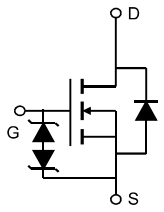
## Description

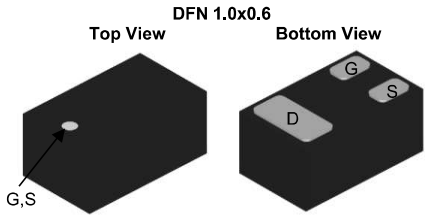
The 1606 designed by the trench processing techniques to achieve extremely low on-resistance. And fast switching speed and improved transfer effective .




Schematic diagram

## Features

- Ron(typ.)=210mΩ @VGS=2.5V
- Ron(typ.)=180mΩ @VGS=4.5V
- Low On-Resistance
- 150°C Operating Temperature
- Fast Switching
- Lead-Free, RoHS Compliant




## Application

- Load switch

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings ($T_C$=25°C Unless Otherwise Noted)** | | | | |
| $V_{GS}$ | Gate-Source Voltage | | ±8 | V |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | | 20 | V |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -50 to 155 | °C |
| $I_S$ | Diode Continuous Forward Current | $T_C$=25°C | 0.7① | A |
| **Mounted on Large Heat Sink** | | | | |
| $I_{DM}$ | Pulse Drain Current Tested | $T_C$=25°C | 3 | A |
| $I_D$ | Continuous Drain Current(VGS=10V) | $T_C$=25°C | 0.7① | A |
| | | $T_C$=100°C | 0.5 | |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 0.55 | W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | | 100 | °C/W |

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| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=250μA | 20 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current (Tc=25℃) | $V_{DS}$=20V,$V_{GS}$=0V | -- | -- | 1 | μA |
| | Zero Gate Voltage Drain Current (Tc=125℃) | $V_{DS}$=20V,$V_{GS}$=0V | -- | -- | 100 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±8 V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 0.4 | 0.8 | 1.2 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=2.5V,$I_D$=0.3A | -- | 180 | 220 | mΩ |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=4.5V, $I_D$=0.5A | -- | 210 | 260 | mΩ |
| **Dynamic Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V,$V_{GS}$=0V, f=1MHz | -- | 40 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 15 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 6.5 | -- | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=10V,$I_D$=0.5A, $V_{GS}$=4.5V | -- | 1.1 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 0.3 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 0.2 | -- | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$=10V, $I_D$=0.3A, $R_G$=6Ω, $V_{GS}$=4.5V, RL=5Ω, | -- | 2.2 | -- | nS |
| $t_r$ | Turn-on Rise Time | | -- | 4 | -- | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | -- | 18 | -- | nS |
| $t_f$ | Turn-Off Fall Time | | -- | 9 | -- | nS |
| **Source- Drain Diode Characteristics** | | | | | | |
| $I_{SD}$ | Source-drain current(Body Diode) | $T_C$=25℃ | -- | -- | 0.5① | A |
| $I_{SDM}$ | Pulsed Source-drain current (Body Diode) | | -- | -- | 3① | A |
| $V_{SD}$ | Forward on voltage | $T_j$=25℃,$I_{SD}$=0.5A, $V_{GS}$=0V | -- | 0.75 | 1.2 | V |

## Typical Characteristics

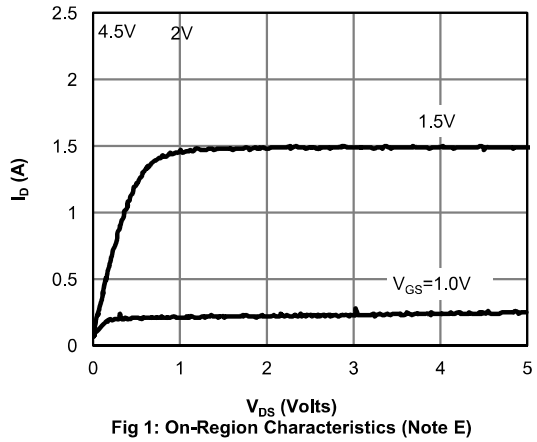


Fig 1: On-Region Characteristics (Note E)

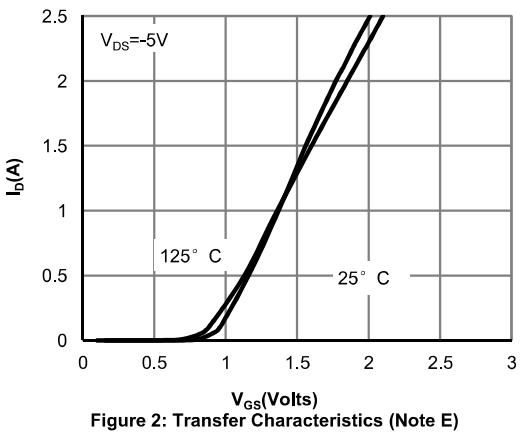


Figure 2: Transfer Characteristics (Note E)

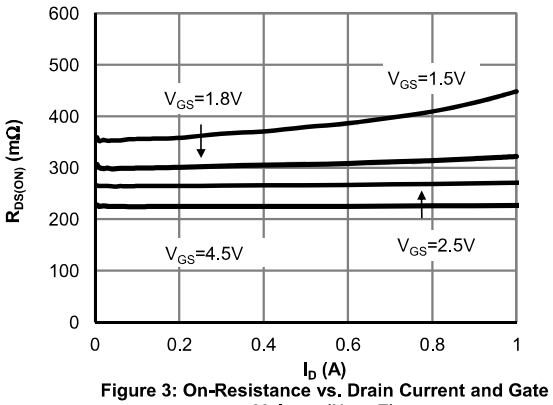


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

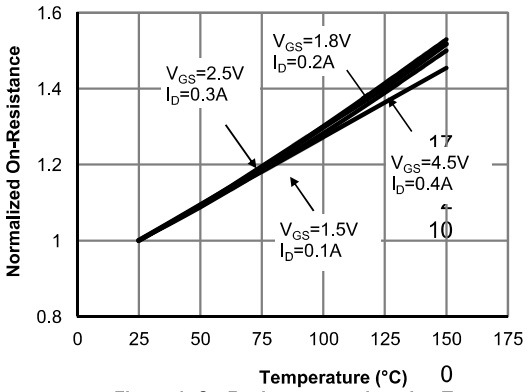


Figure 4: On-Resistance vs. Junction Temperature (Note E)

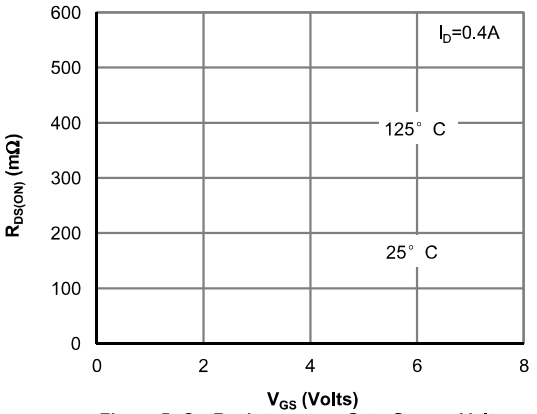


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

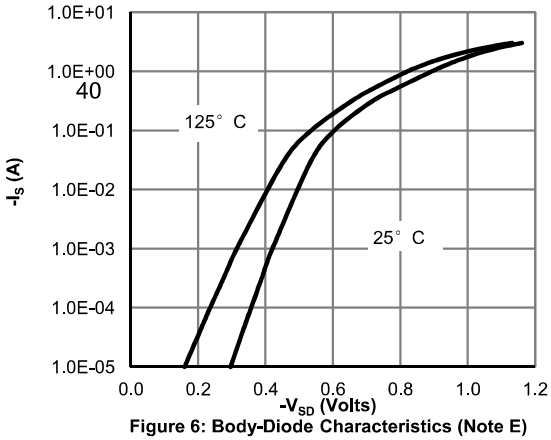


Figure 6: Body-Diode Characteristics (Note E)

## Typical Characteristics

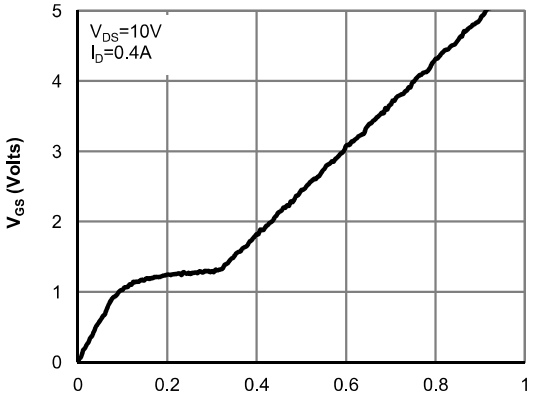


Figure 7: Gate-Charge Characteristics

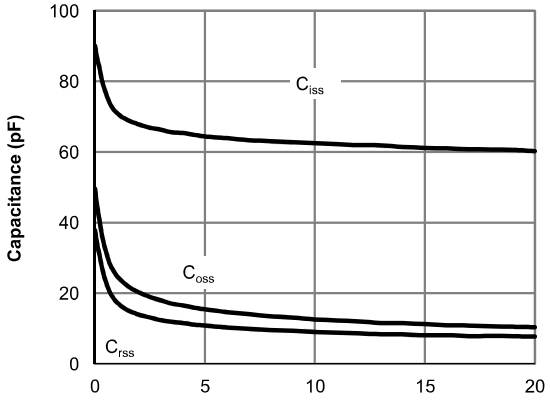


Figure 8: Capacitance Characteristics

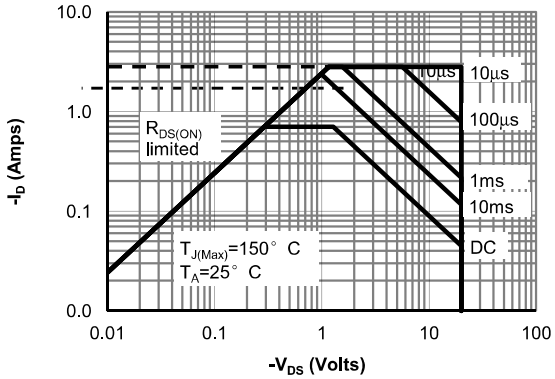


Figure 9: Maximum Forward Biased Safe Operating Area (Note B)

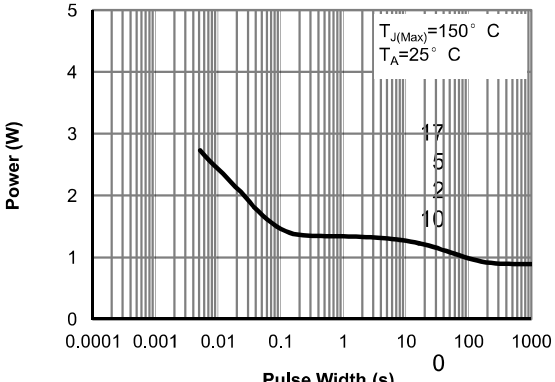


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note B)

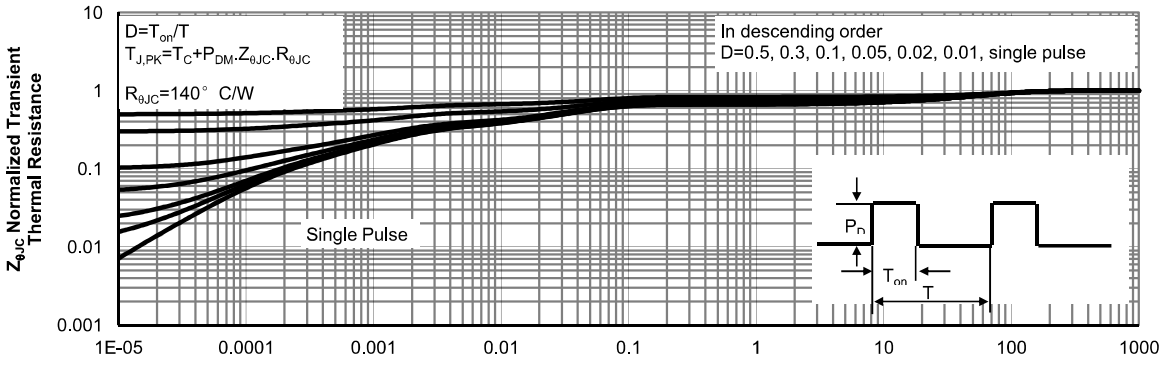


Figure 11: Normalized Maximum Transient Thermal Impedance (Note B)