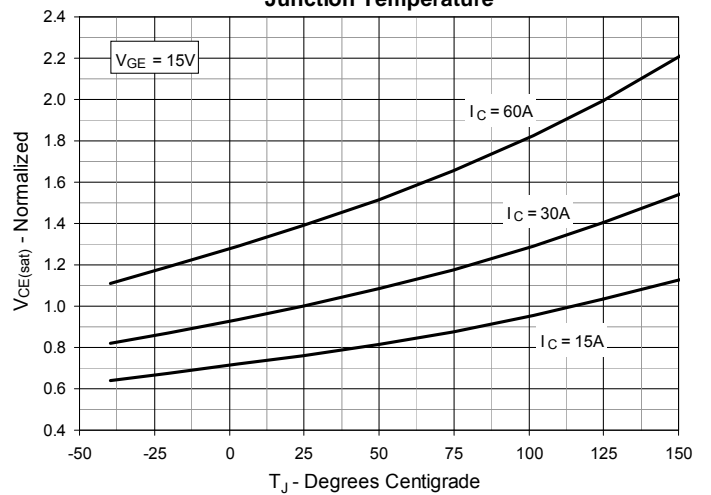


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

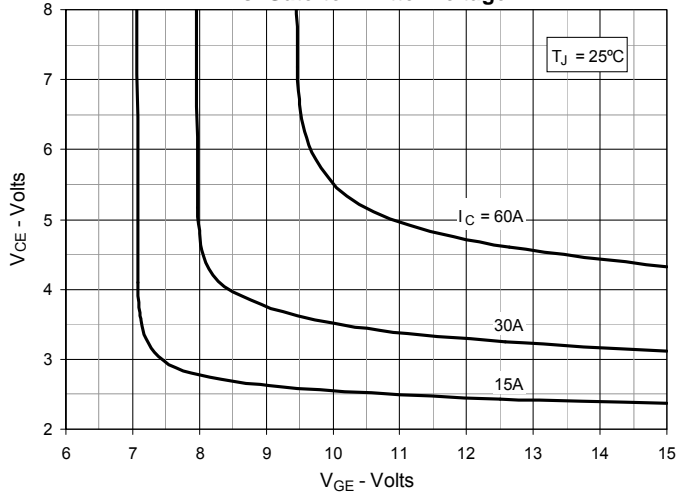
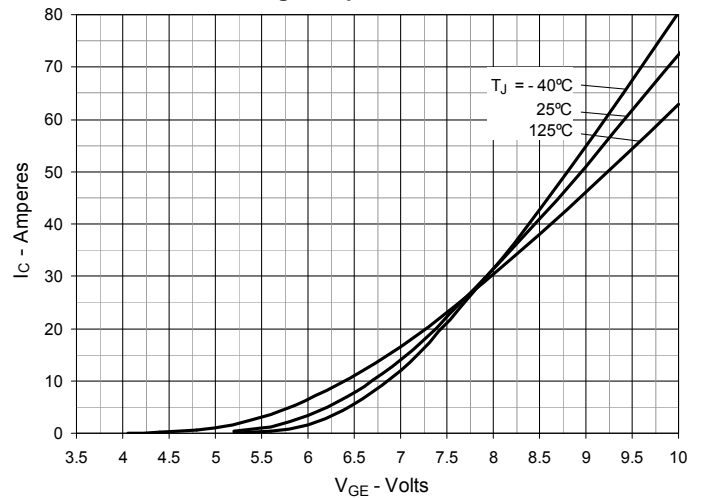
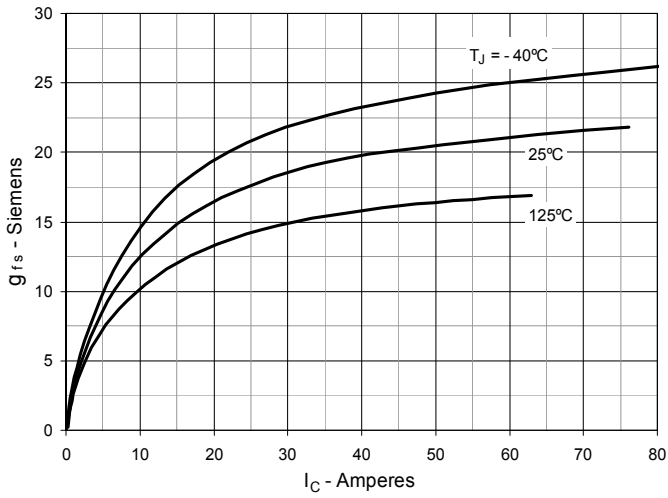


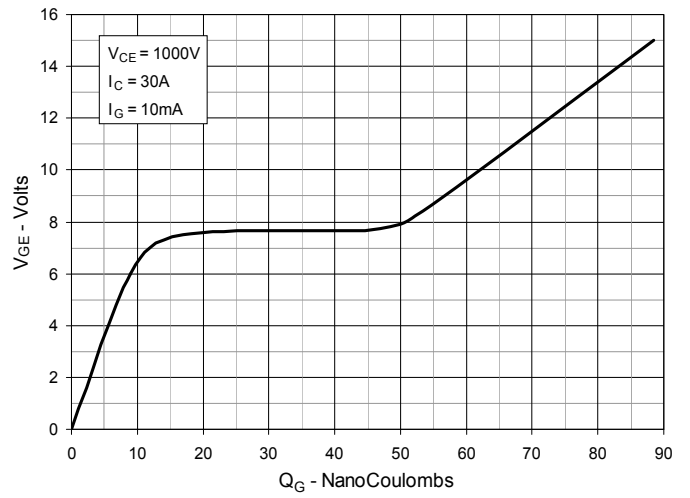
Fig. 6. Input Admittance



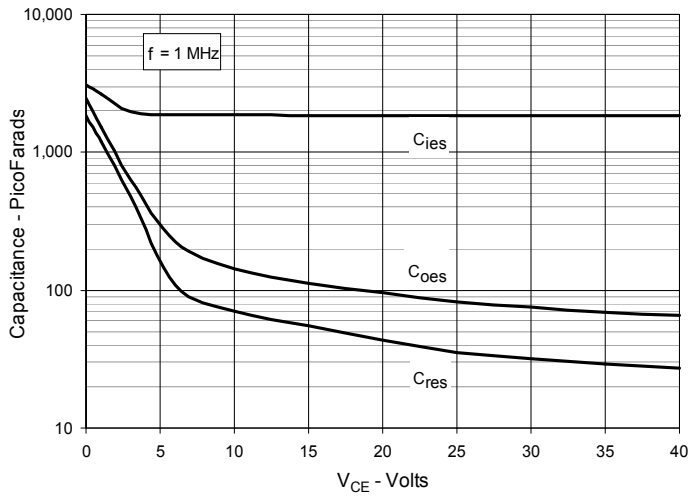
**Fig. 7. Transconductance**



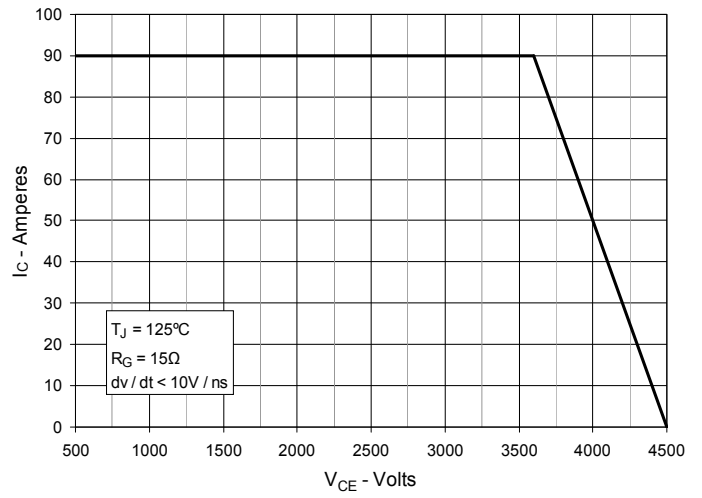
**Fig. 8. Gate Charge**



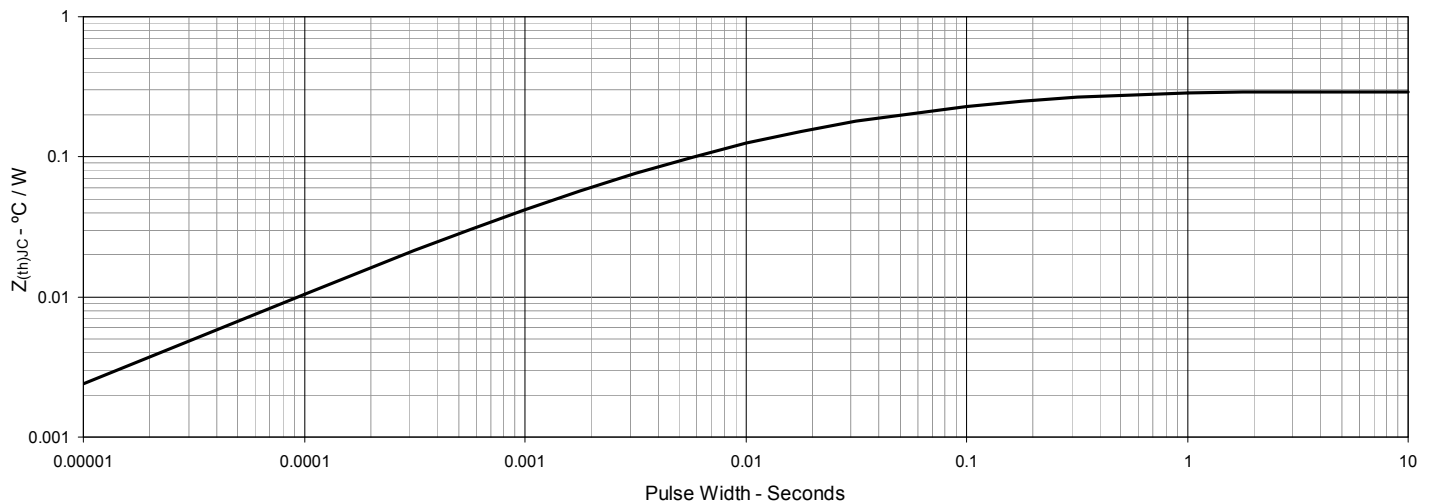
**Fig. 9. Capacitance**



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



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



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