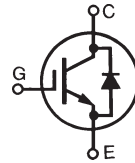


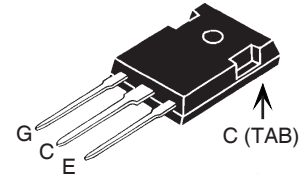
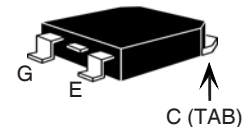
**High Voltage
IGBTs w/Diode**
**IXGH24N170AH1
IXGT24N170AH1**


$$V_{CES} = 1700V$$

$$I_{C25} = 24A$$

$$V_{CE(sat)} \leq 6.0V$$

$$t_{fi(typ)} = 40ns$$

TO-247 (IXGH)

TO-268 (IXGT)


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

| Symbol | Test Conditions | Maximum Ratings | |
|-------------------------|--|--------------------------------------|------------|
| V_{CES} | $T_C = 25^\circ C$ to $150^\circ C$ | 1700 | V |
| V_{CGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GE} = 1M\Omega$ | 1700 | V |
| V_{GES} | Continuous | ± 20 | V |
| V_{GEM} | Transient | ± 30 | V |
| I_{C25} | $T_C = 25^\circ C$ | 24 | A |
| I_{C90} | $T_C = 90^\circ C$ | 16 | A |
| I_{CM} | $T_C = 25^\circ C$, 1ms | 75 | A |
| SSOA (RBSOA) | $V_{GE} = 15V$, $T_{VJ} = 125^\circ C$, $R_G = 10\Omega$ Clamped Inductive Load | $I_{CM} = 50$ $0.8 \cdot V_{CES}$ | A V |
| t_{sc} | $T_J = 125^\circ C$, $V_{CE} = 1200V$, $V_{GE} = 15V$, $R_G = 22\Omega$ | 10 | μs |
| P_C | $T_C = 25^\circ C$ | 250 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from Case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic Body for 10 seconds | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-247) | 1.13/10 | Nm/lb.in. |
| Weight | TO-247 | 6 | g |
| | TO-268 | 4 | g |

Features

- Optimized for Low Conduction and Switching Losses
- Anti-Parallel Ultra Fast Diode
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

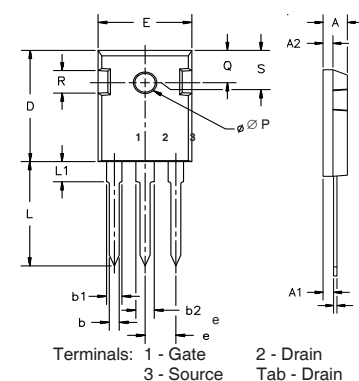
Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines

| Symbol | Test Conditions ($T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values | | |
|---------------|---|-----------------------|------------|-----------------------|
| | | Min. | Typ. | Max. |
| BV_{CES} | $I_C = 250\mu A$, $V_{GE} = 0V$ | 1700 | | V |
| $V_{GE(th)}$ | $I_C = 250\mu A$, $V_{CE} = V_{GE}$ | 3.0 | | V |
| I_{CES} | $V_{CE} = 0.8 \cdot V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ C$ | | | 100 μA 1.5 mA |
| I_{GES} | $V_{CE} = 0V$, $V_{GE} = \pm 20V$ | | | ± 100 nA |
| $V_{CE(sat)}$ | $I_C = 16A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ C$ | | 4.5 4.8 | V V |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|--|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $I_C = 24\text{A}, V_{CE} = 10\text{V}$, Note 2 | 13 | 22 | S |
| C_{ies} | $V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$ | | 2860 | pF |
| C_{oes} | | | 198 | pF |
| C_{res} | | | 58 | pF |
| Q_g | $I_C = 16\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$ | | 140 | nC |
| Q_{ge} | | | 18 | nC |
| Q_{gc} | | | 60 | nC |
| $t_{d(on)}$ | Inductive Load, $T_J = 25^\circ\text{C}$ $I_C = 24\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 10\Omega$ Note 1 | | 21 | ns |
| t_{ri} | | | 36 | ns |
| E_{on} | | | 2.97 | mJ |
| $t_{d(off)}$ | | | 336 | ns |
| t_{fi} | | | 40 | 80 ns |
| E_{off} | | | 0.79 | 1.50 mJ |
| $t_{d(on)}$ | Inductive Load, $T_J = 125^\circ\text{C}$ $I_C = 24\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 10\Omega$ Note 1 | | 23 | ns |
| t_{ri} | | | 31 | ns |
| E_{on} | | | 3.60 | mJ |
| $t_{d(off)}$ | | | 360 | ns |
| t_{fi} | | | 96 | ns |
| E_{off} | | | 1.47 | mJ |
| R_{thJC} | | | | 0.50 $^\circ\text{C/W}$ |
| R_{thCK} | (TO-247) | 0.21 | | $^\circ\text{C/W}$ |

TO-247 (IXGH) Outline



| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L ₁ | | 4.50 | | .177 |
| ∅P | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | 242 | BSC |

Reverse Diode (FRED)

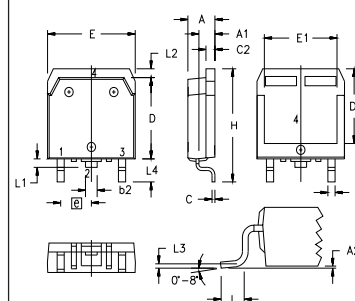
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|------------|---|-----------------------|------|------------------------|
| | | Min. | Typ. | Max. |
| V_F | $I_F = 20\text{A}, V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$ | | 2.5 | 2.95 V |
| I_{RM} | $I_F = 20\text{A}, -di_F/dt = 150\text{A}/\mu\text{s}$ $V_R = 1200\text{V}, V_{GE} = 0\text{V}$ $T_J = 125^\circ\text{C}$ | | 15 | A |
| t_{rr} | | | 80 | ns |
| I_{RM} | | | 20 | A |
| t_{rr} | | | 200 | ns |
| R_{thJC} | | | | 0.9 $^\circ\text{C/W}$ |

- Notes:
- Switching times may increase for $V_{CE}(\text{Clamp}) > 0.5 \cdot V_{CES}$, higher T_J or increased R_G .
 - Pulse Test, $t \leq 300\mu\text{s}$; Duty Cycle, $d \leq 2\%$.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-268 (IXGT) Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | 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 |
| b2 | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 0.40 | 0.65 |
| C2 | .057 | .063 | 1.45 | 1.60 |
| D | .543 | .551 | 13.80 | 14.00 |
| D1 | .488 | .500 | 12.40 | 12.70 |
| 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 | .094 | .106 | 2.40 | 2.70 |
| L1 | .047 | .055 | 1.20 | 1.40 |
| L2 | .039 | .045 | 1.00 | 1.15 |
| L3 | .010 BSC | | 0.25 BSC | |
| L4 | .150 | .161 | 3.80 | 4.10 |

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 |
| | 4,850,072 | 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. Output Characteristics
@ 25°C

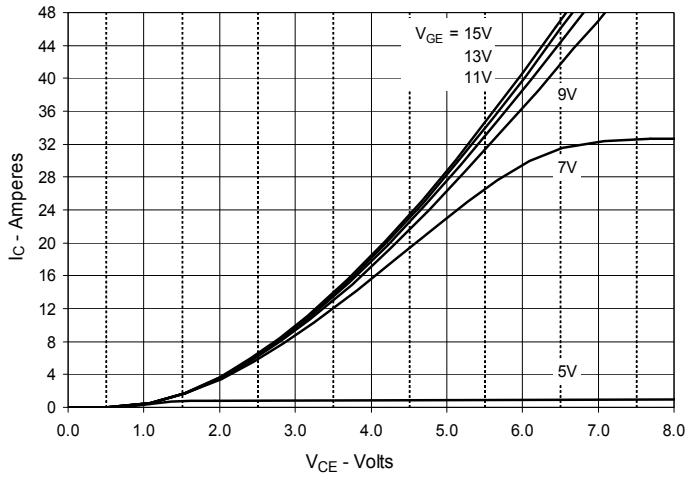


Fig. 2. Extended Output Characteristics
@ 25°C

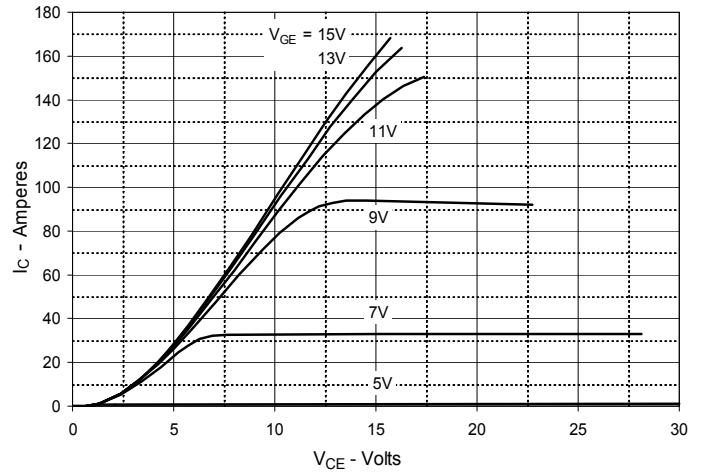


Fig. 3. Output Characteristics
@ 125°C

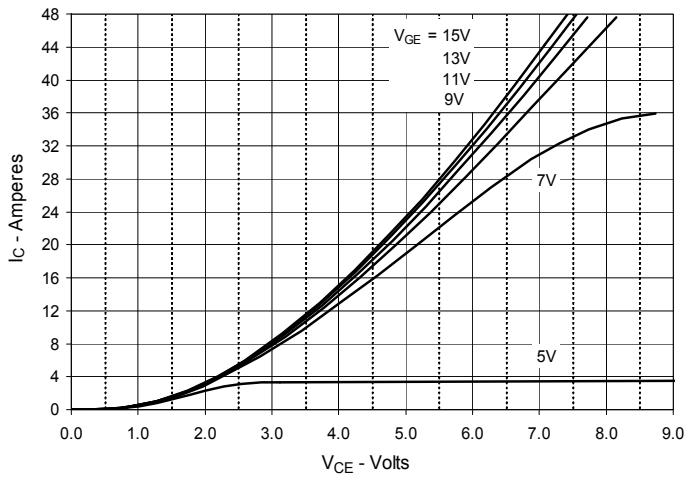


Fig. 4. Dependence of $V_{CE(sat)}$ on
Junction Temperature

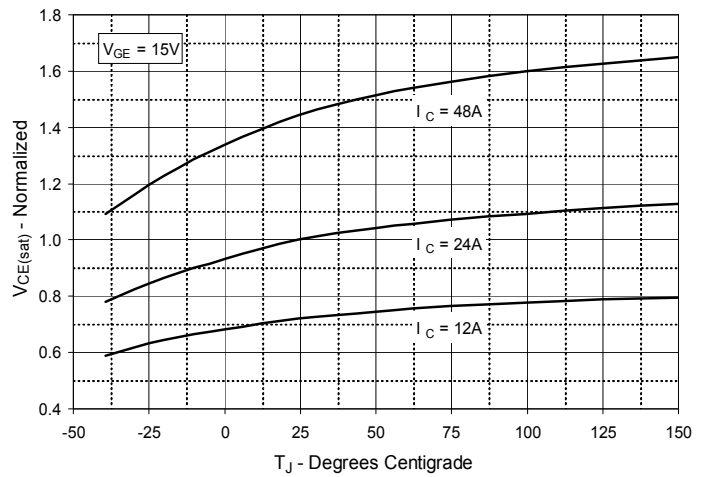


Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter Voltage

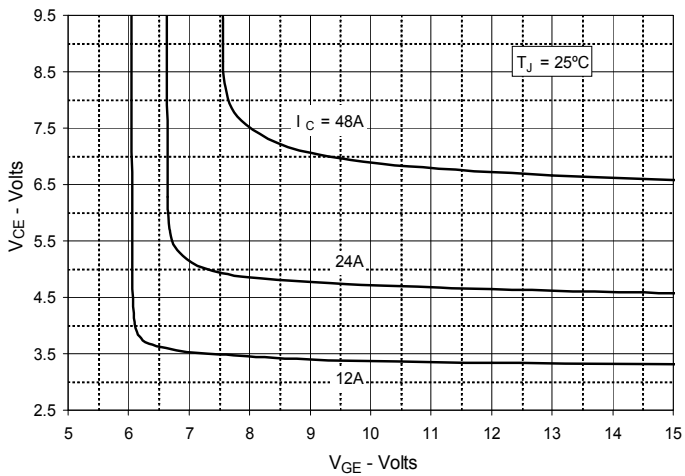


Fig. 6. Input Admittance

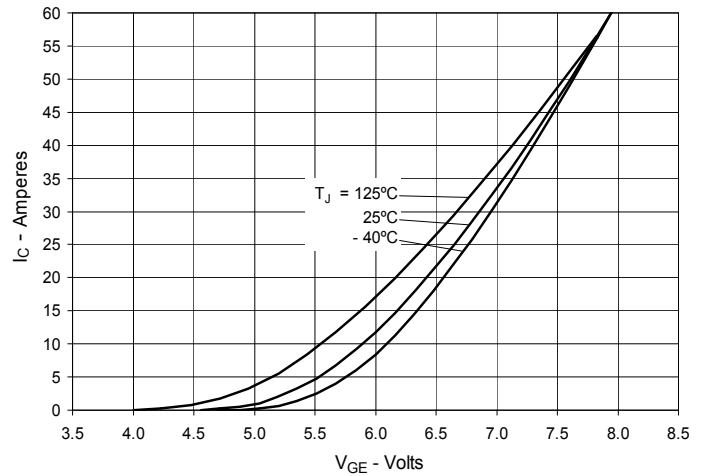


Fig. 7. Transconductance

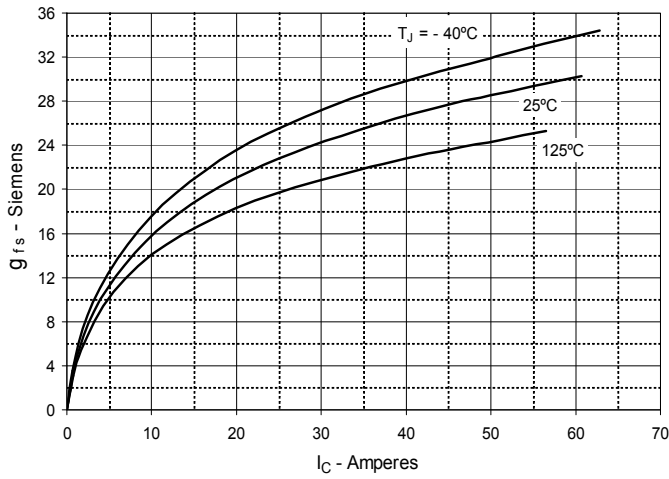


Fig. 8. Gate Charge

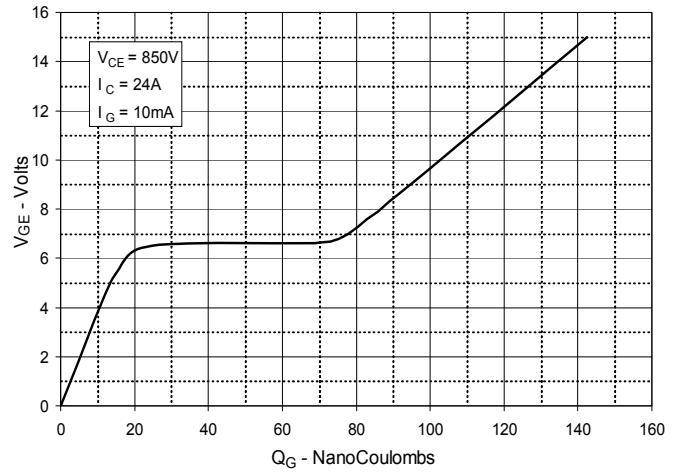


Fig. 9. Capacitance

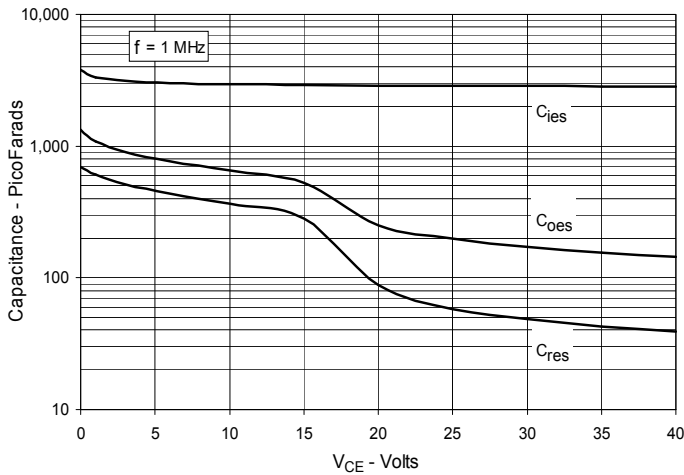


Fig. 10. Reverse-Bias Safe Operating Area

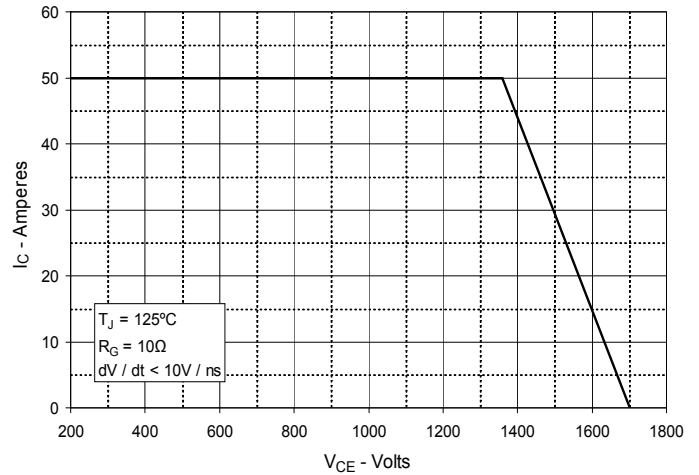
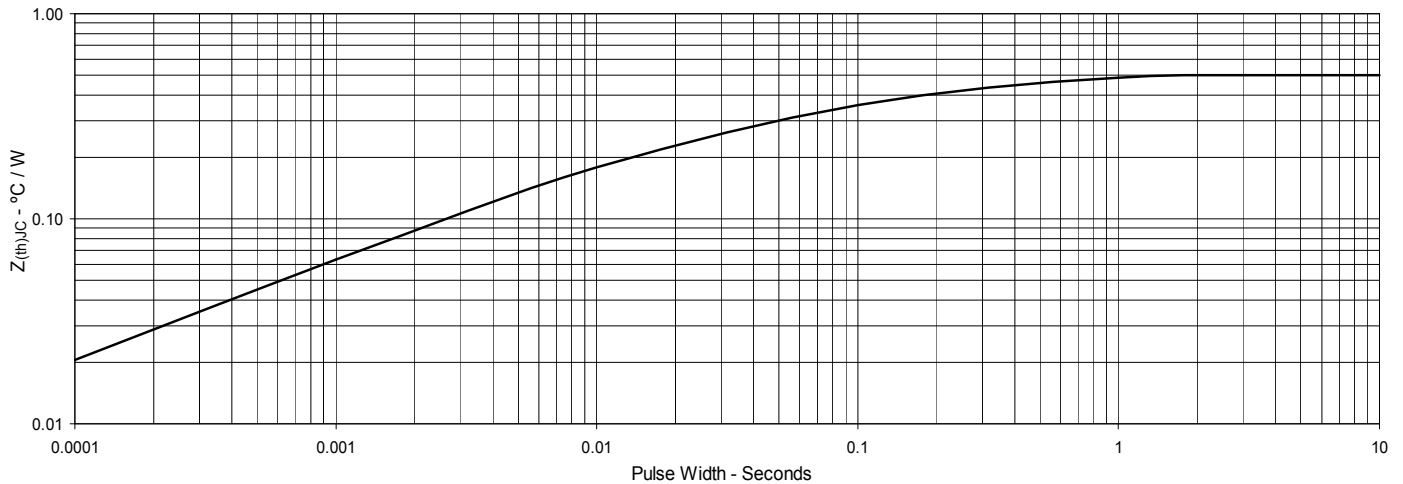


Fig. 11. Maximum Transient Thermal Impedance



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