



STC6301D



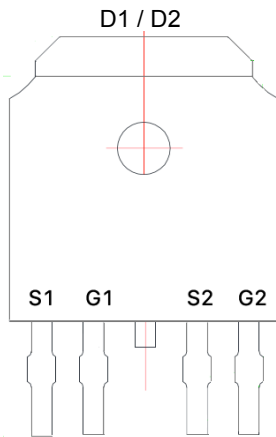
N&P Pair Enhancement Mode MOSFET

23.0A / -18.0A

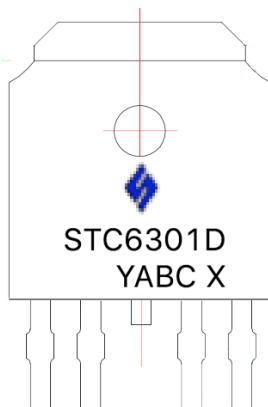
DESCRIPTION

The STC6301D is the N & P-Channel enhancement mode power field effect transistor using high cell density DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. This device is particularly suited for low voltage application such as power management, where high-side switching, low in-line power loss and resistance to transient are needed.

PIN CONFIGURATION TO252-4L



PART MARKING



Y : Year
A : Date code
B/C : Process Code
X : Package Code

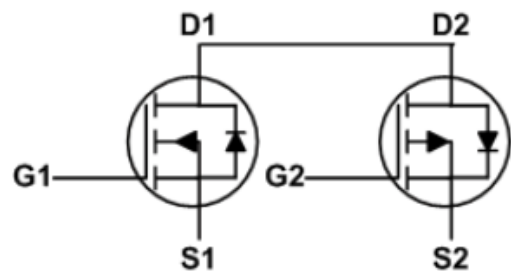
FEATURE

N-Channel

- 60V/8.0A, $R_{DS(ON)} = 37m\Omega$
@ $V_{GS} = 10V$
- 60V/5.0A, $R_{DS(ON)} = 28m\Omega$
@ $V_{GS} = 4.5V$

P-Channel

- -60V/-5.0A, $R_{DS(ON)} = 46m\Omega$
@ $V_{GS} = -10V$
- -60V/-3.0A, $R_{DS(ON)} = 65m\Omega$
@ $V_{GS} = -4.5V$
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- TO252-4L package



STANSON TECHNOLOGY
120 Bentley Square, Mountain View, Ca 94040 USA
www.stansontech.com



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N&P Pair Enhancement Mode MOSFET

23.0A / -18.0A

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C Unless otherwise noted)

| Parameter | | Symbol | Typical | | Unit |
|---|----------------------|------------------|---------|-------|------|
| | | | N | P | |
| Drain-Source Voltage | | V _{DSS} | 60 | -60 | V |
| Gate-Source Voltage | | V _{GSS} | ±20 | ±20 | V |
| Continuous Drain Current | T _A =25°C | I _D | 23.0 | -18.0 | A |
| | T _A =70°C | | 15.0 | -11.0 | |
| Pulsed Drain Current | | I _{DM} | 46 | -36 | A |
| Continuous Source Current (Diode Conduction) | | I _S | 59 | -50 | A |
| Power Dissipation | T _A =25°C | P _D | 34.7 | 34.7 | W |
| Operation Junction Temperature | | T _J | 150 | | °C |
| Storage Temperature Range | | T _{STG} | -55/150 | | °C |
| Thermal Resistance-Junction to Ambient | | R _{θJA} | 85 | 85 | °C/W |



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N&P Pair Enhancement Mode MOSFET

23.0A / -18.0A

ELECTRICAL CHARACTERISTICS (Ta = 25°C Unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------------|---|---|--|-------------|------------------------|----------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=10mA$ $V_{GS}=0V, I_D=-10mA$ | N P | 60 -60 | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250 \mu A$ $V_{DS}=V_{GS}, I_D=-250\mu A$ | N P | 1.0 -1.0 | 2.5 -2.5 | V |
| Gate Leakage Current | I_{GSS} | $V_{DS}=0V, V_{GS}=\pm 20V$ $V_{DS}=0V, V_{GS}=\pm 20V$ | N P | | ± 100 ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} $T_J=25^\circ C$ $T_J=55^\circ C$ | $V_{DS}=48V, V_{GS}=0V$ $V_{DS}=-48V, V_{GS}=0V$ | N P | | 1 -1 | μA |
| | | $V_{DS}=32V, V_{GS}=0V$ $V_{DS}=-32V, V_{GS}=0V$ | N P | | 5 -5 | |
| Drain-source On-Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=8.0A$ $V_{GS}=-10V, I_D=-5.0A$ | N P | | 0.037 0.046 | Ω |
| | | $V_{GS}=4.5V, I_D=5.0A$ $V_{GS}=-4.5V, I_D=-3.0 A$ | N P | | 0.028 0.065 | |
| Forward Tran Conductance | g_{fs} | $V_{DS}=5V, I_D=8.0A$ $V_{DS}=-5V, I_D=-5.0A$ | N P | | 21 15 | S |
| Diode Forward Voltage | V_{SD} | $I_S=1.0A, V_{GS}=0V$ $I_S=-1.0A, V_{GS}=0V$ | N P | | 1.2 -1.2 | V |
| Dynamic | | | | | | |
| Total Gate Charge | Q_g | N-Channel $V_{DS}=48V, V_{GS}=4.5V$ $I_D \equiv 8.0A$ | N P | | 12.6 9.9 | nC |
| Gate-Source Charge | Q_{gs} | | N P | | 3.5 3.1 | |
| Gate-Drain Charge | Q_{gd} | P-Channel $V_{DS}=-48V, V_{GS}=-4.5V$ $I_D \equiv -5.0A$ | N P | | 6.3 3.0 | |
| Turn-On Time | $t_{d(on)}$ t_r | | N-Channel $V_{DS}=30V, R_G=3.3 \Omega$ $I_D=8A, V_{GS}=10V$ | N P | | 8 9.7 |
| | | P-Channel $V_{DS}=-20V, R_G=3.3 \Omega$ $I_D=-1A, R_{GS}=-10V$ | N P | | 14.2 18 | |
| Turn-Off Time | $t_{d(off)}$ t_f | N-Channel $V_{DS}=-20V, R_G=3.3 \Omega$ $I_D=-1A, R_{GS}=-10V$ | N P | | 24.6 45.8 | |
| | | P-Channel $V_{DS}=-20V, R_G=3.3 \Omega$ $I_D=-1A, R_{GS}=-10V$ | N P | | 4.6 45.8 | |

TYPICAL CHARACTERISTICS (N MOS)

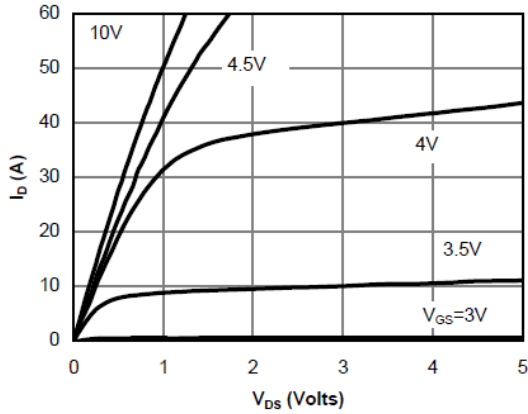


Fig 1: On-Region Characteristics (Note E)

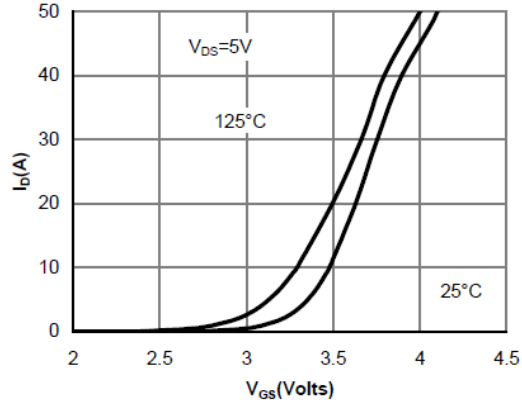


Figure 2: Transfer Characteristics (Note E)

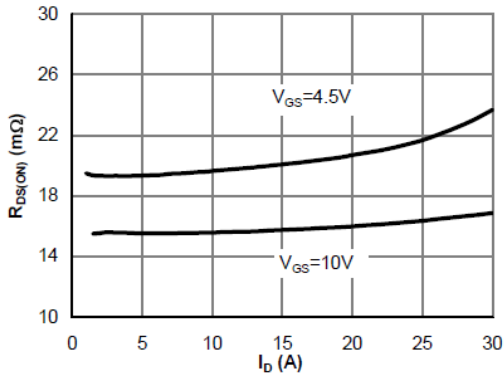


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

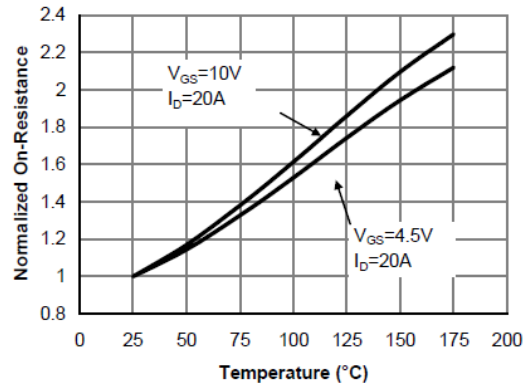


Figure 4: On-Resistance vs. Junction Temperature (Note E)

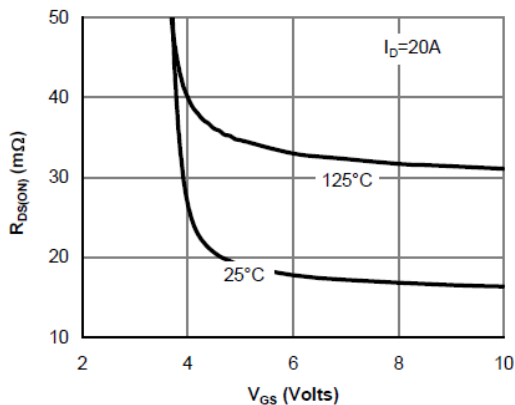


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

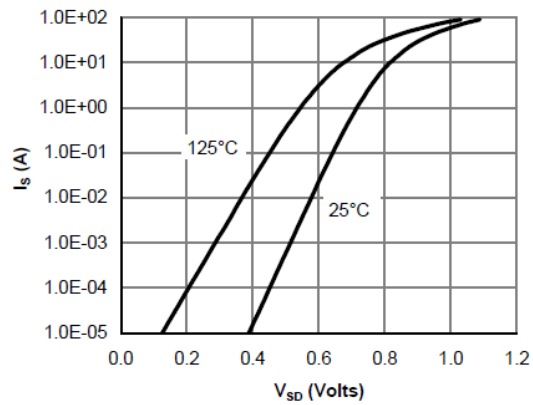


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL CHARACTERISTICS (N MOS)

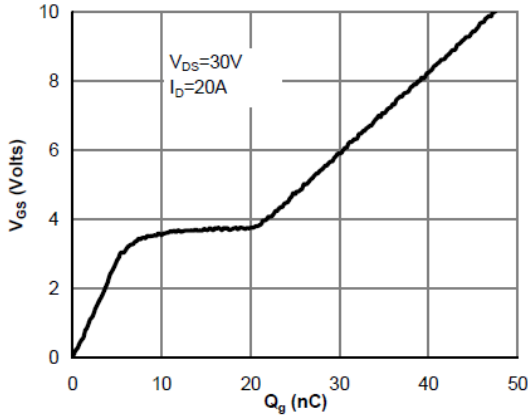


Figure 7: Gate-Charge Characteristics

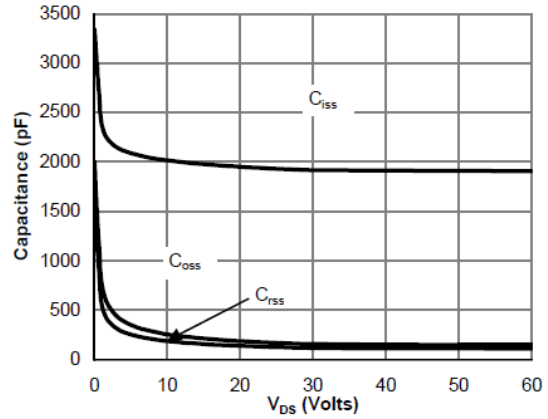


Figure 8: Capacitance Characteristics

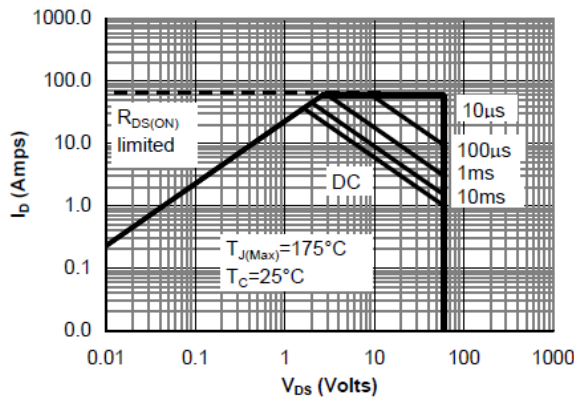


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

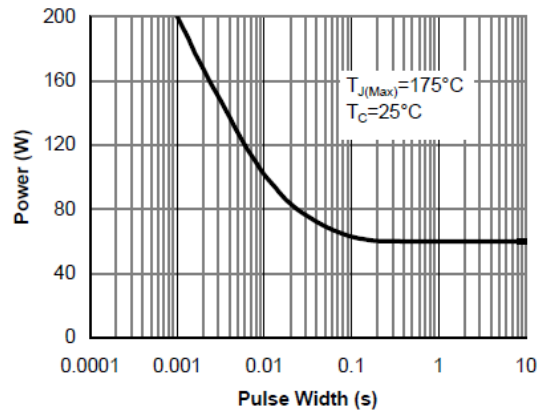


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

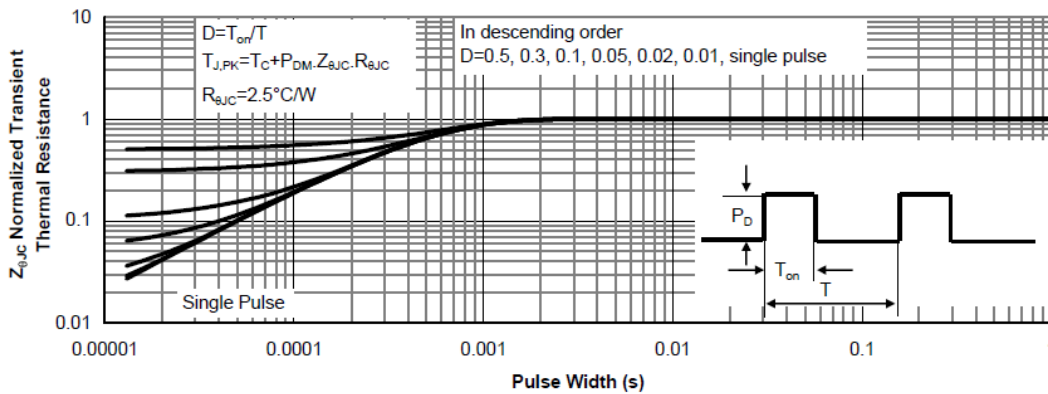


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

YPICAL CHARACTERISTICS (P MOS)

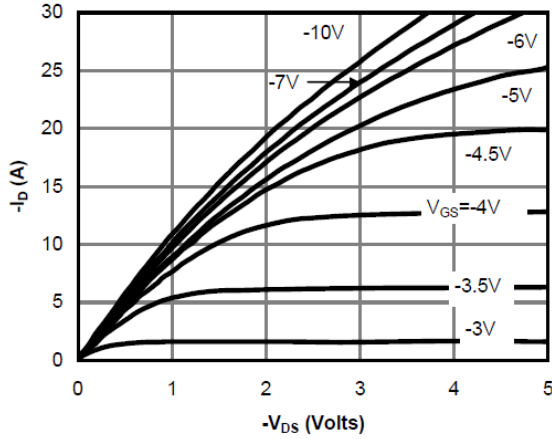


Fig 1: On-Region Characteristics

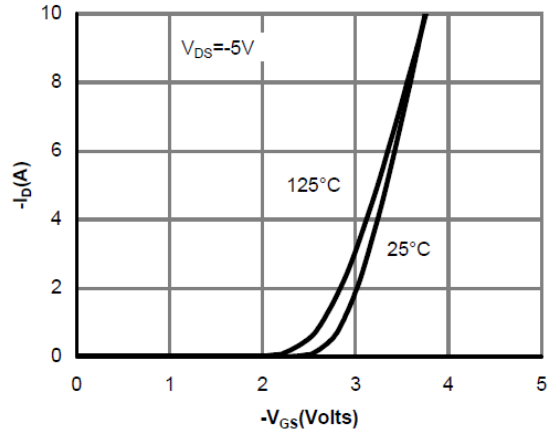


Figure 2: Transfer Characteristics

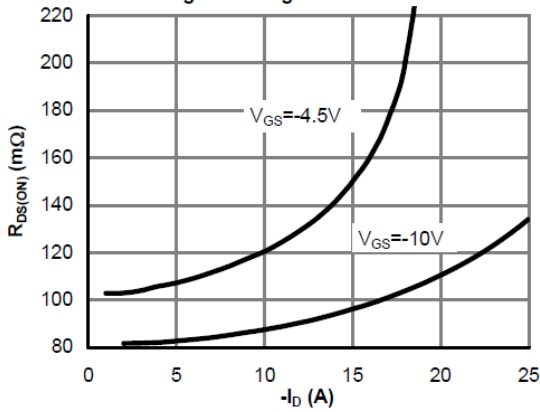


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

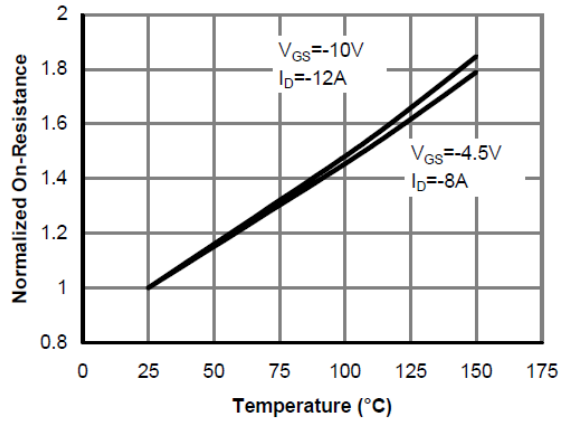


Figure 4: On-Resistance vs. Junction Temperature

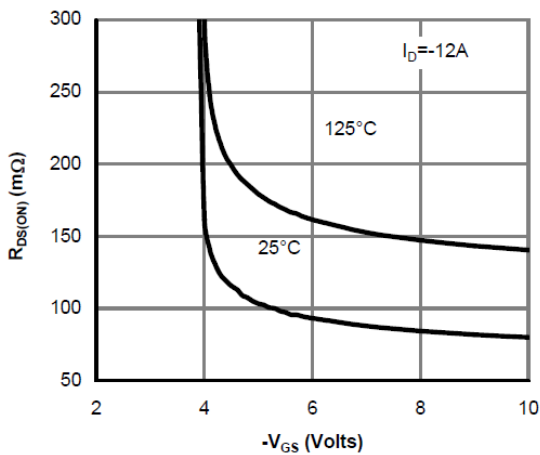


Figure 5: On-Resistance vs. Gate-Source Voltage

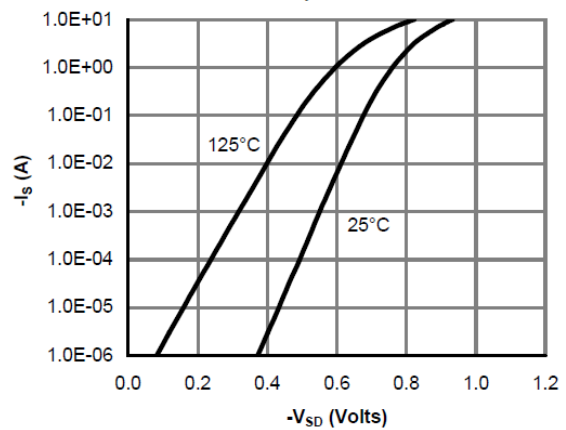


Figure 6: Body-Diode Characteristics

TYPICAL CHARACTERISTICS (P MOS)

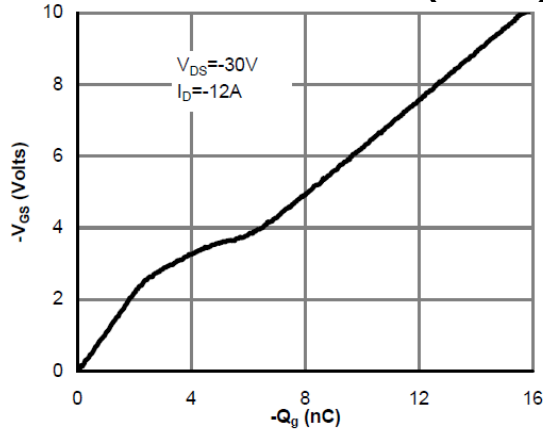


Figure 7: Gate-Charge Characteristics

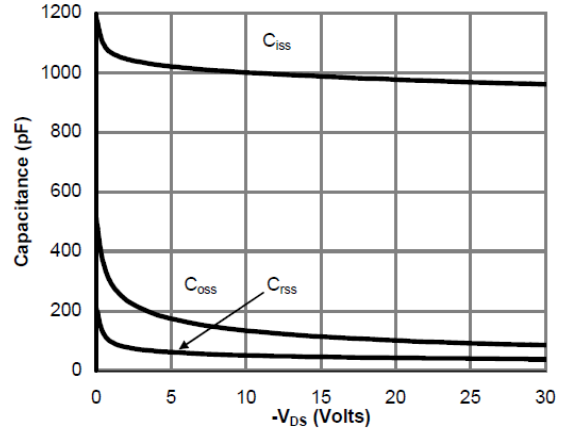


Figure 8: Capacitance Characteristics

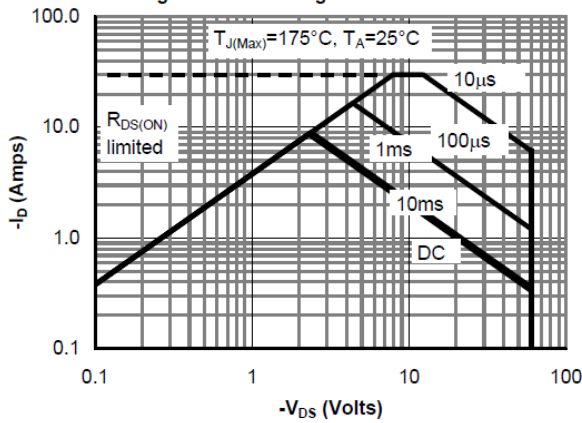


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

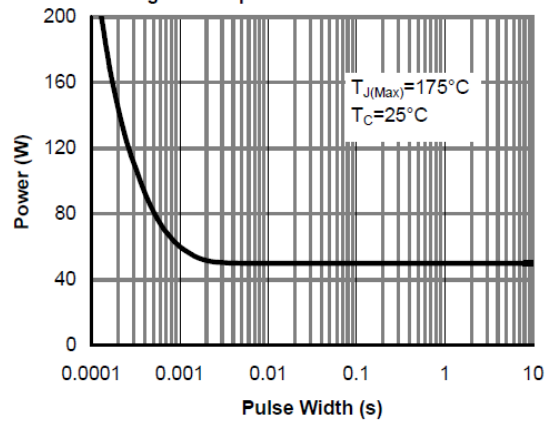


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

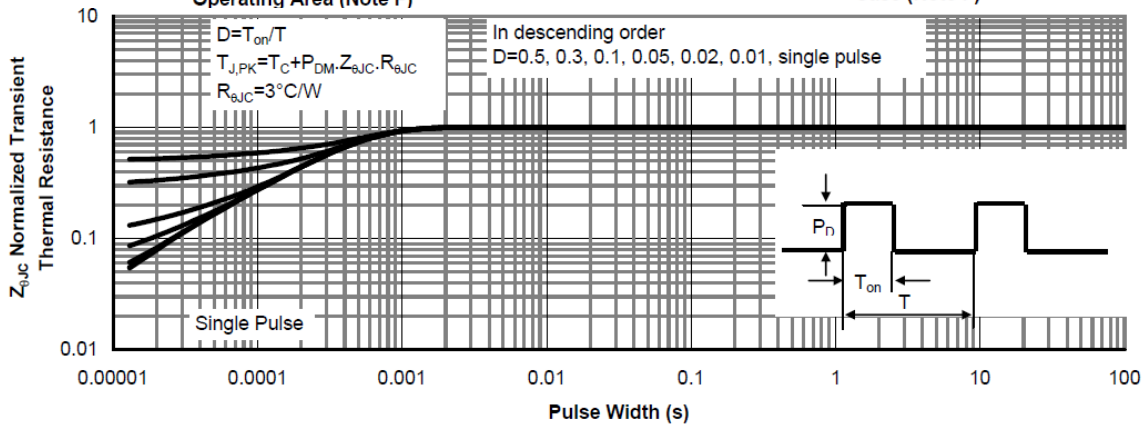
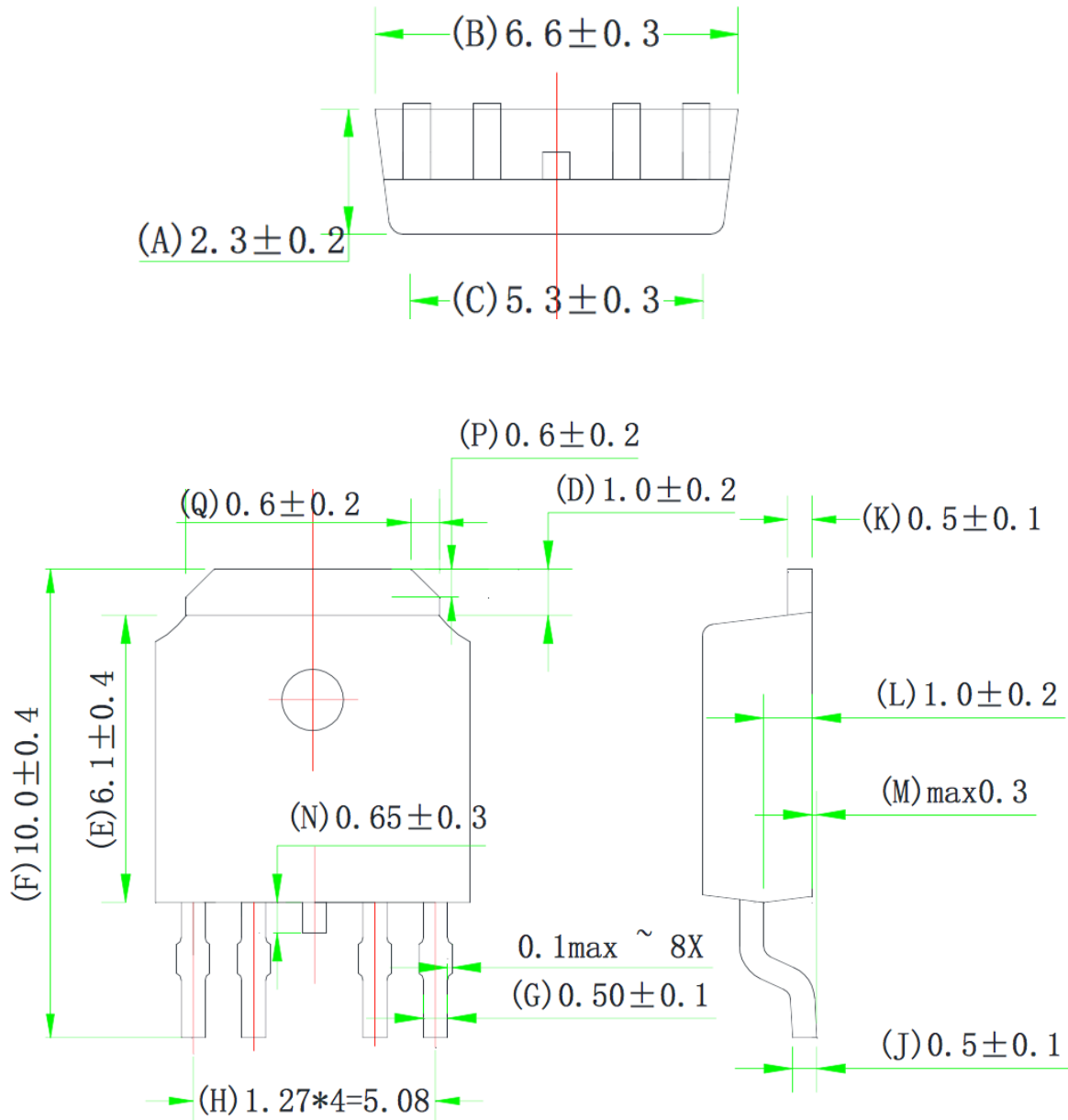


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TO252-4L PACKAGE OUTLINE



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