

20V/27mΩ@4.5V N-Channel MOSFET

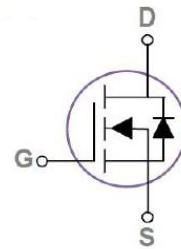
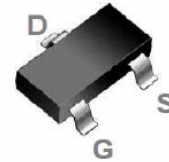
Features

- VDS(max)=20V
- ID(max)=5A
- RDS(ON) =27mΩ(max)@VGS = 4.5V
- RDS(ON) =44mΩ(max)@VGS = 2.5V
- Improved dv/dt capability
- Green Device Available
- Fast switching

Applications

- Notebook
- Hand-Held Instrument
- Load Switch

SOT23 Pin Configuration



Maximum Ratings (Tc = 25°C, Unless Otherwise Noted)

| Parameters | Symbol | Limits | Unit |
|---------------------------------------|------------------------------|----------|------|
| Drain-Source Voltage | V _{DS} | 20 | V |
| Gate-Source Voltage | V _{GS} | ±12 | V |
| Drain Current - Continuous(TC=25°C) | I _D | 5 | A |
| Drain Current - Continuous(TC=100°C) | | 3.2 | A |
| Drain Current - Pulsed | I _{DM} ¹ | 20 | A |
| Power Dissipation(TC=25°C) | P _D | 1.56 | W |
| Power Dissipation - Derate above 25°C | | 0.012 | W/°C |
| Storage Temperature Range | T _{STG} | -55~ 150 | °C |
| Operating Junction Temperature Range | T _j | -55~ 150 | °C |

Thermal Characteristics

| Parameter | Symbol | Max. | Typ. | Unit |
|--|------------------|------|------|------|
| Thermal Resistance Junction to ambient | R _{θJA} | --- | 80 | °C/W |

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



HL2302DNR

Electrical Characteristics (T_j = 25 °C, Unless Otherwise Noted)

| Off Characteristics | | | | | | |
|--|-------------------------------------|--|------|------|------|------|
| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
| Drain to Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 20 | --- | --- | V |
| BV _{DSS} Temperature Coefficient | ΔBV _{DSS} /ΔT _J | Reference to 25 °C, I _D =1mA | --- | 0.02 | --- | V/°C |
| Drain-Source Leakage Current | I _{DSS} | V _{DS} =20V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | μA |
| Gate-Source Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±12V | --- | --- | ±100 | nA |
| On Characteristics | | | | | | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | V _{GS} =4.5V, I _D =4A | --- | 21 | 27 | mΩ |
| | | V _{GS} =2.5V, I _D =3A | --- | 29 | 44 | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 0.3 | 0.75 | 1 | V |
| Dynamic And Switching Characteristics | | | | | | |
| Total Gate Charge ^{3, 4} | Q _g | V _{DS} =10V, V _{GS} =4.5V, I _D =4A | --- | 6 | --- | nC |
| Gate-Source Charge ^{3, 4} | Q _{gs} | | --- | 4 | --- | |
| Gate-Drain Charge ^{3, 4} | Q _{gd} | | --- | 1.5 | --- | |
| Turn-on Delay Time ^{3, 4} | T _{d(on)} | V _{DD} =10V, I _D =1A V _{GS} =4.5V, R _{GEN} =25Ω | --- | 4 | --- | nS |
| Turn-on Rise Time ^{3, 4} | T _r | | --- | 13 | --- | |
| Turn-off Delay Time ^{3, 4} | T _{d(off)} | | --- | 65 | --- | |
| Turn-off Fall Time ^{3, 4} | T _f | | --- | 33 | --- | |
| Input Capacitance | C _{iss} | V _{DS} =15V, V _{GS} =0V, F=1MHz | --- | 455 | --- | pF |
| Output Capacitance | C _{oss} | | --- | 64 | --- | |
| Reverse Transfer Capacitance | C _{rss} | | --- | 55 | --- | |
| Drain-Source Diode Characteristics And Maximum Ratings | | | | | | |
| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
| Continuous Source Current | I _S | V _G =V _D =0V, | --- | --- | 5 | A |
| Pulsed Source Current ³ | I _{SM} | Force Current | --- | --- | 16 | |
| Diode Forward Voltage ³ | V _{SD} | V _{GS} =0V, I _S =1A, T _J =25 °C | --- | --- | 1.2 | V |

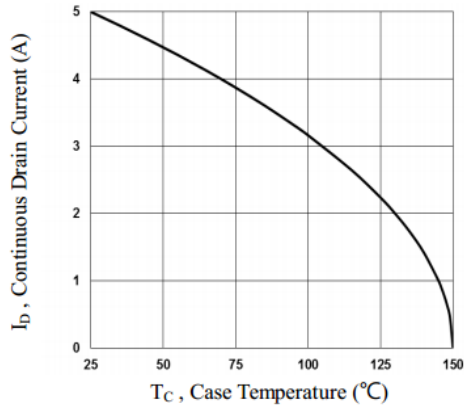


Fig.1 Continuous Drain Current vs. T_c

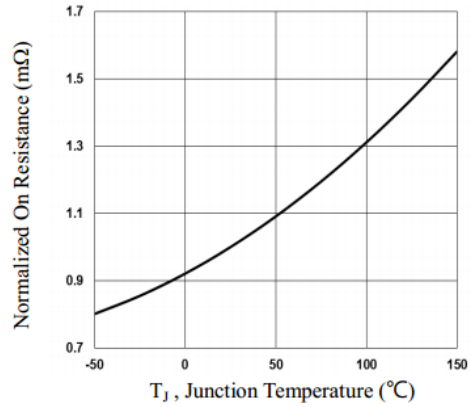


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

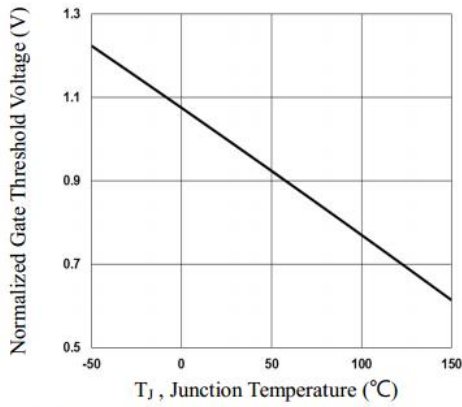


Fig.3 Normalized V_{th} vs. T_j

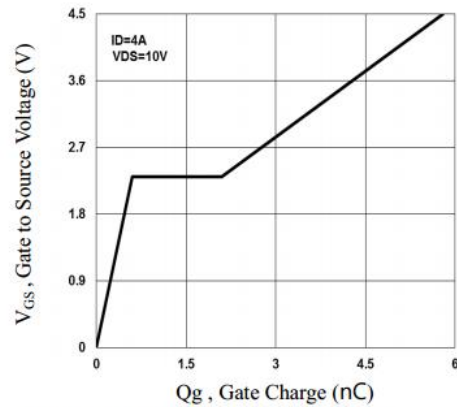


Fig.4 Gate Charge Waveform

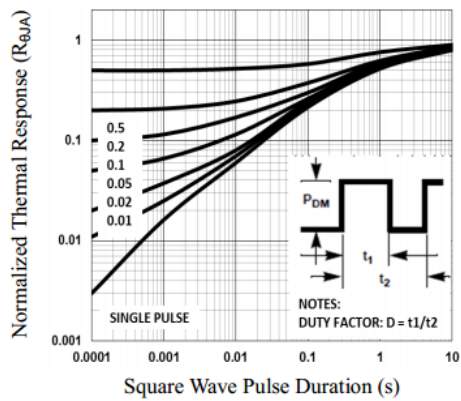


Fig.5 Normalized Transient Impedance

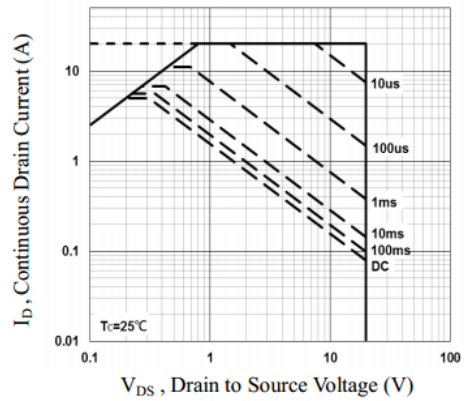


Fig.6 Maximum Safe Operation Area

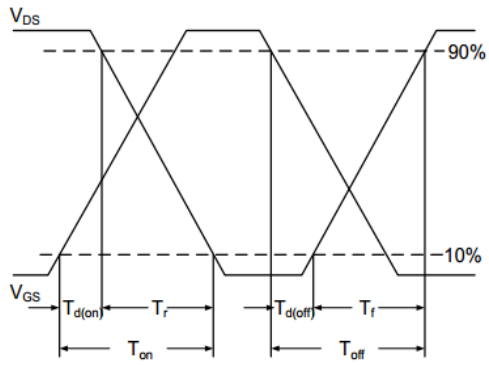


Fig.7 Switching Time Waveform

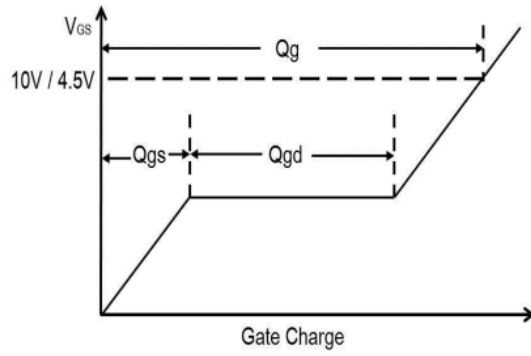
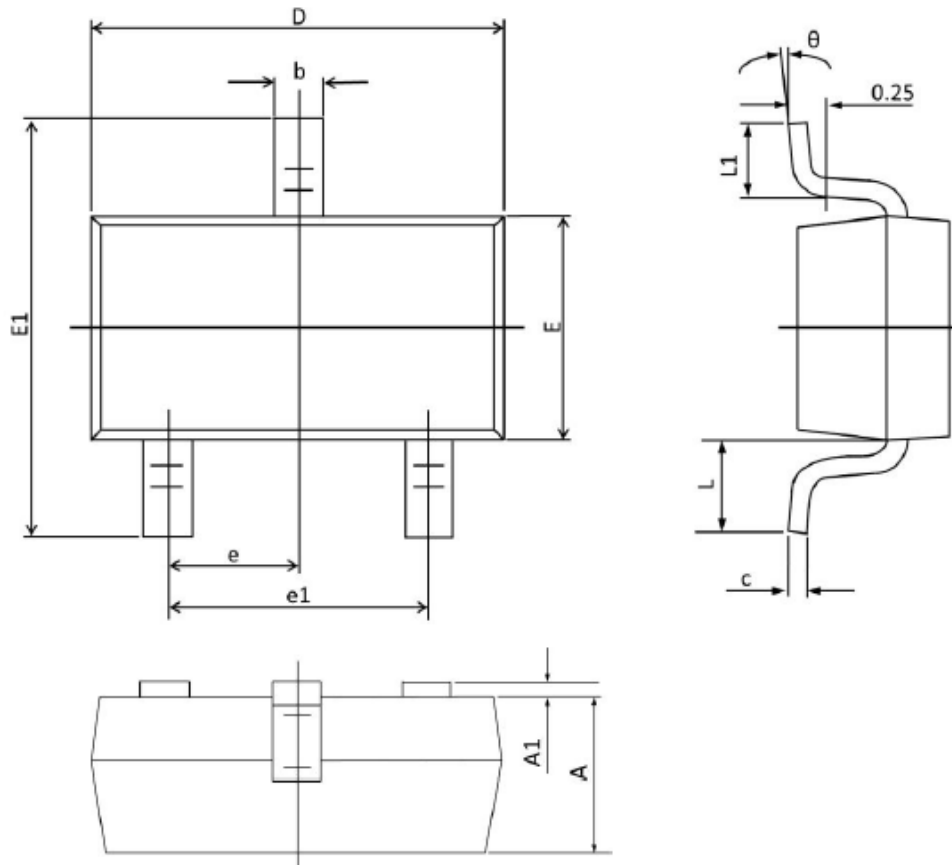


Fig.8 Gate Charge Waveform

SOT23 PACKAGE INFORMATION


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.000 | 0.035 | 0.039 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.090 | 0.110 | 0.003 | 0.004 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 1° | 7° | 1° | 7° |



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