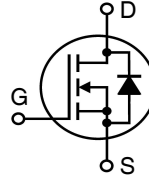


X2-Class HiperFET™ Power MOSFET

IXFP34N65X2M

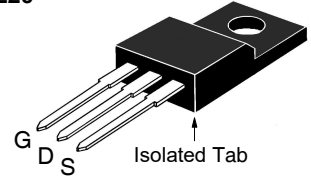
$V_{DSS} = 650V$
 $I_{D25} = 34A$
 $R_{DS(on)} \leq 100m\Omega$

(Electrically Isolated Tab)



N-Channel Enhancement Mode

**OVERMOLDED
TO-220**



G = Gate D = Drain
S = Source

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|-----------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 650 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 650 | V |
| V_{GSS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ C$, Limited by T_{JM} | 34 | A |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | 68 | A |
| I_A | $T_C = 25^\circ C$ | 10 | A |
| E_{AS} | $T_C = 25^\circ C$ | 1 | J |
| dv/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 50 | V/ns |
| P_D | $T_C = 25^\circ C$ | 40 | 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 | $^\circ C$ |
| V_{ISOL} | 50/60 Hz, 1 Minute | 2500 | V~ |
| M_d | Mounting Torque | 1.13 / 10 | Nm/lb.in |
| Weight | | 2.5 | g |

Features

- International Standard Package
- Plastic Overmolded Tab
- High Voltage Package
- Low $R_{DS(ON)}$ and Q_G
- Avalanche Rated
- 2500V~ Electrical Isolation
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|----------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu A$ | 650 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 1.5mA$ | 3.5 | | 5.0 V |
| I_{GSS} | $V_{GS} = \pm 30V$, $V_{DS} = 0V$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 10 μA 1.5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 17A$, Note 1 | | | 100 m Ω |

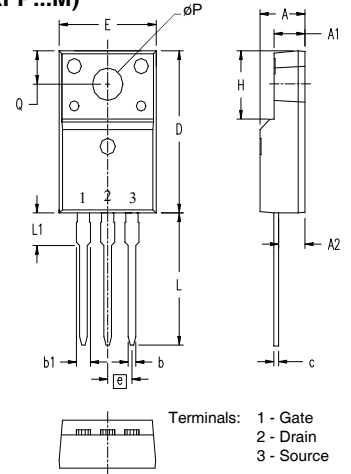
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|-------------------------------------|--|--|------|-------------------------|
| | | Min. | Typ. | Max |
| g_{fs} | $V_{DS} = 10\text{V}$, $I_D = 17\text{A}$, Note 1 | 12 | 20 | S |
| R_{Gi} | Gate Input Resistance | | 0.8 | Ω |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 3230 | pF |
| C_{oss} | | | 2000 | pF |
| C_{rss} | | | 2 | pF |
| Effective Output Capacitance | | | | |
| $C_{o(er)}$ | Energy related | $V_{GS} = 0\text{V}$ $V_{DS} = 0.8 \cdot V_{DSS}$ | 130 | pF |
| $C_{o(tr)}$ | Time related | | 486 | pF |
| Resistive Switching Times | | | | |
| $t_{d(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 17\text{A}$ $R_G = 10\Omega$ (External) | | 37 | ns |
| t_r | | | 60 | ns |
| $t_{d(off)}$ | | | 64 | ns |
| t_f | | | 30 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 17\text{A}$ | | 56 | nC |
| Q_{gs} | | | 19 | nC |
| Q_{gd} | | | 18 | nC |
| R_{thJC} | | | | 3.10 $^\circ\text{C/W}$ |
| R_{thCS} | | 0.50 | | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max |
| I_S | $V_{GS} = 0\text{V}$ | | | 34 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 136 A |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{V}$, Note 1 | | | 1.4 V |
| t_{rr} | $I_F = 17\text{A}$, $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}$ | | 164 | ns |
| Q_{RM} | | | 1.2 | μC |
| I_{RM} | | | 14.4 | A |

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

OVERMOLDED TO-220 (IXFP...M)



| SYM | INCHES | | MILLIMETERS | |
|---------------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .177 | .193 | 4.50 | 4.90 |
| A1 | .092 | .108 | 2.34 | 2.74 |
| A2 | .101 | .117 | 2.56 | 2.96 |
| b | .028 | .035 | 0.70 | 0.90 |
| b1 | .050 | .058 | 1.27 | 1.47 |
| c | .018 | .024 | 0.45 | 0.60 |
| D | .617 | .633 | 15.67 | 16.07 |
| E | .392 | .408 | 9.96 | 10.36 |
| e | .100 BSC | | 2.54 BSC | |
| H | .255 | .271 | 6.48 | 6.88 |
| L | .499 | .523 | 12.68 | 13.28 |
| L1 | .119 | .135 | 3.03 | 3.43 |
| $\emptyset P$ | .121 | .129 | 3.08 | 3.28 |
| Q | .126 | .134 | 3.20 | 3.40 |

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 | 6,404,065B1 | 6,683,344 | 6,727,585 | 7,005,734B2 | 7,157,338B2 |
| 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123B1 | 6,534,343 | 6,710,405B2 | 6,759,692 | 7,063,975B2 | |
| 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728B1 | 6,583,505 | 6,710,463 | 6,771,478B2 | 7,071,537 | |

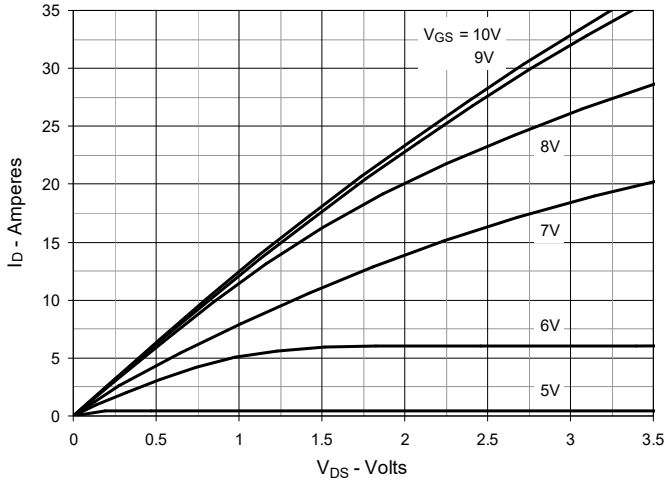
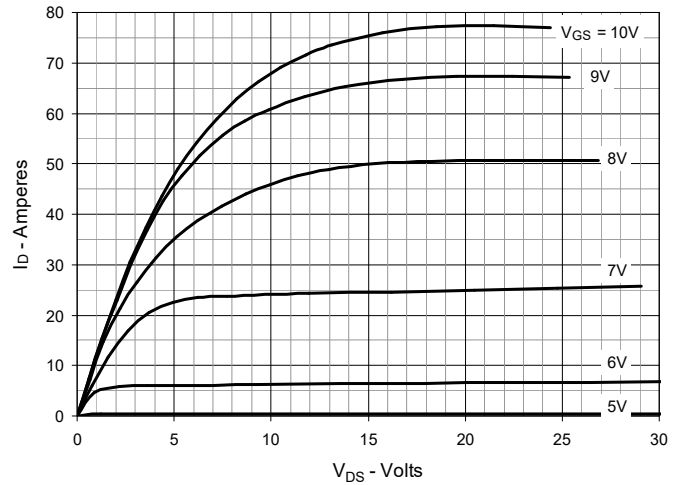
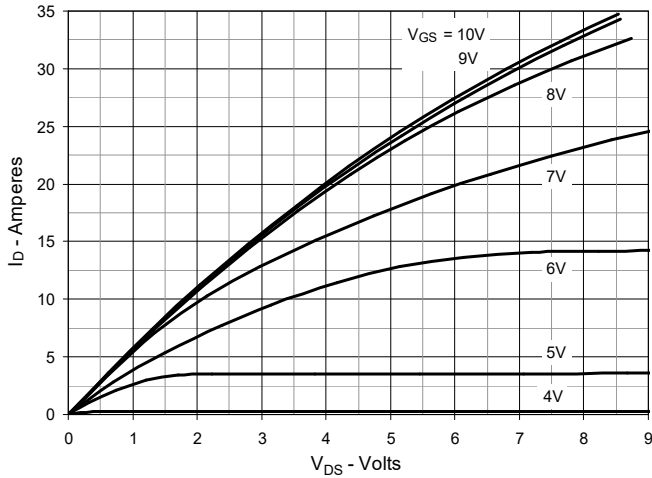
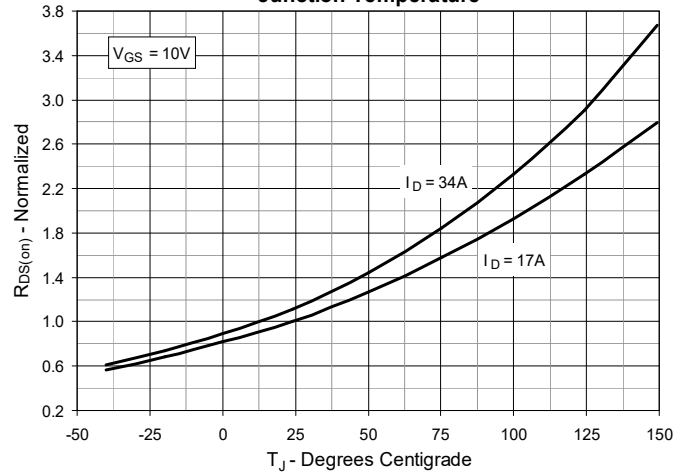
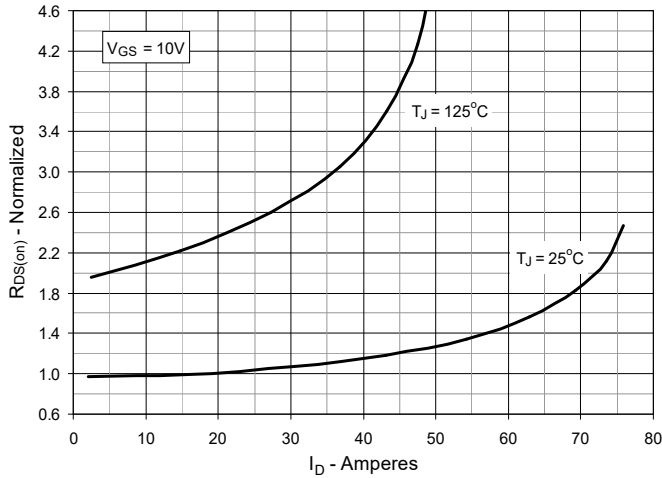
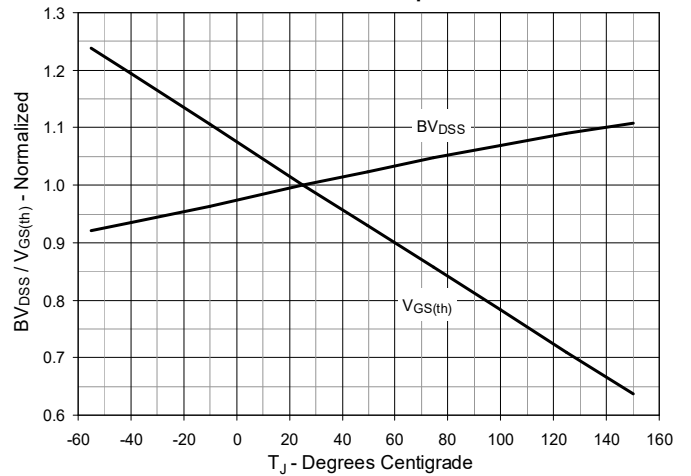
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

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

Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 17\text{A}$ Value vs. Junction Temperature

Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 17\text{A}$ Value vs. Drain Current

Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature


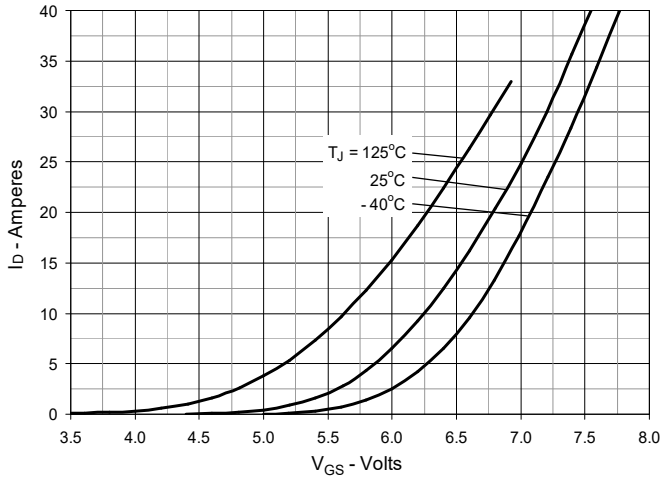
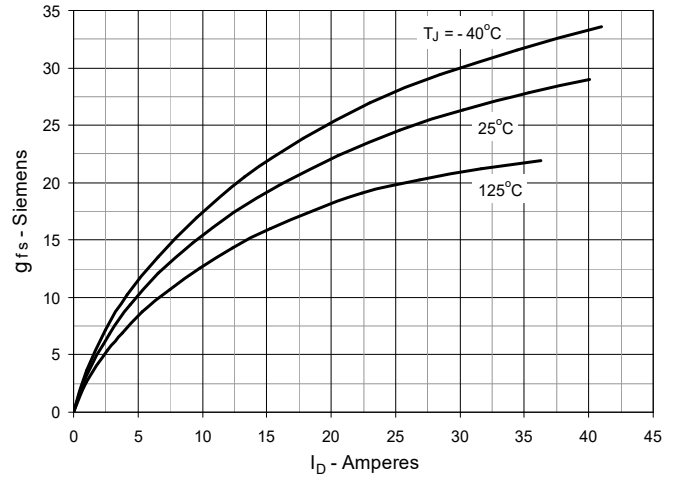
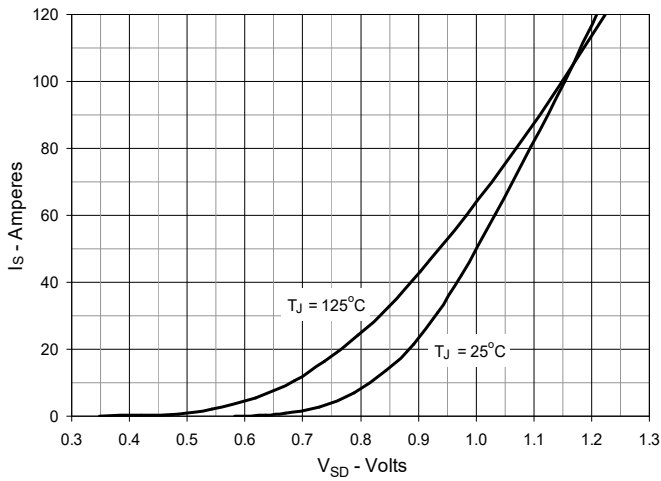
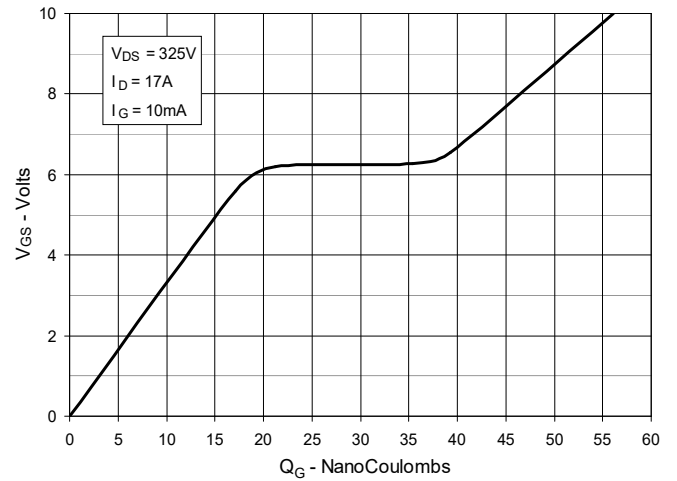
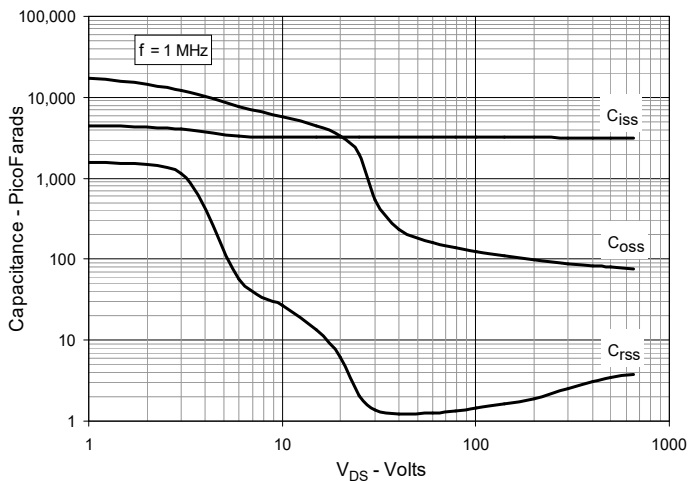
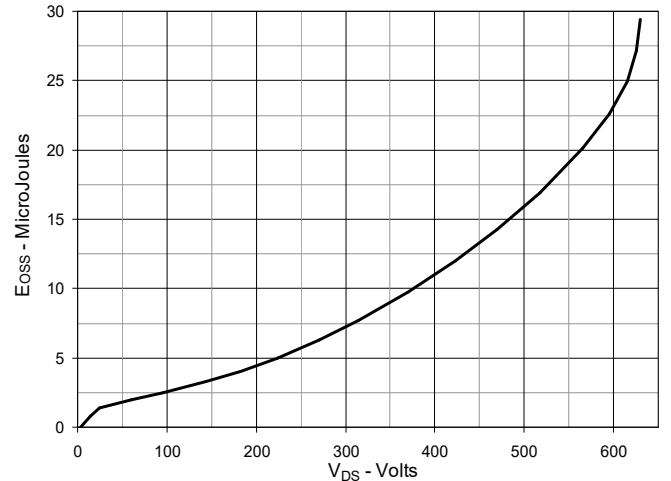
Fig. 7. Input Admittance

Fig. 8. Transconductance

Fig. 9. Forward Voltage Drop of Intrinsic Diode

Fig. 10. Gate Charge

Fig. 11 Capacitance

Fig. 12. Output Capacitance Stored Energy


Fig. 13. Forward-Bias Safe Operating Area

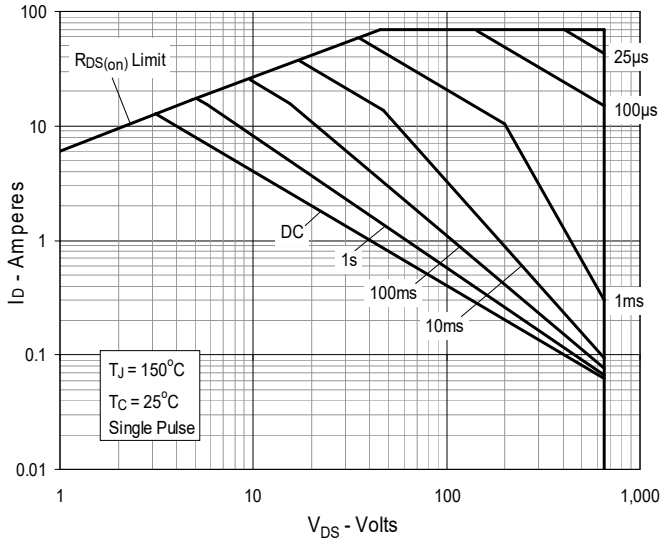
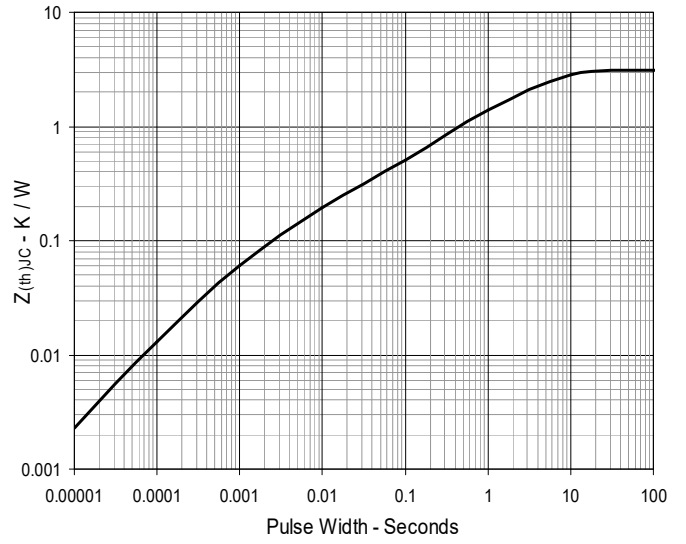


Fig. 14. Maximum Transient Thermal Impedance





Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

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