深圳市国芯佳品半导体有限公司
SHENZHEN GUOXIN JIAPIN SEMICONDUCTOR CO.LTD

# GX3442

## 100V N-Channel MOSFET

### General Description

The GX3442 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

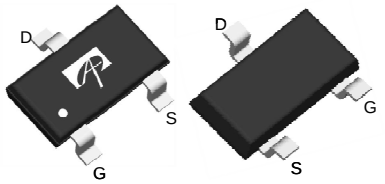
### Product Summary

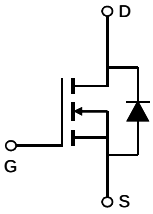
| | |
|---|---|
| $V_{DS}$ | 100V |
| $I_D$ (at $V_{GS}$=10V) | 1A |
| $R_{DS(ON)}$ (at $V_{GS}$=10V) | < 630mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$=4.5V) | < 720mΩ |

Green Product

SOT23

Top View Bottom View




**Absolute Maximum Ratings $T_A$=25℃ unless otherwise noted**

| Parameter | | Symbol | Maximum | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_A$=25℃ | $I_D$ | 1 | A |
| | $T_A$=70℃ | | 0.8 | |
| Pulsed Drain Current [C] | | $I_{DM}$ | 4 | |
| Power Dissipation [B] | $T_A$=25℃ | $P_D$ | 1.4 | W |
| | $T_A$=70℃ | | 0.9 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | ℃ |

**Thermal Characteristics**

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient [A] | t ≤ 10s | $R_{\theta JA}$ | 70 | 90 | ℃/W |
| Maximum Junction-to-Ambient [A D] | Steady-State | | 100 | 125 | ℃/W |
| Maximum Junction-to-Lead | Steady-State | $R_{\theta JL}$ | 63 | 80 | ℃/W |

**Electrical Characteristics ($T_J$=25℃ unless otherwise noted)**

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $I_D$=250μA, $V_{GS}$=0V | 100 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=100V, $V_{GS}$=0V | | | 1 | μA |
| | | $T_J$=55℃ | | | 5 | |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.7 | 2.3 | 2.9 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}$=10V, $V_{DS}$=5V | 4 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=1A | | 514 | 630 | mΩ |
| | | $T_J$=125℃ | | 983 | 1200 | |
| | | $V_{GS}$=4.5V, $I_D$=0.8A | | 554 | 720 | mΩ |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_D$=1A | | 2.8 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1A,$V_{GS}$=0V | | 0.9 | 1.2 | V |
| $I_S$ | Maximum Body-Diode Continuous Current[G] | | | | 1 | A |
| **DYNAMIC PARAMETERS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=50V, f=1MHz | | 100 | | pF |
| $C_{oss}$ | Output Capacitance | | | 13 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 5 | | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | 2.5 | 5 | 7.5 | Ω |
| **SWITCHING PARAMETERS** | | | | | | |
| $Q_g$(10V) | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=50V, $I_D$=1A | | 2.8 | 6 | nC |
| $Q_g$(4.5V) | Total Gate Charge | | | 1.5 | 3 | nC |
| $Q_{gs}$ | Gate Source Charge | | | 0.4 | | nC |
| $Q_{gd}$ | Gate Drain Charge | | | 0.8 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}$=10V, $V_{DS}$=50V, $R_L$=50Ω, $R_{GEN}$=3Ω | | 5 | | ns |
| $t_r$ | Turn-On Rise Time | | | 4 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | 12 | | ns |
| $t_f$ | Turn-Off Fall Time | | | 5 | | ns |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=5.6A, dI/dt=100A/μs | | 52 | | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | $I_F$=5.6A, dI/dt=100A/μs | | 60 | | nC |

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25° C. The value in any given application depends on the user's specific board design.
B. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initial$T_J$=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

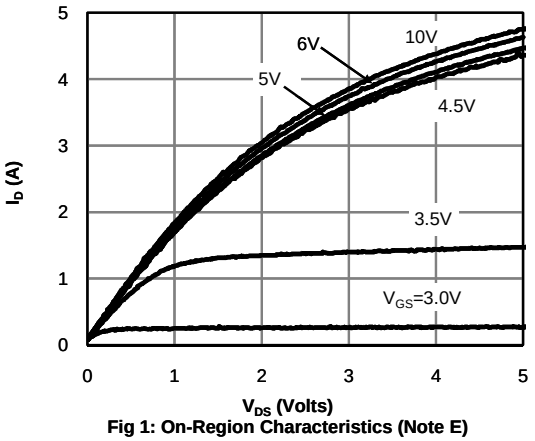



Fig 1: On-Region Characteristics (Note E)

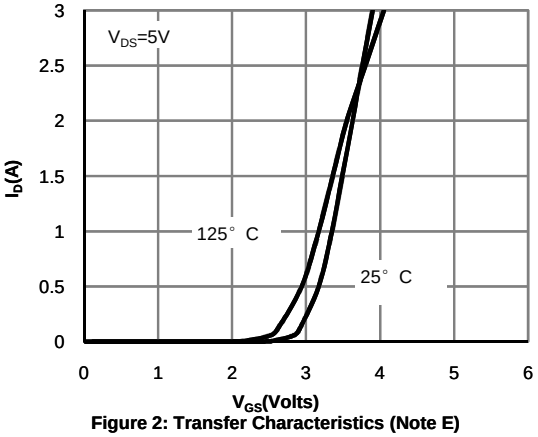



Figure 2: Transfer Characteristics (Note E)

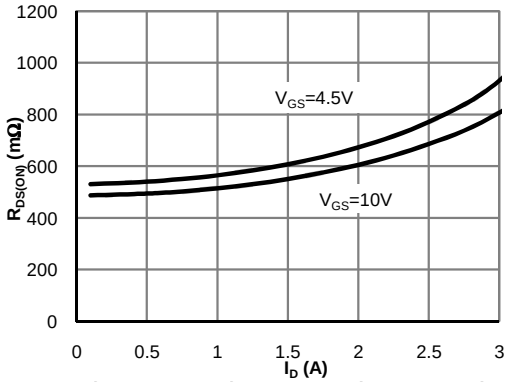



Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

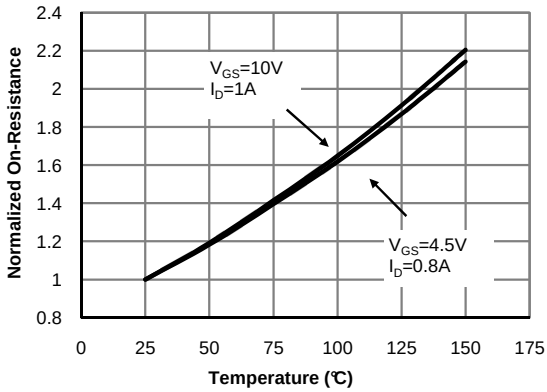



Figure 4: On-Resistance vs. Junction Temperature (Note E)

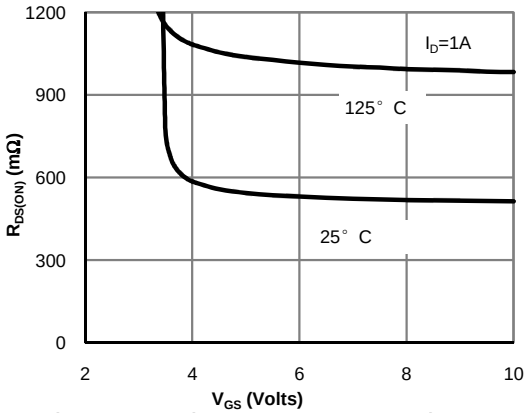



Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

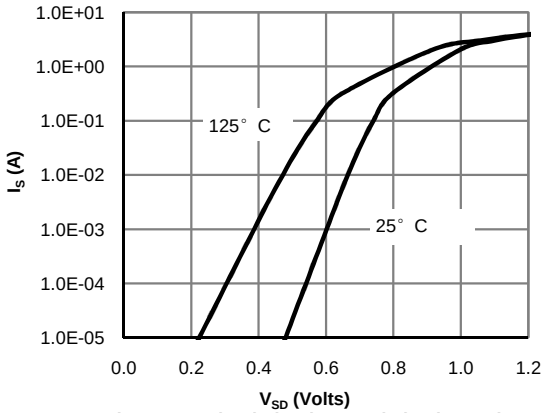



Figure 6: Body-Diode Characteristics (Note E)

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

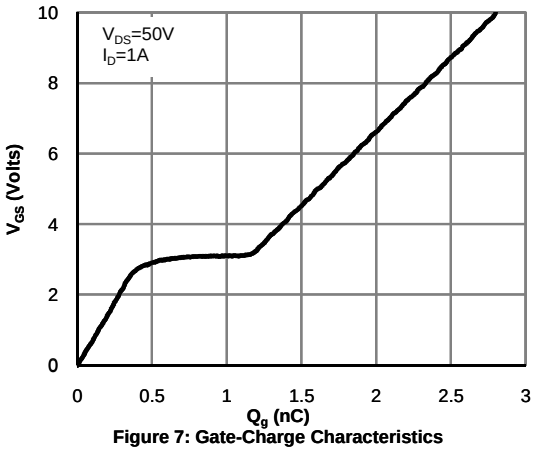



**Figure 7: Gate-Charge Characteristics**

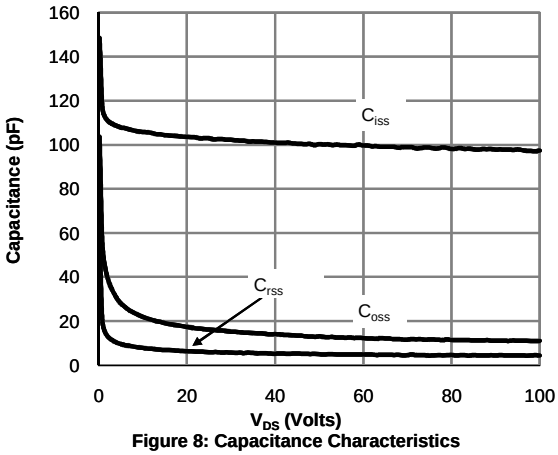



**Figure 8: Capacitance Characteristics**

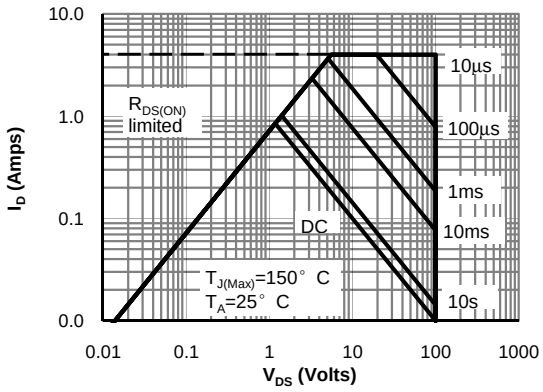



**Figure 9: Maximum Forward Biased Safe Operating Area (Note F)**

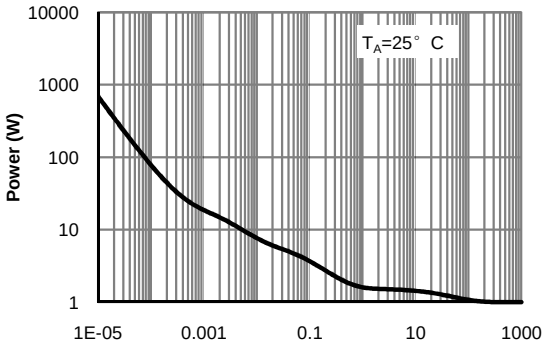



**Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)**

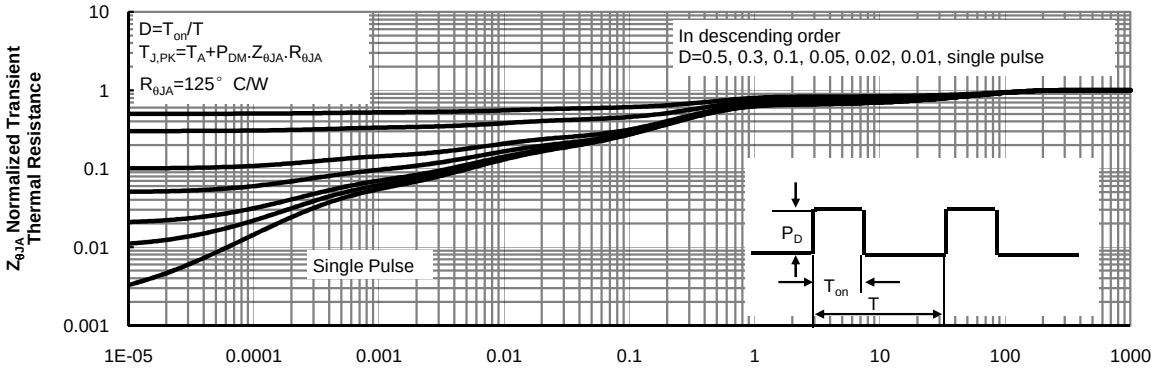
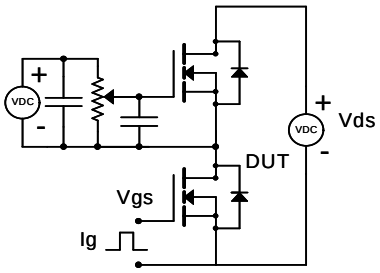
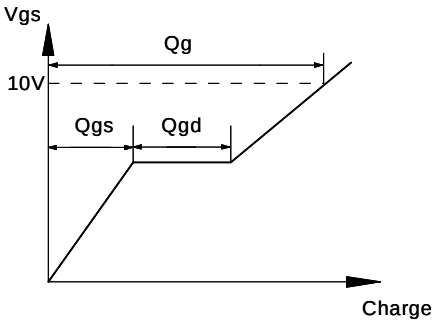


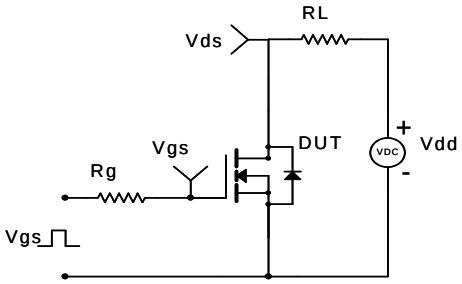

**Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)**

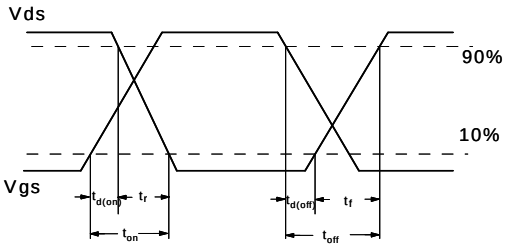
## Gate Charge Test Circuit & Waveform




## Resistive Switching Test Circuit & Waveforms




## Diode Recovery Test Circuit & Waveforms