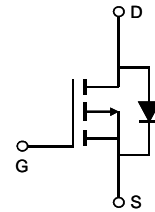
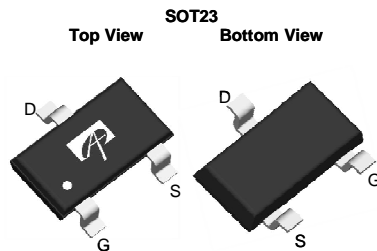


General Description

The GX3407A uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use as a load switch or in PWM applications.

Product Summary

| | |
|-----------------------------------|----------------|
| V_{DS} | -30V |
| I_D (at $V_{GS}=-10V$) | -4.3A |
| $R_{DS(ON)}$ (at $V_{GS}=-10V$) | < 48m Ω |
| $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) | < 78m Ω |



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

| Parameter | Symbol | Maximum | Units |
|----------------------------------------|----------------|------------------------|------------------|
| Drain-Source Voltage | V_{DS} | -30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | I_D | $T_A=25^\circ\text{C}$ | -4.3 |
| | | $T_A=70^\circ\text{C}$ | -3.5 |
| Pulsed Drain Current ^C | I_{DM} | -25 | A |
| Power Dissipation ^B | P_D | $T_A=25^\circ\text{C}$ | 1.4 |
| | | $T_A=70^\circ\text{C}$ | 0.9 |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Units |
|--------------------------------------------|-----------------|--------------|-----|---------------------------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 70 | 90 | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Ambient ^{A,D} | | Steady-State | 100 | 125 |
| Maximum Junction-to-Lead | $R_{\theta JL}$ | 63 | 80 | $^\circ\text{C}/\text{W}$ |

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|--------------------------------------------------------------------------------------|------|----------|-----------|---------------|
| STATIC PARAMETERS | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$ | -30 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$ | | | -1 -5 | μA |
| I_{GSS} | Gate-Body leakage current | $V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$ | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$ | -1.4 | -1.9 | -2.4 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}=-10\text{V}$, $V_{DS}=-5\text{V}$ | -25 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=-10\text{V}$, $I_D=-4.3\text{A}$ $T_J=125^\circ\text{C}$ | | 34 52 | 48 68 | m Ω |
| | | $V_{GS}=-4.5\text{V}$, $I_D=-3\text{A}$ | | 54 | 78 | |
| g_{FS} | Forward Transconductance | $V_{DS}=-5\text{V}$, $I_D=-4.3\text{A}$ | | 10 | | S |
| V_{SD} | Diode Forward Voltage | $I_S=-1\text{A}$, $V_{GS}=0\text{V}$ | | -0.7 | -1 | V |
| I_S | Maximum Body-Diode Continuous Current | | | | -2 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$ | | 520 | | pF |
| C_{oss} | Output Capacitance | | | 100 | | pF |
| C_{riss} | Reverse Transfer Capacitance | | | 65 | | pF |
| R_g | Gate resistance | $V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$ | 3.5 | 7.5 | 11.5 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| $Q_g(10\text{V})$ | Total Gate Charge | $V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-4.3\text{A}$ | | 9.2 | 11 | nC |
| $Q_g(4.5\text{V})$ | Total Gate Charge | | | 4.6 | 6 | nC |
| Q_{gs} | Gate Source Charge | | | 1.6 | | nC |
| Q_{gd} | Gate Drain Charge | | | 2.2 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $R_L=3.5\Omega$, $R_{GEN}=3\Omega$ | | 7.5 | | ns |
| t_r | Turn-On Rise Time | | | 5.5 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | 19 | | ns |
| t_f | Turn-Off Fall Time | | | 7 | | ns |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=-4.3\text{A}$, $di/dt=100\text{A}/\mu\text{s}$ | | 11 | | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | $I_F=-4.3\text{A}$, $di/dt=100\text{A}/\mu\text{s}$ | | 5.3 | | 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 $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

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 $<300\mu\text{s}$ 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 $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

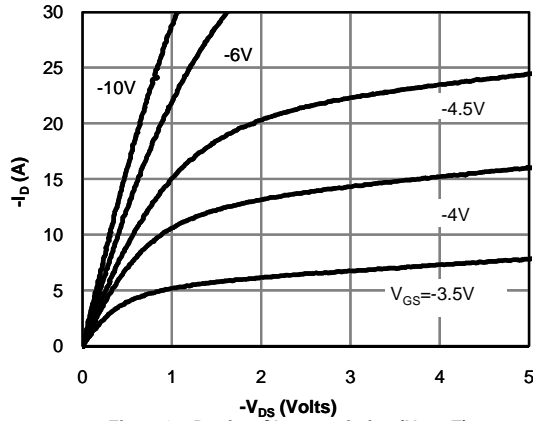


Figure 1: On-Region Characteristics (Note E)

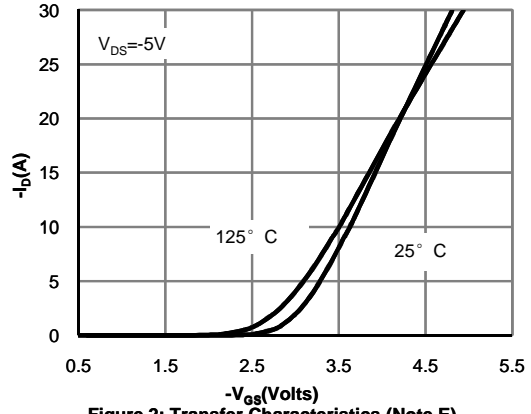


Figure 2: Transfer Characteristics (Note E)

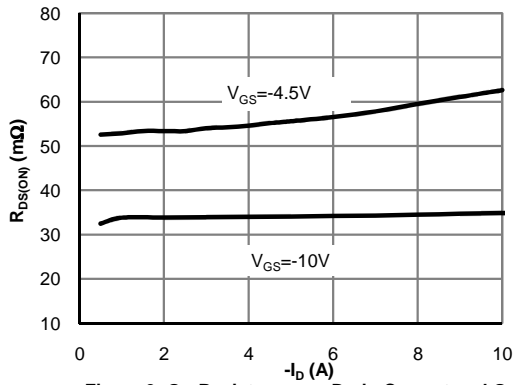


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

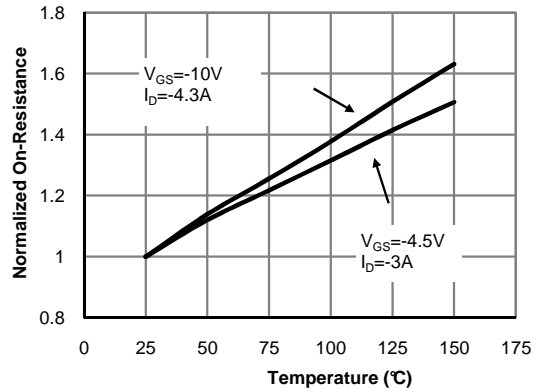


Figure 4: On-Resistance vs. Junction Temperature (Note E)

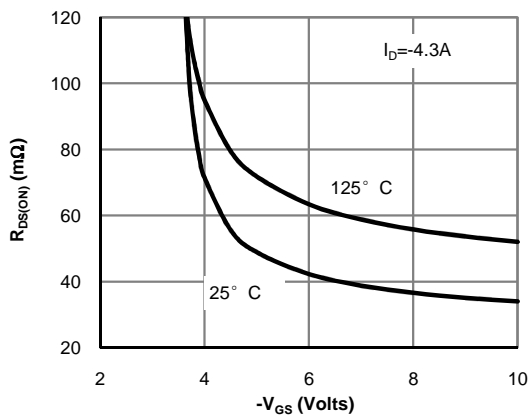


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

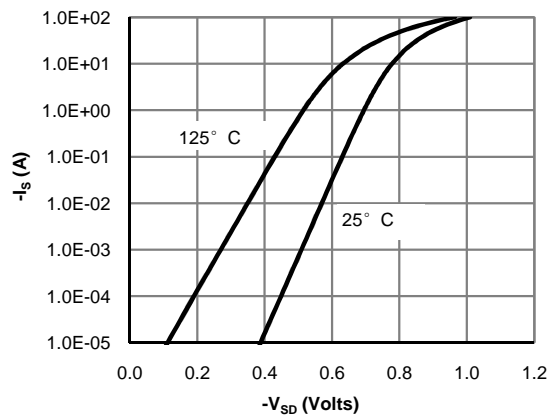


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

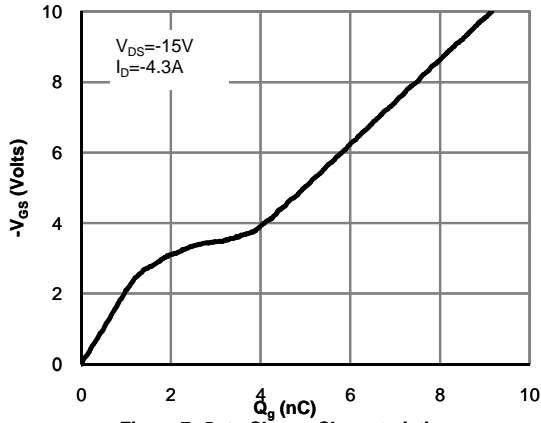


Figure 7: Gate-Charge Characteristics

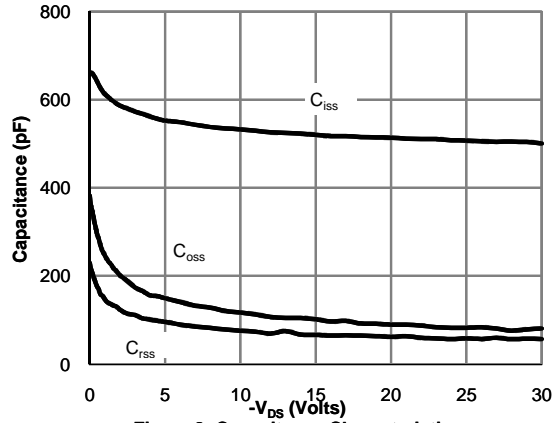


Figure 8: Capacitance Characteristics

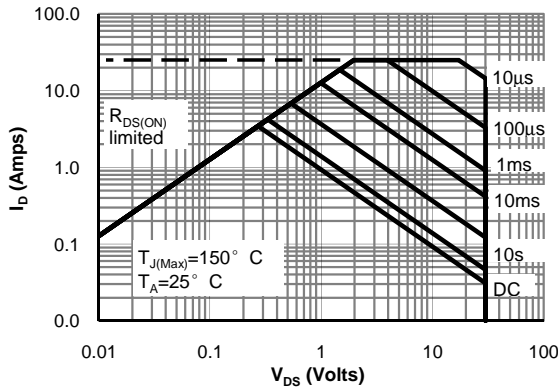


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

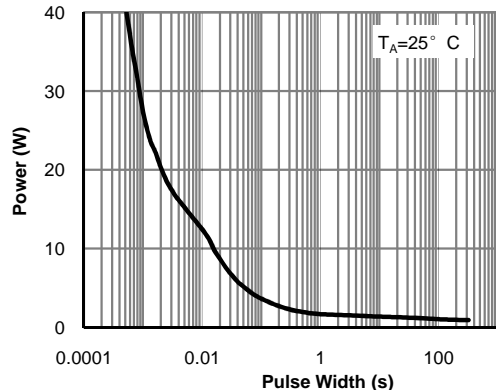


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

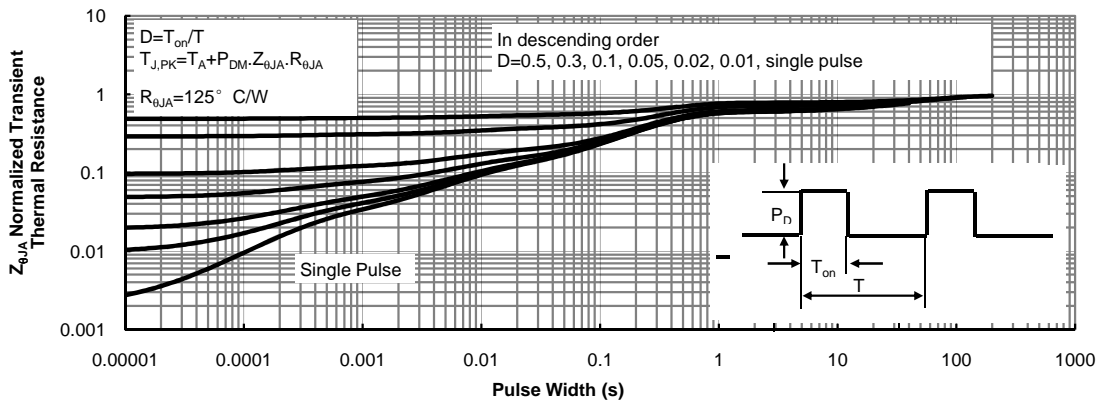
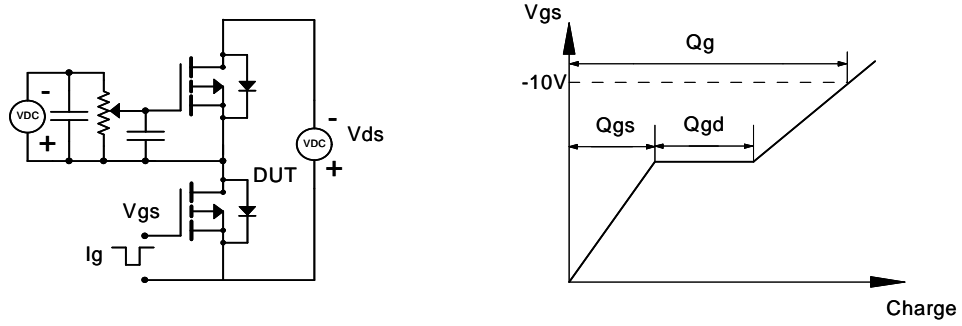
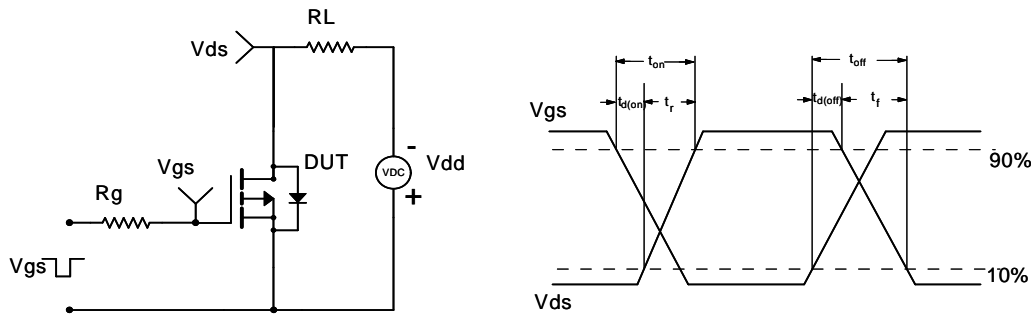


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

