



Advanced Technical Information

**PolarHT™
Power MOSFET**

**IXTQ 100N25P
IXTK 100N25P
IXTT 100N25P**

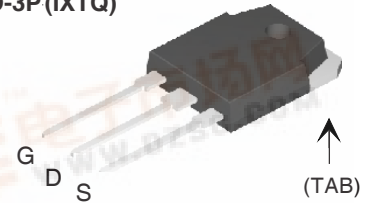
**V_{DSS} = 250 V
I_{D25} = 100 A
R_{DS(on)} = 27 mΩ**

N-Channel Enhancement Mode



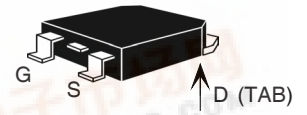
| Symbol | Test Conditions | Maximum Ratings | |
|---------------------|---|-----------------|-----------|
| V _{DSS} | T _J = 25°C to 150°C | 250 | V |
| V _{DGR} | T _J = 25°C to 150°C; R _{GS} = 1 MΩ | 250 | V |
| V _{GSM} | | ±20 | V |
| I _{D25} | T _C = 25°C | 100 | A |
| I _{D(RMS)} | External lead current limit | 75 | A |
| I _{DM} | T _C = 25°C, pulse width limited by T _{JM} | 250 | A |
| I _{AR} | T _C = 25°C | 60 | A |
| E _{AR} | T _C = 25°C | 60 | mJ |
| E _{AS} | T _C = 25°C | 2.0 | J |
| dv/dt | I _S ≤ I _{DM} , di/dt ≤ 100 A/μs, V _{DD} ≤ V _{DSS} , T _J ≤ 150°C, R _G = 4 Ω | 10 | V/ns |
| P _D | T _C = 25°C | 600 | W |
| T _J | | -55 ... +150 | °C |
| T _{JM} | | 150 | °C |
| T _{stg} | | -55 ... +150 | °C |
| T _L | 1.6 mm (0.062 in.) from case for 10 s | 300 | °C |
| M _d | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | TO-3P | 5.5 | g |
| | TO-264 | 10 | g |
| | TO-268 | 5 | g |

TO-3P (IXTQ)

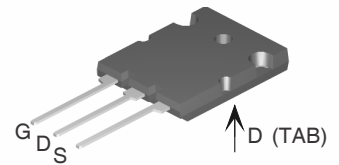


G = Gate, D = Drain,
S = Source, TAB = Drain

TO-268 (IXTT)



TO-264(SP) (IXTK)



G = Gate D = Drain
S = Source TAB = Drain

Features

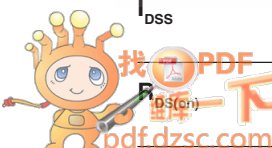
- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance - easy to drive and to protect

Advantages

- Easy to mount
- Space savings
- High power density

PolarHT™ DMOS transistors utilize proprietary designs and process. US patent is pending.

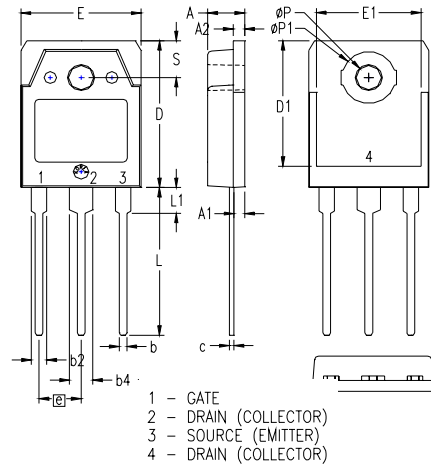
| Symbol | Test Conditions | Characteristic Values | | |
|---------------------|---|-----------------------|------|---------|
| | | Min. | Typ. | Max. |
| V _{DSS} | V _{GS} = 0 V, I _D = 250 μA | 250 | | V |
| V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250 μA | 2.5 | | 5.0 V |
| I _{GSS} | V _{GS} = ±20 V _{DC} , V _{DS} = 0 | | | ±100 nA |
| I _{DSS} | V _{DS} = V _{DSS} V _{GS} = 0 V T _J = 125°C | | | 25 μA |
| | | | | 250 μA |
| R _{DS(on)} | V _{GS} = 10 V, I _D = 0.5 I _{D25} Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % | | | 27 mΩ |



| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}$; $I_D = 0.5 I_{D25}$, pulse test | 40 | 56 | S |
| C_{iss} | $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$ | | 6300 | pF |
| C_{oss} | | | 1150 | pF |
| C_{rss} | | | 240 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = I_{D25}$ $R_G = 3.3\ \Omega$ (External) | | 25 | ns |
| t_r | | | 26 | ns |
| $t_{d(off)}$ | | | 100 | ns |
| t_f | | | 28 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 0.5 I_{D25}$ | | 185 | nC |
| Q_{gs} | | | 43 | nC |
| Q_{gd} | | | 91 | nC |
| R_{thJC} | | | 0.21 | K/W |
| R_{thCK} | TO-3P | | 0.21 | K/W |
| R_{thCK} | TO-264 | | 0.15 | K/W |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|--|---|------|---------------|
| | | Min. | typ. | Max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 100 A |
| I_{SM} | Repetitive | | | 250 A |
| V_{SD} | $I_F = I_S$, $V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| t_{rr} | $I_F = 25\text{ A}$ $-di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$ | | 200 | ns |
| Q_{RM} | | | 3.0 | μC |

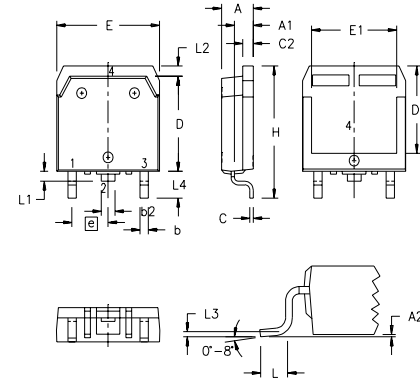
TO-3P Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .193 | 4.70 | 4.90 |
| A1 | .051 | .059 | 1.30 | 1.50 |
| A2 | .057 | .065 | 1.45 | 1.65 |
| b | .035 | .045 | 0.90 | 1.15 |
| b2 | .075 | .087 | 1.90 | 2.20 |
| b4 | .114 | .126 | 2.90 | 3.20 |
| c | .022 | .031 | 0.55 | 0.80 |
| D | .780 | .791 | 19.80 | 20.10 |
| D1 | .665 | .677 | 16.90 | 17.20 |
| E | .610 | .622 | 15.50 | 15.80 |
| E1 | .531 | .539 | 13.50 | 13.70 |
| e | .215 BSC | | 5.45 BSC | |
| L | .779 | .795 | 19.80 | 20.20 |
| L1 | .134 | .142 | 3.40 | 3.60 |
| ØP1 | .126 | .134 | 3.20 | 3.40 |
| ØP | .272 | .280 | 6.90 | 7.10 |
| S | .193 | .201 | 4.90 | 5.10 |

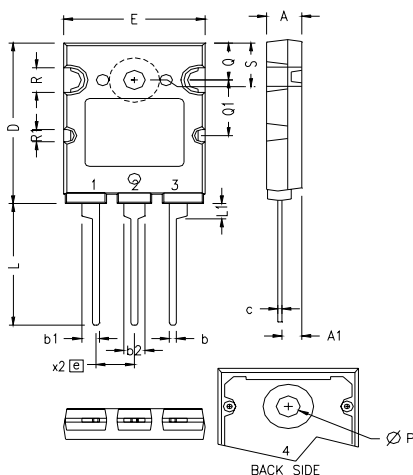
All metal area ore tin plated.

TO-268 Outline



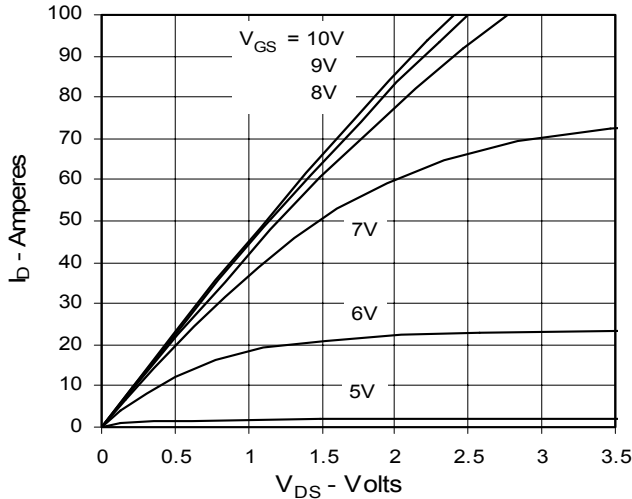
| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .193 | .201 | 4.90 | 5.10 |
| A1 | .106 | .114 | 2.70 | 2.90 |
| A2 | .001 | .010 | 0.02 | 0.25 |
| b | .045 | .057 | 1.15 | 1.45 |
| b2 | .075 | .083 | 1.90 | 2.10 |
| C | .016 | .026 | 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 |

TO-264 Outline

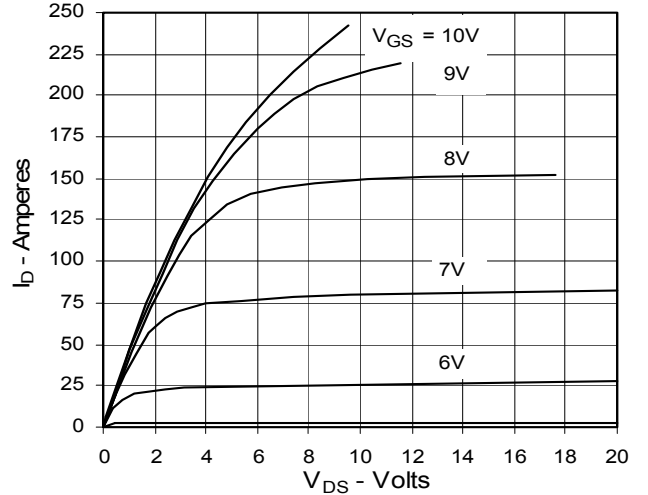


| SYM | INCHES | | MILLIMETERS | |
|-----|---------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .209 | 4.70 | 5.30 |
| A1 | .102 | .118 | 2.60 | 3.00 |
| b | .035 | .049 | 0.90 | 1.25 |
| b1 | .091 | .106 | 2.30 | 2.70 |
| b2 | .110 | .126 | 2.80 | 3.20 |
| c | .020 | .033 | 0.50 | 0.85 |
| D | 1.012 | 1.035 | 25.70 | 26.30 |
| E | .776 | .799 | 19.70 | 20.30 |
| e | .215BSC | | 5.46 BSC | |
| L | .768 | .807 | 19.50 | 20.50 |
| L1 | .091 | .106 | 2.30 | 2.70 |
| ØP | .122 | .138 | 3.10 | 3.50 |
| Q | .228 | .244 | 5.80 | 6.20 |
| Q1 | .346 | .362 | 8.80 | 9.20 |
| ØR | .150 | .165 | 3.80 | 4.20 |
| ØR1 | .071 | .087 | 1.80 | 2.20 |
| S | .228 | .244 | 5.80 | 6.20 |

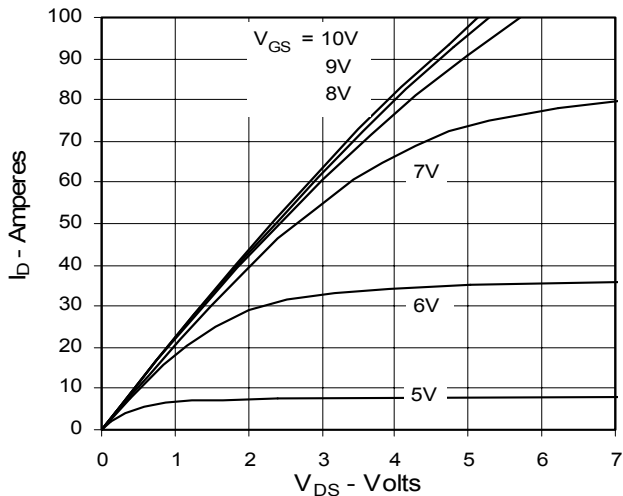
**Fig. 1. Output Characteristics
@ 25°C**



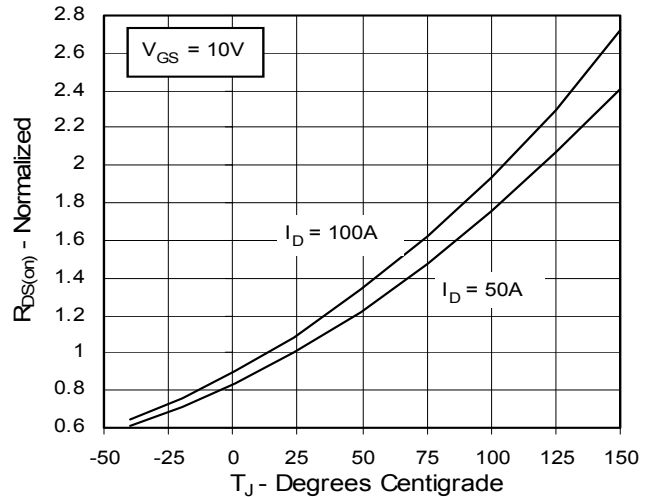
**Fig. 2. Extended Output Characteristics
@ 25°C**



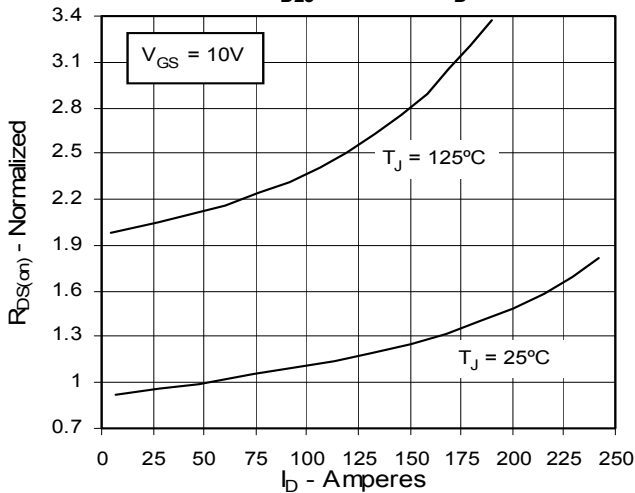
**Fig. 3. Output Characteristics
@ 125°C**



**Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25}
Value vs. Junction Temperature**



**Fig. 5. $R_{DS(on)}$ Normalized to
0.5 I_{D25} Value vs. I_D**



**Fig. 6. Drain Current vs. Case
Temperature**

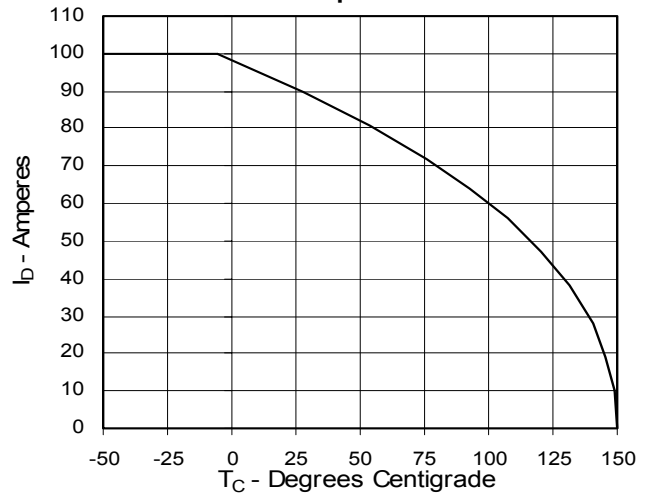


Fig. 7. Input Admittance

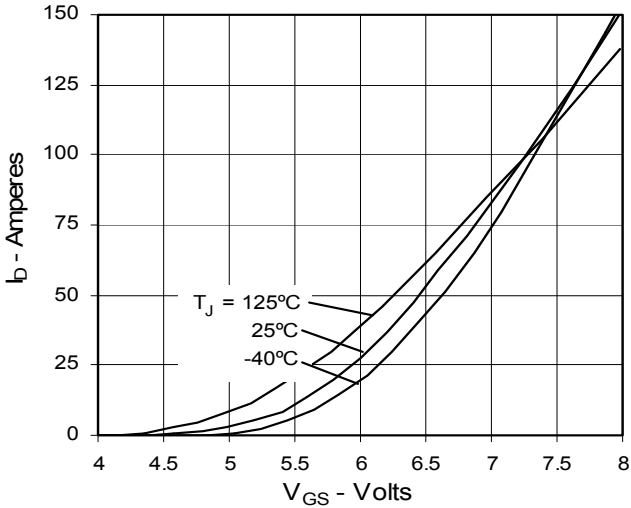


Fig. 8. Transconductance

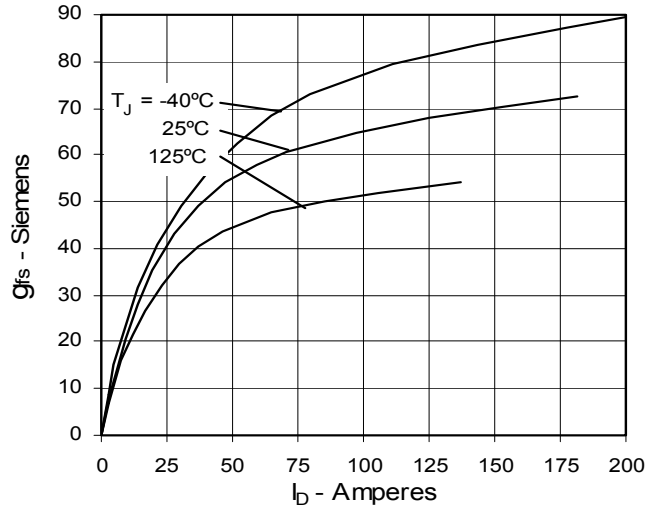


Fig. 9. Source Current vs. Source-To-Drain Voltage

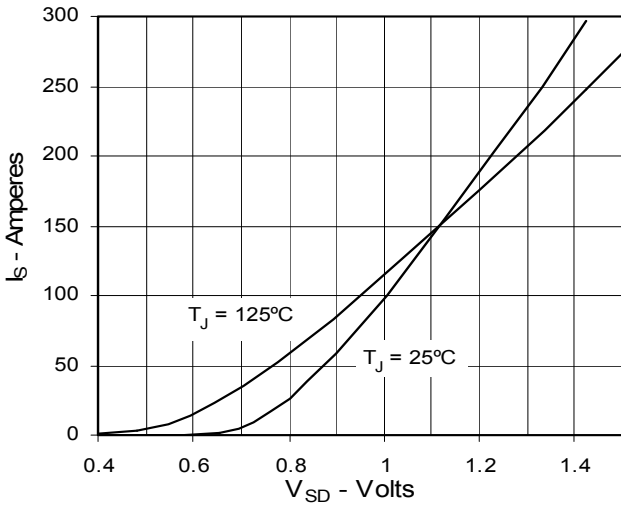


Fig. 10. Gate Charge

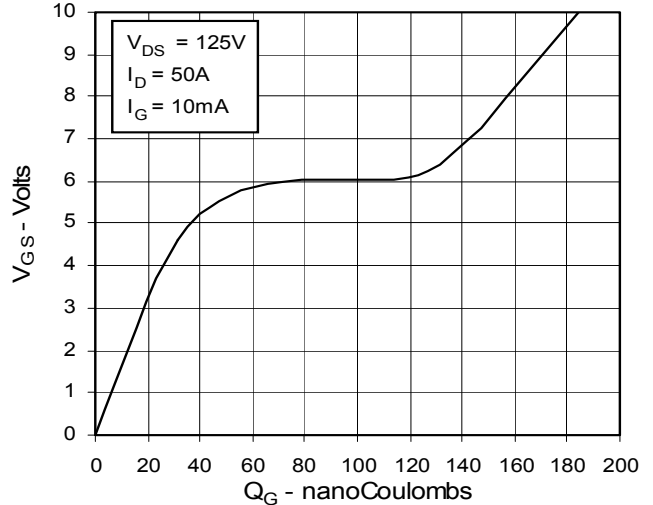


Fig. 11. Capacitance

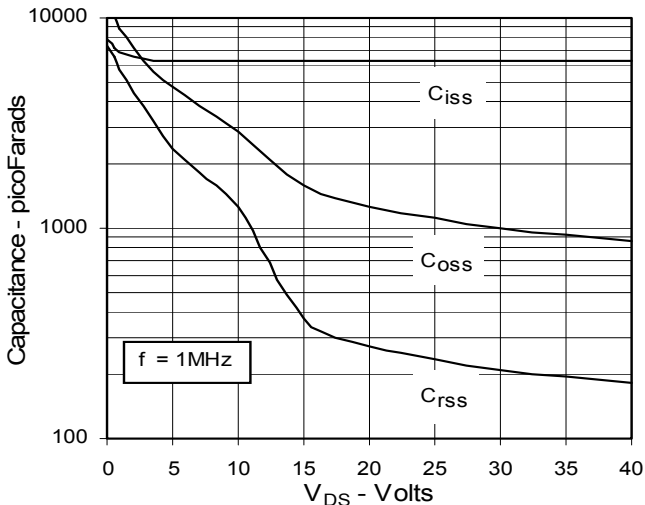


Fig. 12. Forward-Bias Safe Operating Area

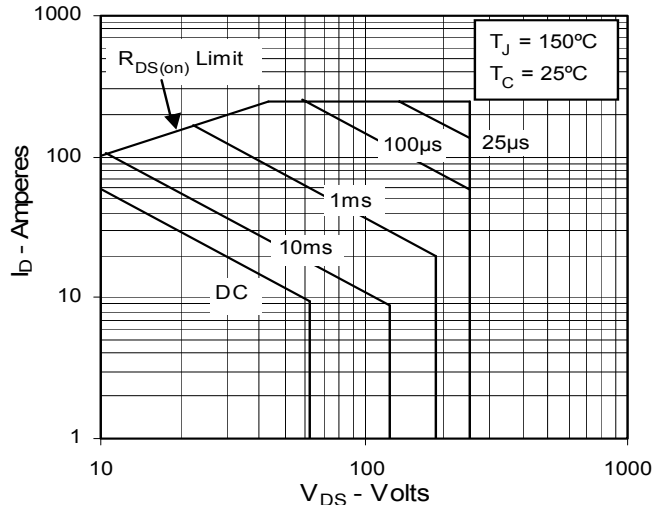


Fig. 13. Maximum Transient Thermal Resistance

