

GL Silicon N-Channel Power MOSFET

General Description:

The GL3010-8 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is SOP-8, which accords with the RoHS standard.

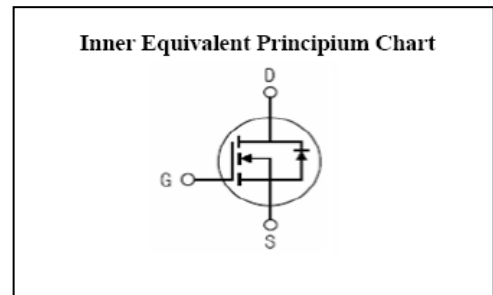
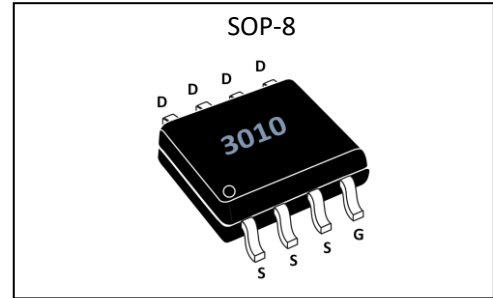
Features:

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications:

- PWM applications
- Load switch
- Power management

| | | |
|------------------|-----|----|
| V_{DSS} | 30 | V |
| I_D | 10 | A |
| P_D | 2.5 | W |
| $R_{DS(ON)type}$ | 7 | mΩ |



Absolute (Tc=25°C unless otherwise specified):

| Symbol | Parameter | Rating | Units |
|----------------|---|-----------------|------------------|
| V_{DSS} | Drain-to-Source Voltage | 30 | V |
| I_D | Continuous Drain Current | 10 | A |
| | Continuous Drain Current $T_C = 70\text{ }^\circ\text{C}$ | 8 | A |
| I_{DM}^{a1} | Pulsed Drain Current | 50 | A |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| dv/dt^{a3} | Peak Diode Recovery dv/dt | 5.0 | V/ns |
| P_D | Power Dissipation | 2.5 | W |
| T_J, T_{stg} | Operating Junction and Storage Temperature Range | 150, -55 to 150 | $^\circ\text{C}$ |
| T_L | Maximum Temperature for Soldering | 300 | $^\circ\text{C}$ |



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Electrical Characteristics (Tc= 25°C unless otherwise specified) :

| OFF Characteristics | | | | | | |
|-------------------------------------|-----------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| V _{DSS} | Drain to Source Breakdown Voltage | V _{GS} =0V, I _D =-250μA | 30 | -- | -- | V |
| ΔBV _{DSS} /ΔT _J | Bvdss Temperature Coefficient | I _D =-250uA, Reference 25°C | -- | 0.1 | -- | V/°C |
| I _{DSS} | Drain to Source Leakage Current | V _{DS} =30, V _{GS} =0V, T _a =25°C | -- | -- | 1 | μA |
| | | V _{DS} =24V, V _{GS} =0V, T _a =125°C | -- | -- | 250 | |
| I _{GSS(F)} | Gate to Source Forward Leakage | V _{GS} =+20V | -- | -- | 1 | μA |
| I _{GSS(R)} | Gate to Source Reverse Leakage | V _{GS} =-20V | -- | -- | -1 | μA |

| ON Characteristics | | | | | | |
|----------------------------|-------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| R _{DS(ON)} | Drain-to-Source On-Resistance | V _{GS} =10V, I _D =5A | -- | 7 | 10 | mΩ |
| R _{DS(ON)} | Drain-to-Source On-Resistance | V _{GS} =4.5V, I _D =5.0A | -- | 11 | 15 | mΩ |
| V _{GS(TH)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.3 | 2.5 | V |
| Pulse width tp≤380μs, δ≤2% | | | | | | |

| Dynamic Characteristics | | | | | | |
|-------------------------|------------------------------|---|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =10A | 15 | -- | -- | S |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =15V f=1.0MHz | -- | 1600 | -- | pF |
| C _{oss} | Output Capacitance | | -- | 300 | -- | |
| C _{rss} | Reverse Transfer Capacitance | | -- | 180 | -- | |

| Resistive Switching Characteristics | | | | | | |
|-------------------------------------|----------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| t _{d(ON)} | Turn-on Delay Time | I _D =1A, V _{DD} =25V V _{GS} =10V, R _G =6Ω | -- | 30 | -- | ns |
| t _r | Rise Time | | -- | 20 | -- | |
| t _{d(OFF)} | Turn-Off Delay Time | | -- | 100 | -- | |
| t _f | Fall Time | | -- | 80 | -- | |
| Q _g | Total Gate Charge | I _D =5A, V _{DD} =30V V _{GS} =5V | -- | 10 | -- | nC |
| Q _{gs} | Gate to Source Charge | | -- | 5 | -- | |
| Q _{gd} | Gate to Drain ("Miller")Charge | | -- | 3 | -- | |

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| Source-Drain Diode Characteristics | | | | | | |
|------------------------------------|--|------------------------------|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| I_S | Continuous Source Current (Body Diode) | | -- | -- | 10 | A |
| I_{SM} | Maximum Pulsed Current (Body Diode) | | -- | -- | 50 | A |
| V_{SD} | Diode Forward Voltage | $I_S=10A, V_{GS}=0V$ | -- | -- | 1.5 | V |
| t_{rr} | Reverse Recovery Time | $I_S=10A, T_j = 25^\circ C$ | -- | 100 | -- | ns |
| Q_{rr} | Reverse Recovery Charge | $di_F/dt=100A/us, V_{GS}=0V$ | -- | 240 | -- | nC |

Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$

| Symbol | Parameter | Typ. | Units |
|-----------------|---------------------|------|--------------|
| $R_{\theta JA}$ | Junction-to-Ambient | 50 | $^\circ C/W$ |

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a3}: $I_{SD} = 10A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, Start T_j = 25^\circ C$

Typical Electrical and Thermal Characteristics

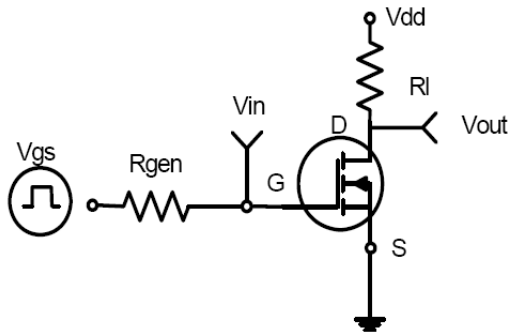


Figure 1: Switching Test Circuit

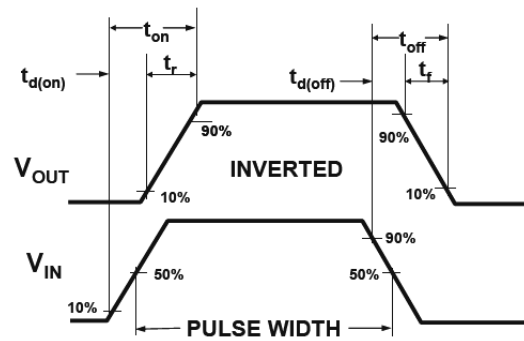


Figure 2: Switching Waveforms



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Typical Electrical and Thermal Characteristics (Curves)

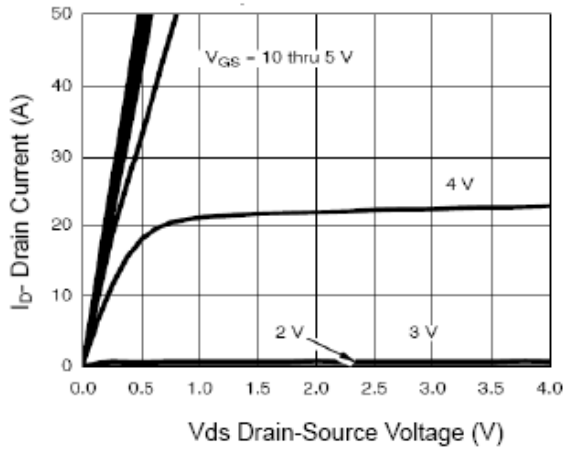


Figure 1 Output Characteristics

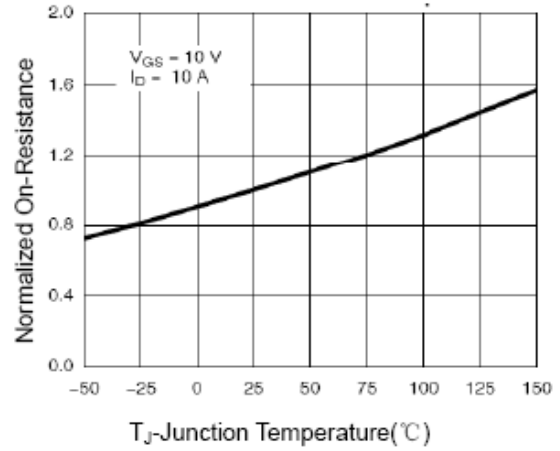


Figure 4 R_{dson} -Junction Temperature

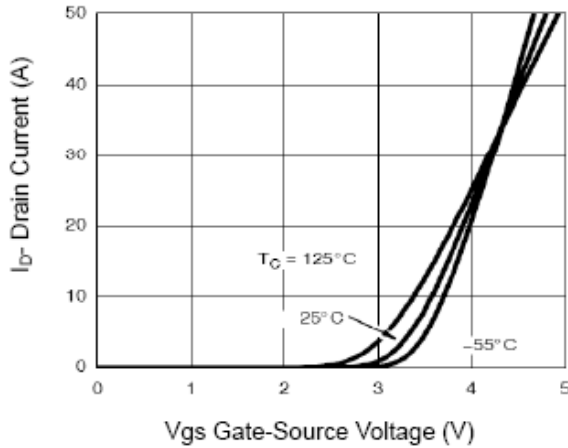


Figure 2 Transfer Characteristics

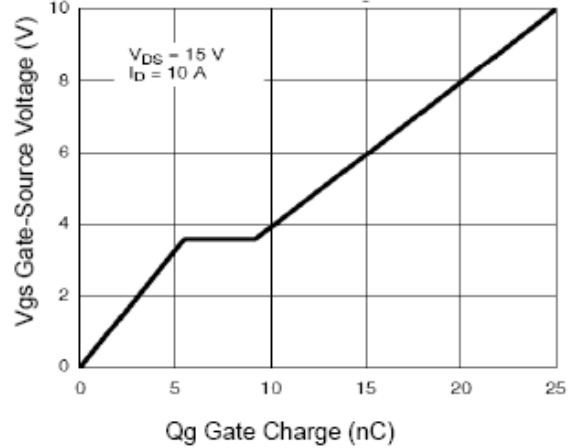


Figure 5 Gate Charge

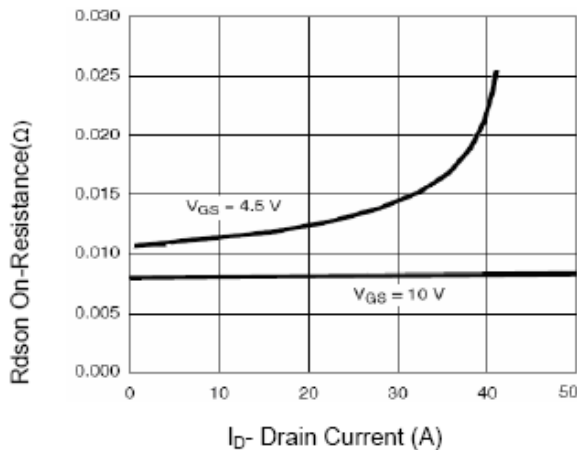


Figure 3 R_{dson} - Drain Current

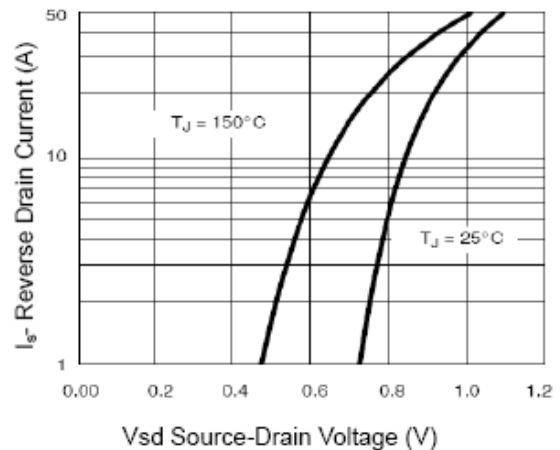


Figure 6 Source- Drain Diode Forward



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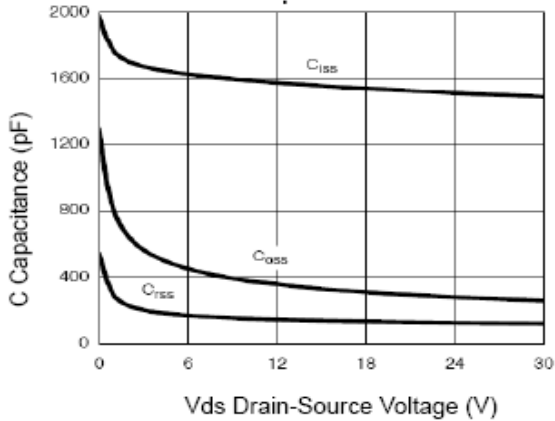


Figure 7 Capacitance vs Vds

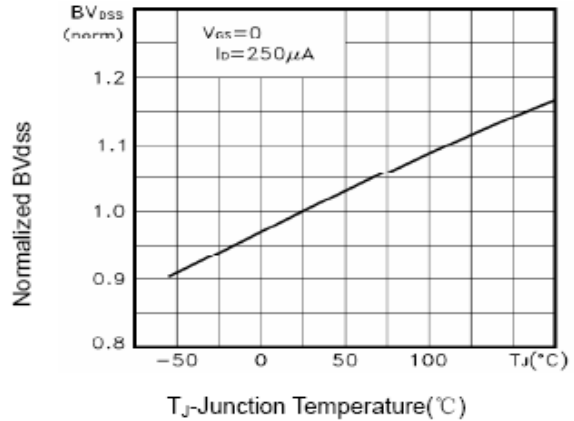


Figure 9 BV_{DSS} vs Junction Temperature

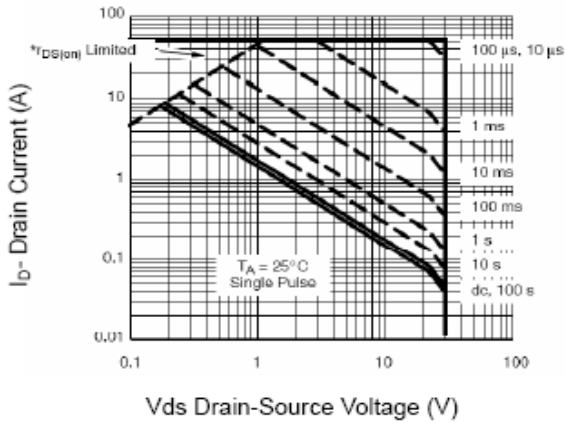


Figure 8 Safe Operation Area

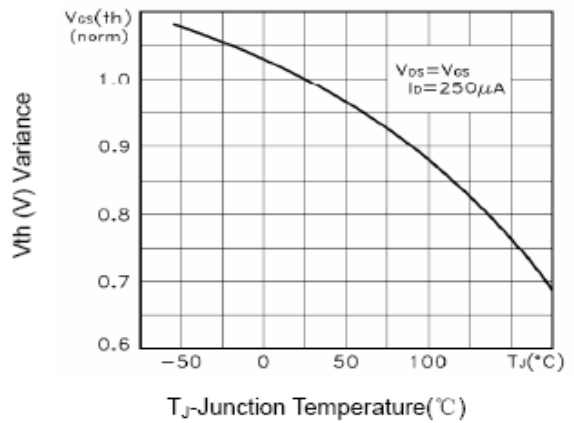


Figure 10 $V_{GS(th)}$ vs Junction Temperature

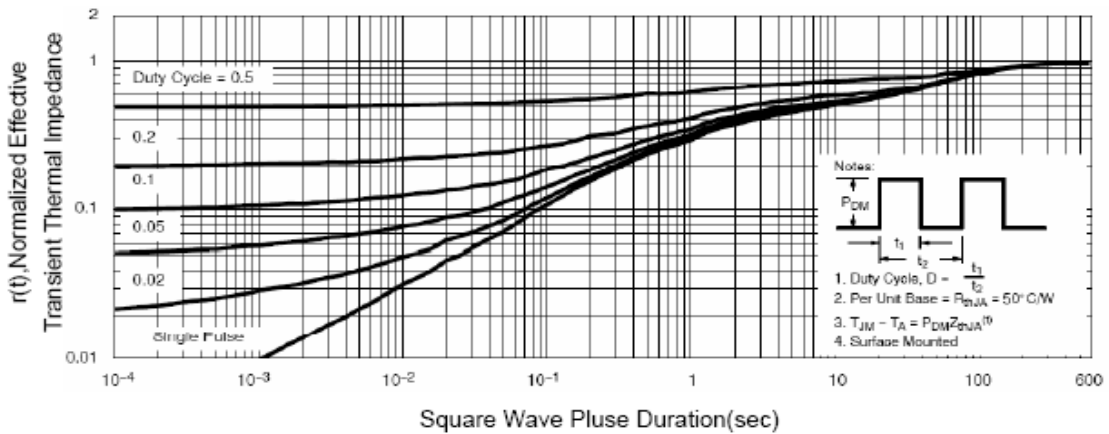


Figure 11 Normalized Maximum Transient Thermal Impedance

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