

FEATURES

V_{DS} max: 30V

V_{GS} max: $\pm 12V$

$R_{DS(on)}$ max: $29m\Omega$ @ $V_{GS}=4.5V$

$R_{DS(on)}$ max: $37m\Omega$ @ $V_{GS}=2.5V$

APPLICATION

Case: SOT-23

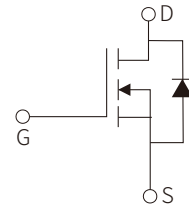
Case Material: Molded Plastic. UL flammability

Classification Rating: 94V-0

APPROVALS

RoHS Compliance with 2011/65/EU

HF Compliance with IEC61249-2-21:2003



ABSOLUTE MAXIMUM RATINGS($T_a=25^\circ C$)

| Parameter | Symbol | Value | Unit |
|--|----------------|------------|---------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Drain Current-Continuous | I_D | 5.0 | A |
| Drain Current-Continuous | I_D | 4.0 | A |
| Pulsed Drain Voltage | I_{DM} | 25 | A |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Total Power Dissipation | P_D | 1.3 | W |
| Total Power Dissipation | P_D | 0.8 | W |
| Linear Derating Factor | | 0.01 | W/ $^\circ C$ |
| Thermal Resistance.Junction- to-Ambient (Note.1) | R_{thJA} | 100 | $^\circ C/W$ |
| | | 99 | $^\circ C/W$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ C$ |

Note.1: Surface mounted on 1 in square Cu board

ELECTRICAL CHARACTERISTICS(T_a =25°C)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--|-----------------------------------|--|------|------|------|------|
| Drain-source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250μA | 30 | | | V |
| Breakdown Voltage Temp. Coefficient | $\Delta V_{(BR)DSS} / \Delta T_J$ | Reference to 25, I _D =1mA | | 0.02 | | V/°C |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =24V, V _{GS} =0V | | | 1.0 | μA |
| | | V _{DS} =24V, V _{GS} =0V, T _J =125°C | | | 150 | μA |
| Gate-Body Leakage | I _{GSS} | V _{GS} =±12V, V _{DS} =0V | | | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =10μA | 0.5 | 0.8 | 1.1 | V |
| Static Drain-Source On-Resistance(Note1) | R _{DS(on)} | V _{GS} =4.5V, I _D =5.0A | | 22 | 29 | mΩ |
| | | V _{GS} =2.5V, I _D =4.0A | | 27 | 37 | |
| Forward Transconductance | g _{FS} | V _{DS} =10V, I _D =5.0A | 19 | | | S |
| Gate resistance | R _g | | | 1.7 | | Ω |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1.0MHz | | 650 | | pF |
| Output Capacitance | C _{oss} | | | 65 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 46 | | |
| Turn-On Delay Time | t _{d(on)} | V _{GS} =4.5V, R _G =6.8Ω V _{DD} =15V, I _D =1.0A | | 4.2 | | ns |
| Turn-On Rise Time | t _r | | | 5.6 | | |
| Turn-Off Delay Time | t _{d(off)} | | | 22 | | |
| Turn-Off Fall Time | t _f | | | 9.1 | | |
| Diode forward voltage | V _{SD} | I _S =5.0A, V _{GS} =0V, T _J =25°C | | | 1.2 | V |
| Total Gate Charge | Q _g | V _{GS} =4.5V, V _{DS} =15V, I _D =5.0A | | 6.8 | | nC |
| Gate Source Charge | Q _{gs} | | | 0.3 | | |
| Gate Drain Charge | Q _{gd} | | | 2.4 | | |
| Diode forward current(Body Diode) | I _S | | | | 1.3 | A |
| Pulsed Source Current(Body Diode) | I _{SM} | | | | 25 | A |
| Reverse Recovery Time | t _{rr} | I _F =1.3A, V _R =15V dI/dt=100A/μs, T _J =25°C, (Note.1) | | 10 | 15 | ns |
| Reverse Recovery Charge | Q _{rr} | | | | 3.8 | 5.7 |

Note.1: Pulse test ; Pulse width ≤400μs, Duty cycle ≤ 2%

Note.2: Repetitive rating; pulse width limited by max. junction temperature.

PARAMETER CHARACTERISTIC CURVE

Fig 1: Typical Output Characteristics

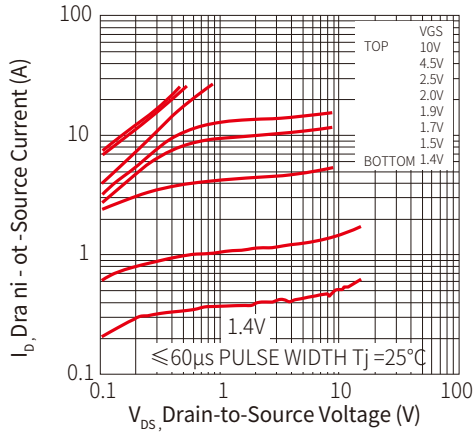


Figure 2: Typical Output Characteristics

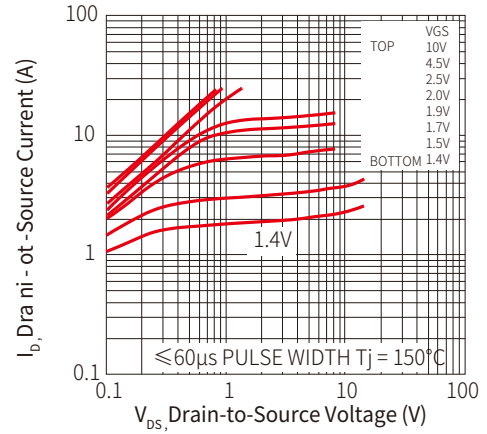


Figure 3: Typical Transfer Characteristics

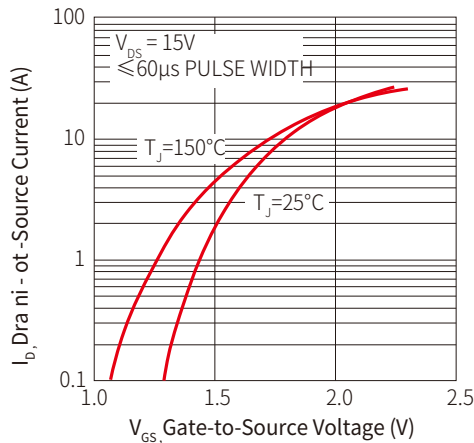


Figure 4: Normalized On-Resistance Vs. Temperature

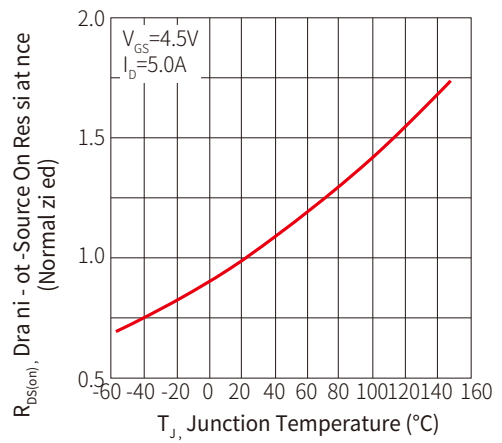


Figure 5: Typical Capacitance Vs. Drain-to-Source Voltage

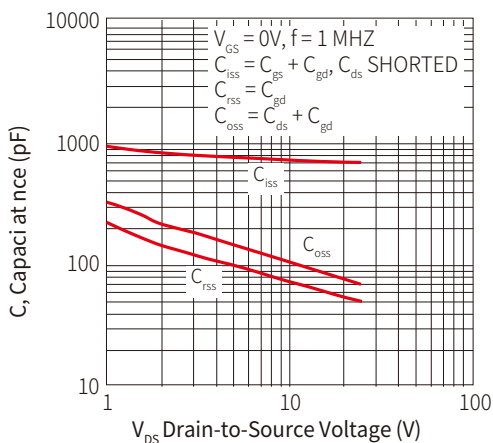


Figure 6: Typical Gate Charge Vs. Gate-to-Source Voltage

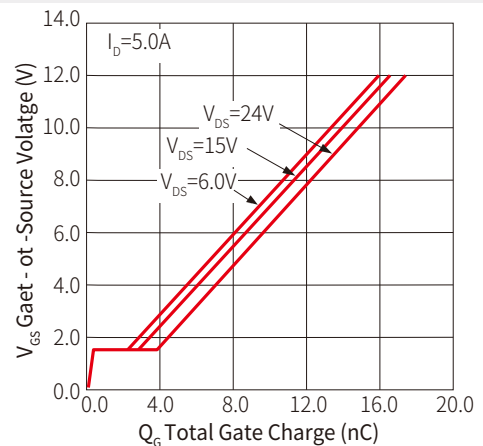


Figure 7: Typical Source-Drain Diode Forward Voltage

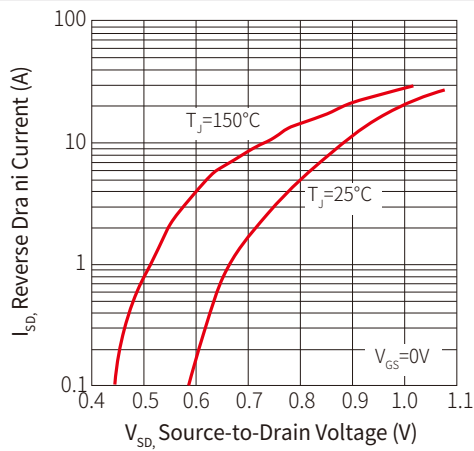


Figure 8: Maximum Safe Operating Area

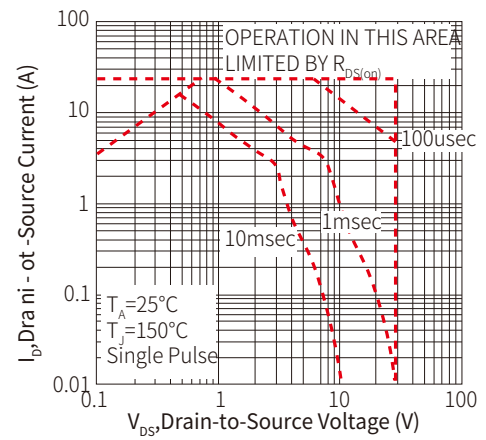


Figure 9: Maximum Drain Current Vs. Ambient Temperature

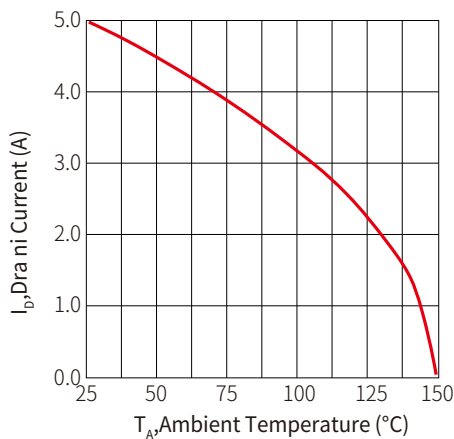


Figure 10: Typical Effective Transient Thermal Impedance, Junction-to-Ambient

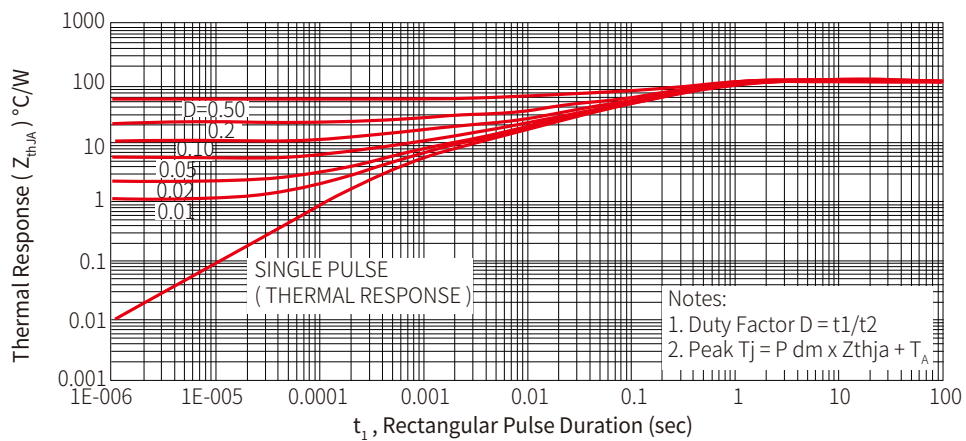
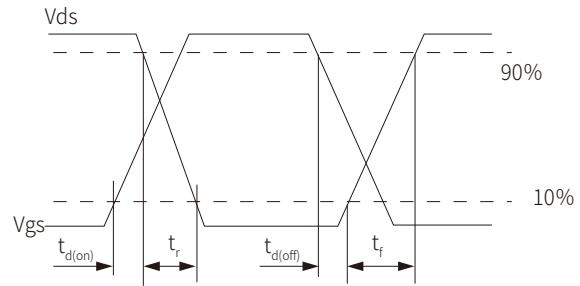
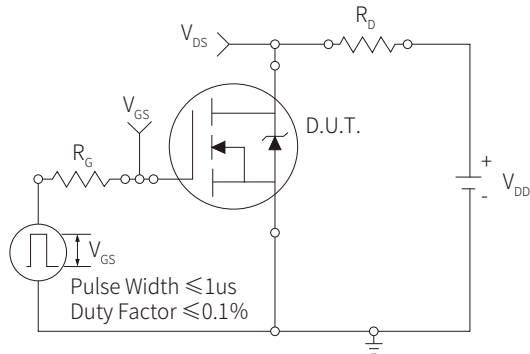
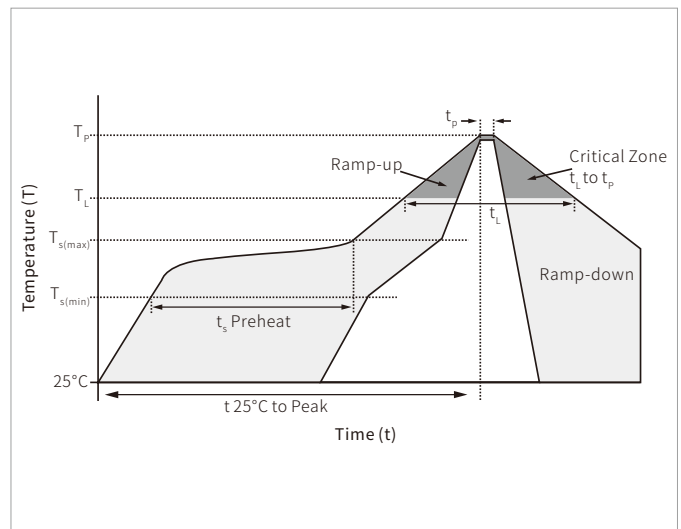


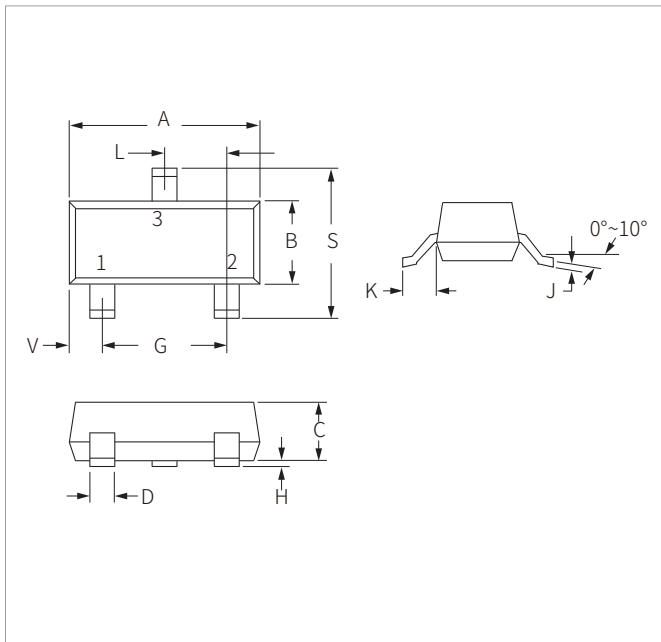
Figure 11: Switching Time Test Circuit & Waveforms


SOLDERING PARAMETERS

| Reflow Condition | | Lead-free assembly |
|--|----------------------------------|--------------------|
| Pre Heat | Temperature Max ($T_{s(min)}$) | 150°C |
| | Temperature Max ($T_{s(max)}$) | 200°C |
| | Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp (T_L) to peak) | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Reflow | Temperature (T_L) (Liquidus) | 217°C |
| | Time (min to max) (t_L) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 260°C |
| Time within 5°C of actual peak Temperature (t_p) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (T_p) | | 8 minutes max. |
| Do not exceed | | 260°C |

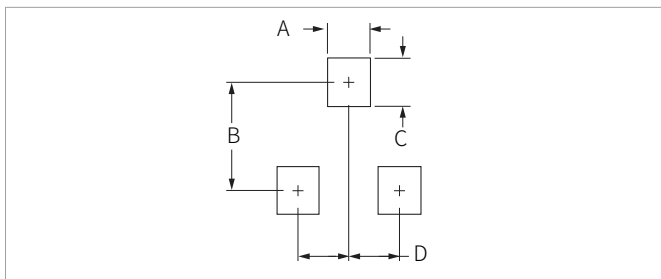


SOT-23 PACKAGE INFORMATION



| Ref. | Millimeters | | Inches | |
|------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.80 | 3.05 | 0.110 | 0.120 |
| B | 1.20 | 1.40 | 0.047 | 0.055 |
| C | 0.90 | 1.15 | 0.035 | 0.045 |
| D | 0.37 | 0.50 | 0.015 | 0.020 |
| G | 1.75 | 2.05 | 0.069 | 0.081 |
| H | 0.01 | 0.100 | 0.001 | 0.004 |
| J | 0.085 | 0.180 | 0.003 | 0.007 |
| K | 0.35 | 0.69 | 0.014 | 0.029 |
| L | 0.89 | 1.02 | 0.035 | 0.040 |
| S | 2.10 | 2.65 | 0.083 | 0.104 |
| V | 0.45 | 0.60 | 0.018 | 0.024 |

RECOMMENDED PAD LAYOUT DIMENSIONS



| Ref. | Millimeters | | Inches | |
|------|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.71 | 0.97 | 0.028 | 0.038 |
| B | 1.88 | 2.13 | 0.074 | 0.084 |
| C | 0.71 | 0.97 | 0.028 | 0.038 |
| D | 0.81 | 1.07 | 0.032 | 0.042 |

ORDERING INFORMATION

| Part Number | Component Package | QTY/Reel | Reel Size |
|-------------|-------------------|----------|-----------|
| SNM6344S | SOT-23 | 3000PCS | 7" |

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