



YEA SHIN TECHNOLOGY CO., LTD

YS2302

N-Channel Enhancement MOSFET

V_{DS}= 20V, I_D= 4.9A



DESCRIPTION

The YS2302 is the highest performance trench N-Ch MOSFETs with extreme high cell density, which provide excellent R_{DS(ON)} and gate charge for most of the small power switching and load switch applications.

The SMG2302-C meet the RoHS and Green Product requirement with full function reliability approved.

FEATURES

- Advanced High Cell Density Trench Technology
- Super Low Gate Charge
- Green Device Available

MARKING

2302

PACKAGE INFORMATION

| Package | MPQ | Leader Size |
|---------|-----|-------------|
| SC-59 | 3K | 7 inch |

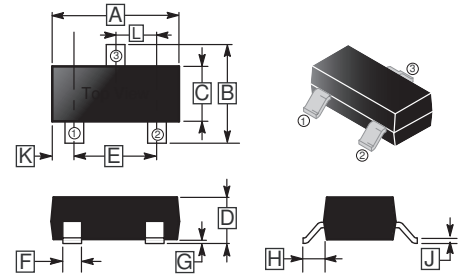
ORDER INFORMATION

| Part Number | Type |
|-------------|---------------------------------|
| YS2302 | Lead (Pb)-free and Halogen-free |

ABSOLUTE MAXIMUM RATINGS

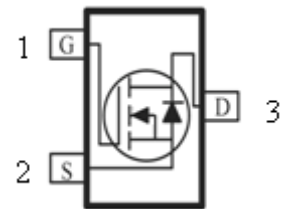
| Parameter | | Symbol | Ratings | | Unit |
|--|---------------------|-----------------------------------|---------|--------------|------|
| | | | ≤10sec | Steady State | |
| Drain-Source Voltage | | V _{DS} | 20 | | V |
| Gate-Source Voltage | | V _{GS} | ±12 | | V |
| Continuous Drain Current ¹ @V _{GS} =4.5V | T _A =25℃ | I _D | 4.9 | 4.2 | A |
| | T _A =70℃ | | 3.8 | 3.3 | |
| Pulsed Drain Current ³ | | I _{DM} | 17 | | A |
| Power Dissipation | T _A =25℃ | P _D | 1.38 | | W |
| Operating Junction and Storage Temperature Range | | T _J , T _{stg} | -55~150 | | ℃ |
| Thermal Resistance Rating | | | | | |
| Thermal Resistance Junction-ambient ¹ | R _{θJA} | ≤10sec, 90 | | ℃/W | |
| | | Steady State,125 | | | |
| Thermal Resistance Junction-ambient ² | | 270 | | | |
| Thermal Resistance Junction-case ¹ | R _{θJC} | 80 | | | |

SC-59



| REF. | Millimeter | | REF. | Millimeter | |
|------|------------|------|------|------------|-------|
| | Min. | Max. | | Min. | Max. |
| A | 2.70 | 3.10 | G | 0.10 | REF. |
| B | 2.10 | 3.00 | H | 0.40 | REF. |
| C | 1.20 | 1.70 | J | 0.047 | 0.207 |
| D | 0.89 | 1.40 | K | 0.5 | REF. |
| E | 2.00 | Typ. | L | 0.95 | REF. |
| F | 0.30 | 0.50 | | | |

TOP VIEW



YS2302

ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|----------------------|---------------------|------|------|------|------|---|
| Drain-Source Breakdown Voltage | | BV _{DSS} | 20 | - | - | V | V _{GS} =0, I _D =250uA |
| Gate-Threshold Voltage | | V _{GS(th)} | 0.5 | - | 1.2 | V | V _{DS} =V _{GS} , I _D =250uA |
| Forward Transconductance | | g _{fs} | - | 20 | - | S | V _{DS} =5V, I _D =4A |
| Gate-Body Leakage Current | | I _{GSS} | - | - | ±100 | nA | V _{GS} = ±12V |
| Drain-Source Leakage Current | T _J =25°C | I _{DSS} | - | - | 1 | μA | V _{DS} =16V, V _{GS} =0 |
| | T _J =55°C | | - | - | 5 | | V _{DS} =16V, V _{GS} =0 |
| Drain-Source On-Resistance ⁴ | | R _{DS(ON)} | - | - | 37 | mΩ | V _{GS} =4.5V, I _D =3.6A |
| | | | - | - | 45 | | V _{GS} =2.5V, I _D =3.1A |
| Total Gate Charge | | Q _g | - | 8.6 | - | nC | V _{DS} =15V V _{GS} =4.5V I _D =4A |
| Gate-Source Charge | | Q _{gs} | - | 1.37 | - | | |
| Gate-Drain Charge | | Q _{gd} | - | 2.3 | - | | |
| Turn-on Delay Time | | T _{d(on)} | - | 5.2 | - | nS | V _{DS} =10V V _{GS} =4.5V I _D =4A R _G =3.3Ω |
| Rise Time | | T _r | - | 34 | - | | |
| Turn-off Delay Time | | T _{d(off)} | - | 23 | - | | |
| Fall Time | | T _f | - | 9.2 | - | | |
| Input Capacitance | | C _{iss} | - | 635 | - | pF | V _{GS} =0 V _{DS} =15V f=1.0MHz |
| Output Capacitance | | C _{oss} | - | 70 | - | | |
| Reverse Transfer Capacitance | | C _{rss} | - | 63 | - | | |
| Source-Drain Diode | | | | | | | |
| Diode Forward Voltage ⁴ | | V _{SD} | - | - | 1.2 | V | I _S =1.6A, V _{GS} =0 |
| Continuous Source Current ¹ | | I _S | - | - | 4.2 | A | |
| Pulsed Source Current ³ | | I _{SM} | - | - | 17 | A | |
| Reverse Recovery Time | | t _{rr} | - | 7.5 | - | nS | I _F =4A, dI/dt=100A/μs |
| Reverse Recovery Charge | | Q _{rr} | - | 2.1 | - | nC | T _J =25°C |

Notes:

1. Surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. When mounted on Min. copper pad.
3. Pulse width limited by maximum junction temperature.
4. The data tested by pulsed , pulse width ≤ 300us, duty cycle ≤ 2%.

DEVICE CHARACTERISTICS

YS2302

CHARACTERISTIC CURVES

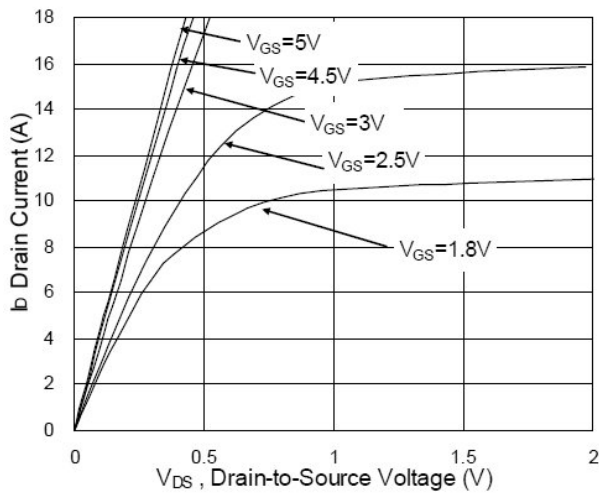


Fig.1 Typical Output Characteristics

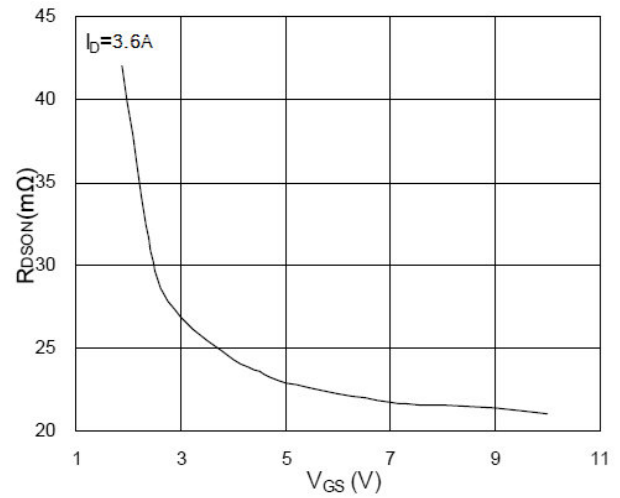


Fig.2 On-Resistance vs. Gate-Source

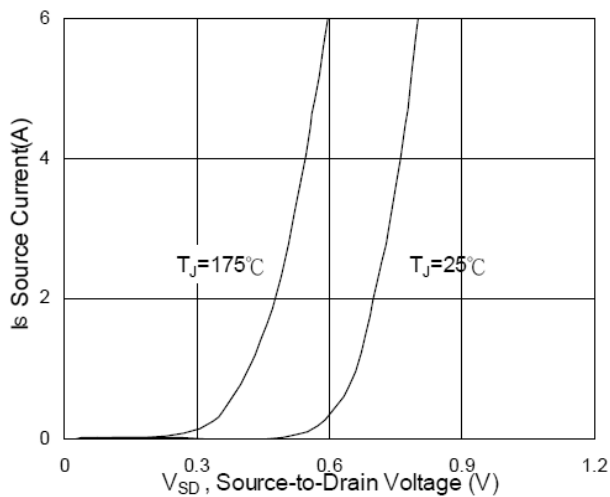


Fig.3 Forward Characteristics Of Reverse

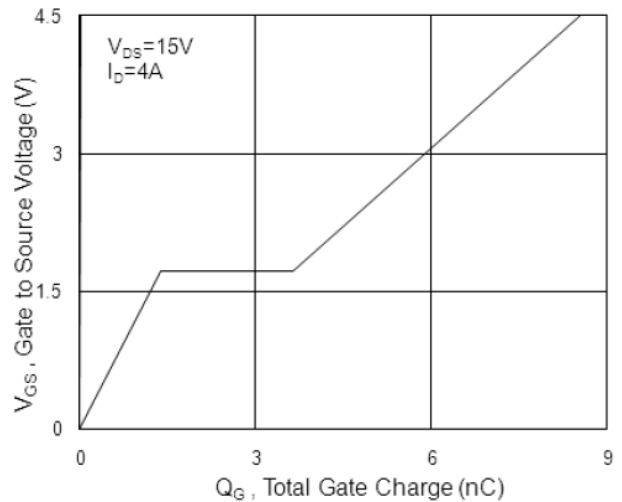


Fig.4 Gate-Charge Characteristics

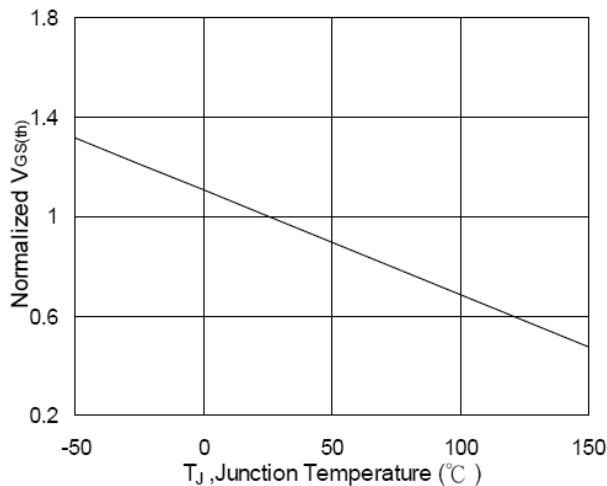


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

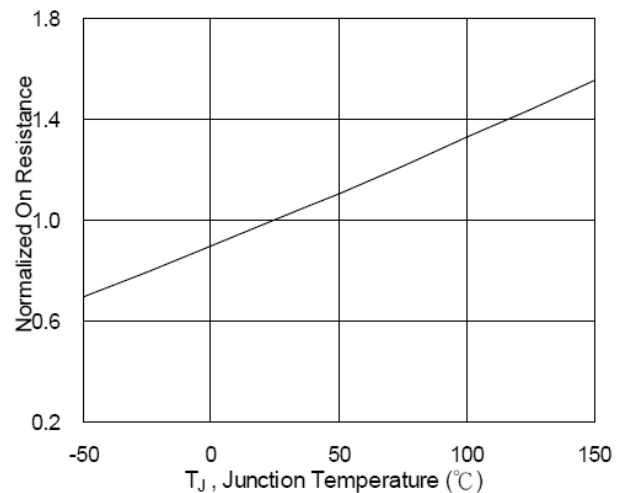


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

DEVICE CHARACTERISTICS

YS2302

CHARACTERISTIC CURVES

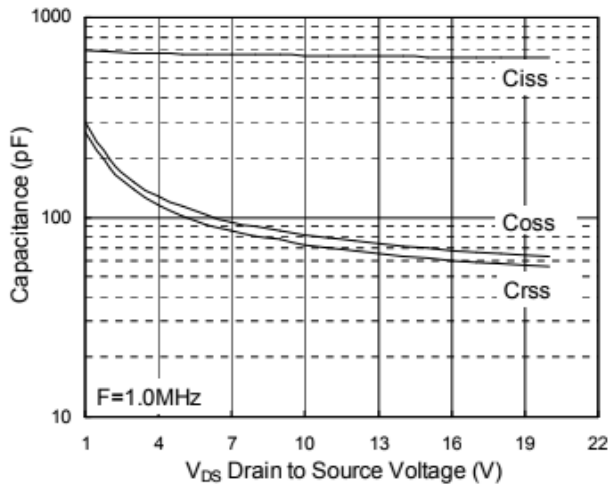


Fig.7 Capacitance

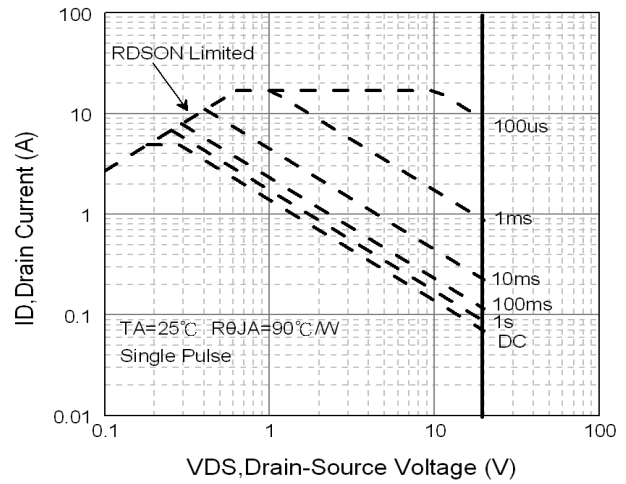


Fig.8 Safe Operating Area

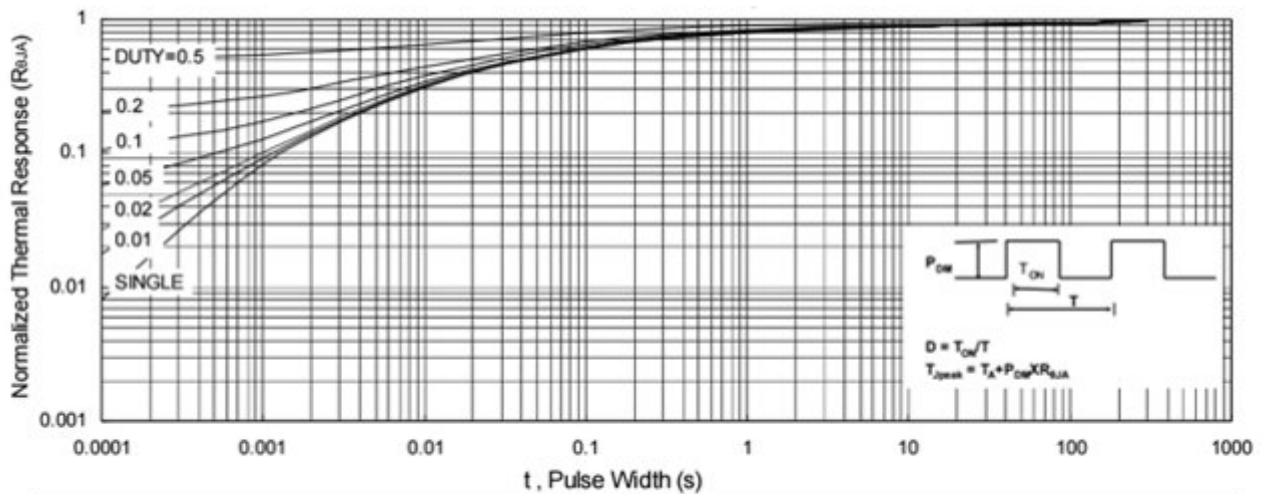


Fig.9 Normalized Maximum Transient Thermal Impedance

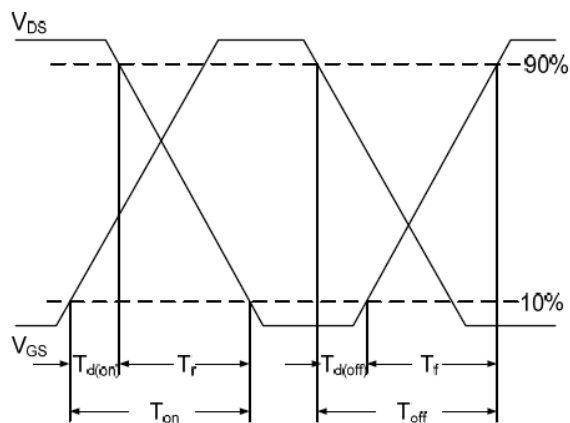


Fig.10 Switching Time Waveform

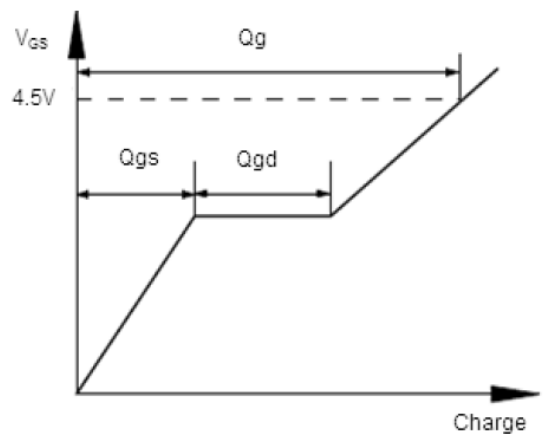


Fig.11 Gate Charge Waveform