



GL14N03

GL Silicon N-Channel Power MOSFET

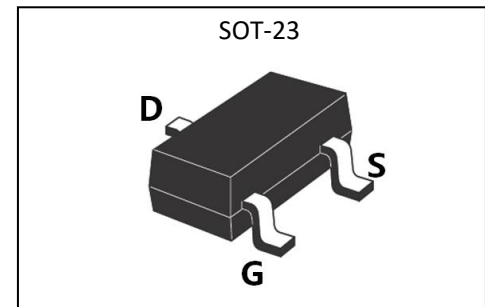
General Description

The GL14N03 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is SOT-23, which accords with the RoHS standard.

| | | |
|-----------------|-----|------------|
| V_{DSS} | 30 | V |
| I_D | 14 | A |
| P_D | 1.5 | W |
| $R_{DS(ON)MAX}$ | 15 | m Ω |

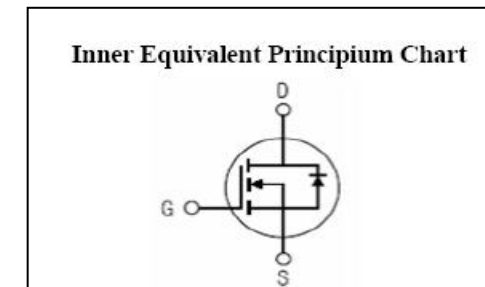
Features

- $R_{DS(ON)} < 15m\Omega @ V_{GS}=10V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



Absolute (Tc= 25°C unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|----------------|--|-----------------|-------------|
| V_{DSS} | Drain-to-Source Voltage | 30 | V |
| I_D | Continuous Drain Current | 14 | A |
| I_{DM} | Pulsed Drain Current | 48 | A |
| V_{GS} | Gate-to-Source Voltage | ± 12 | V |
| P_D | Power Dissipation | 1.5 | W |
| T_J, T_{stg} | Operating Junction and Storage Temperature Range | 150, -55 to 150 | $^{\circ}C$ |

| Symbol | Parameter | Typ. | Units |
|-----------------|----------------------------------|------|---------------|
| $R_{\theta JA}$ | Junction-to-Ambient ² | 83 | $^{\circ}C/W$ |



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Electrical Characteristics (T_c= 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 |
| I _{DSS} | Drain to Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _a =25°C | -- | -- | 1.0 | μA |
| I _{GSS(F)} | Gate to Source Forward Leakage | V _{GS} = +12V | -- | -- | 0.1 | μA |
| I _{GSS(R)} | Gate to Source Reverse Leakage | V _{GS} = -12V | -- | -- | -0.1 | μA |

| ON Characteristics ^{a3} | | | | | | |
|----------------------------------|-------------------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| R _{DS(ON)1} | Drain-to-Source On-Resistance | V _{GS} =10V, I _D =7A | -- | -- | 15 | mΩ |
| R _{DS(ON)2} | Drain-to-Source On-Resistance | V _{GS} =4.5V, I _D =5A | -- | -- | 20 | mΩ |
| R _{DS(ON)3} | Drain-to-Source On-Resistance | V _{GS} =2.5V, I _D =5A | -- | -- | 25 | mΩ |
| V _{GS(TH)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 0.5 | -- | 1.5 | V |
| Pulse width tp ≤ 380μs, δ ≤ 2% | | | | | | |

| Dynamic Characteristics ^{a4} | | | | | | |
|---------------------------------------|------------------------------|---|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =10A | 10 | -- | -- | S |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =15V f=1.0MHz | -- | 1450 | -- | pF |
| C _{oss} | Output Capacitance | | -- | 150 | -- | |
| C _{rss} | Reverse Transfer Capacitance | | -- | 110 | -- | |

| Resistive Switching Characteristics ^{a4} | | | | | | |
|---|---------------------|--|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| t _{d(ON)} | Turn-on Delay Time | V _{DD} =10V, R _L =2.7Ω V _{GS} =10V, R _G =3Ω | -- | -- | 10 | ns |
| t _r | Rise Time | | -- | -- | 14 | |
| t _{d(OFF)} | Turn-Off Delay Time | | -- | -- | 70 | |
| t _f | Fall Time | | -- | -- | 12 | |

| Source-Drain Diode Characteristics | | | | | | |
|------------------------------------|-------------------------------------|---|--------|------|------|-------|
| Symbol | Parameter | Test Conditions | Rating | | | Units |
| | | | Min. | Typ. | Max. | |
| V _{SD} | Diode Forward Voltage ^{a3} | I _S =7A, V _{GS} =0V | -- | -- | 1.5 | V |

^{a1}: Repetitive Rating; Pulse width limited by maximum junction temperature.

^{a2}: Surface Mounted on FR4 Board, t ≤ 10sec.

^{a3}: Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

^{a4}: Guaranteed by design, not subject to production



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

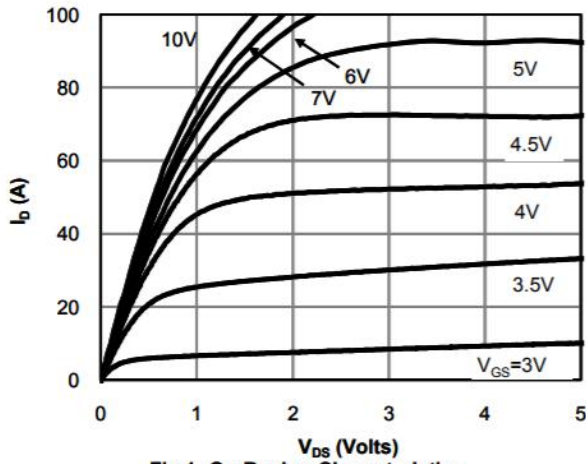


Fig 1: On-Region Characteristics

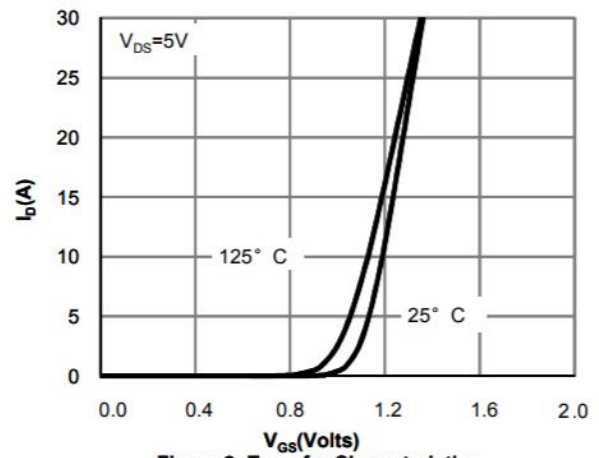


Figure 2: Transfer Characteristics

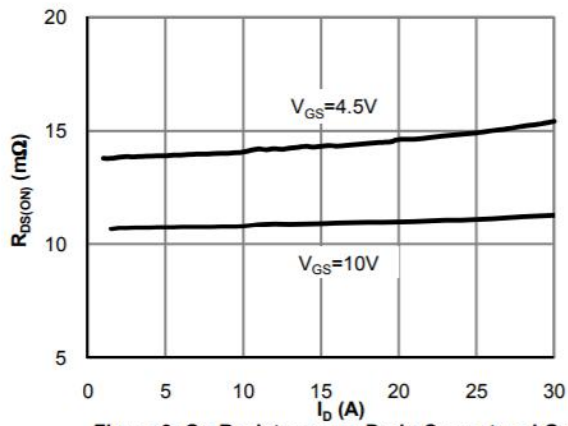


Figure 3: On-Resistance vs. Drain Current and Gate

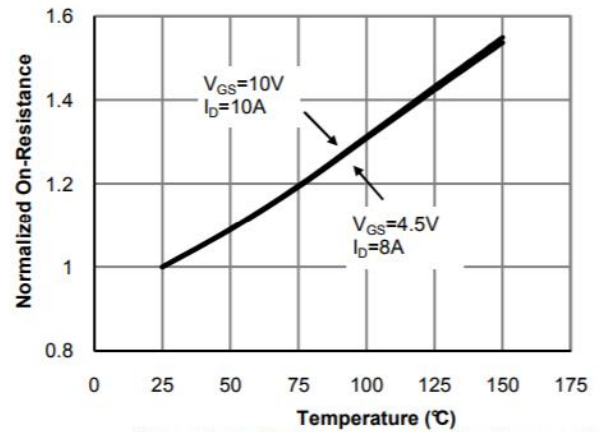


Figure 4: On-Resistance vs. Junction Temperature

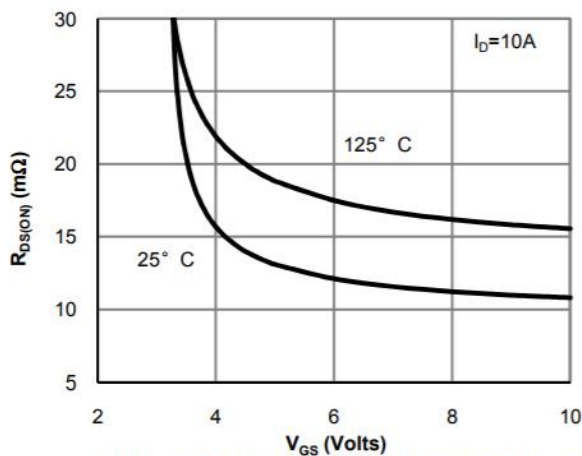


Figure 5: On-Resistance vs. Gate-Source Voltage

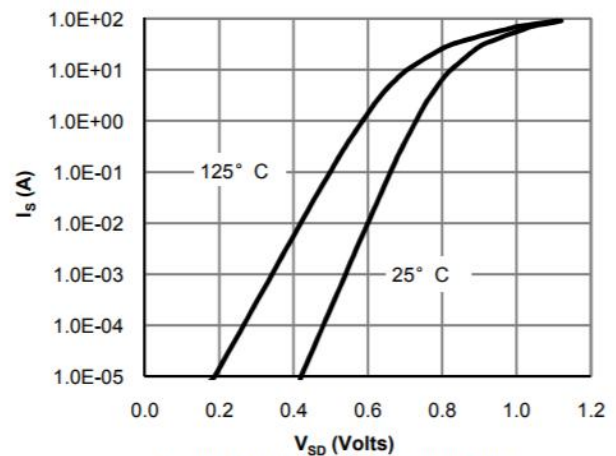


Figure 6: Body-Diode Characteristics



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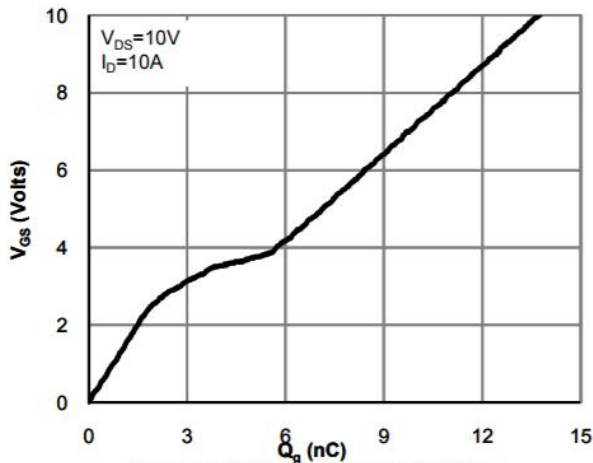


Figure 7: Gate-Charge Characteristics

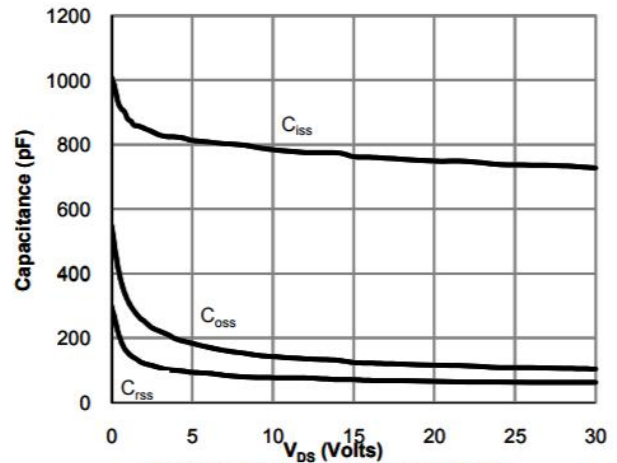


Figure 8: Capacitance Characteristics

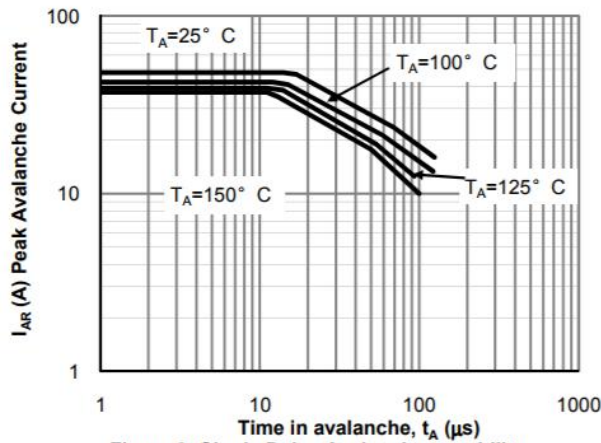


Figure 9: Single Pulse Avalanche capability

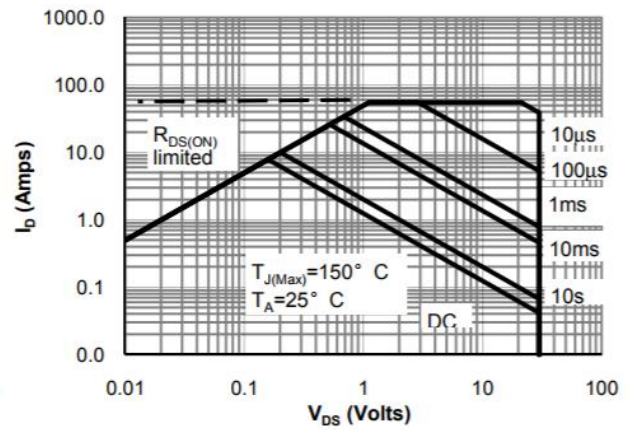


Figure 10: Maximum Forward Biased Safe Operating Area

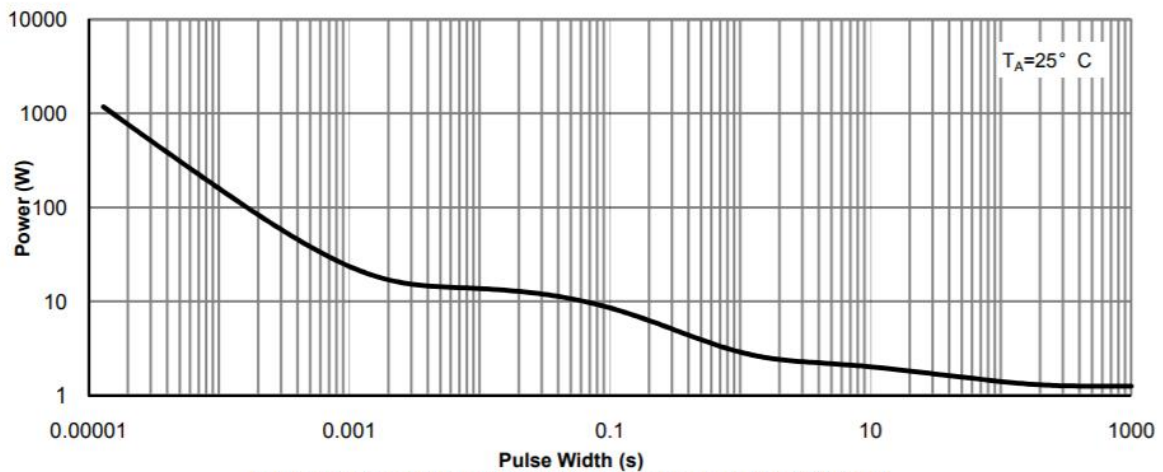


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)