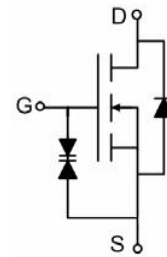




Features

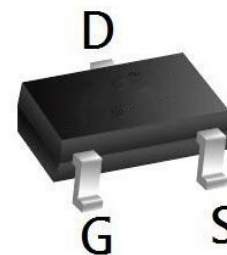
- Low $R_{DS(on)}$ @ $V_{GS}=10V$
- 5V Logic Level Control
- N Channel SOT523 Package
- HMB ESD Protection 1KV
- Pb-Free, RoHS Compliant



Applications

- LED Lighting Application,
- ON/OFF switch
- Networking

SOT-523 Pin Configuration



Product Summary

| BVDSS | RDSON | ID |
|-------|-------|------|
| 60V | 1.5mΩ | 0.5A |

Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Rating | Unit | |
|--|---|--------------------------|--------------------|---|
| Common Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted) | | | | |
| V_{GS} | Gate-Source Voltage | ± 20 | V | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | 60 | V | |
| T_J | Maximum Junction Temperature | 150 | $^\circ\text{C}$ | |
| T_{STG} | Storage Temperature Range | -50 to 150 | $^\circ\text{C}$ | |
| Mounted on Large Heat Sink | | | | |
| I_{DM} | Pulse Drain Current Tested① | $T_A = 25^\circ\text{C}$ | 0.8 | A |
| I_D | Continuous Drain Current($V_{GS}=4.5V$) | $T_A = 25^\circ\text{C}$ | 0.3 | A |
| | | $T_A = 70^\circ\text{C}$ | 0.24 | |
| P_D | Maximum Power Dissipation | $T_A = 25^\circ\text{C}$ | 0.9 | W |
| | | $T_A = 70^\circ\text{C}$ | 0.6 | |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | 125 | $^\circ\text{C/W}$ | |



Electrical Characteristics (T_J=25°C unless otherwise specified)

| Symbol | Parame | Condition | Min | Typ | Max | Unit |
|--|--|---|-----|------|------|------|
| Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V I _D =250μA | 60 | -- | -- | V |
| I _{DSS} | Zero Gate Voltage Drain Current(T _A =25°C) | V _{DS} =60V, V _{GS} =0V | -- | -- | 1 | μA |
| | Zero Gate Voltage Drain Current(T _A =125°C) | V _{DS} =60V, V _{GS} =0V | -- | -- | 100 | uA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±12V, V _{DS} =0V | -- | -- | ±100 | nA |
| V _{GS(TH)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.5 | 2.5 | V |
| R _{DS(ON)} | Drain-Source On-State Resistance② | V _{GS} =10V, I _D =0.3A | -- | 1.5 | 3 | Ω |
| R _{DS(ON)} | Drain-Source On-State Resistance② | V _{GS} =4.5V, I _D =0.2A | -- | 2.6 | 6 | Ω |
| Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =30V, V _{GS} =0V, f=1MHz | -- | 1 | | pF |
| C _{oss} | Output Capacitance | | -- | 3 | -- | pF |
| C _{rss} | Reverse Transfer Capacitance | | -- | 0 | -- | pF |
| Q _g | Total Gate Charge | V _{DS} =30V I _D =0.3A, V _{GS} =4.5V | -- | 0.5 | -- | nC |
| Q _{gs} | Gate Source Charge | | -- | 0.12 | -- | nC |
| Q _{gd} | Gate Drain Charge | | -- | 0.21 | -- | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn on Delay Time | V _{DD} =30V, I _D =0.3A, R _G =3.3Ω, V _{GS} =10V | -- | 4.5 | -- | n |
| t _r | Turn on Rise Time | | -- | 3.1 | -- | n |
| t _{d(off)} | Turn Off Delay Time | | - | 15 | -- | n |
| t _f | Turn Off Fall Time | | -- | 3.3 | -- | n |
| Source Drain Diode Characteristics | | | | | | |
| I _{SD} | Source drain current(Body Diode) | T _A =25°C | -- | - | 0.2 | A |
| V _{SD} | Forward on voltage② | T _J =25°C, I _{SD} =0.2A, V _{GS} =0V | -- | 0 | 1.2 | V |

Notes:

① Pulse width limited by maximum allowable junction temperature

② Pulse test ; Pulse width≤300μs, duty cycle≤2%.



Typical Characteristics

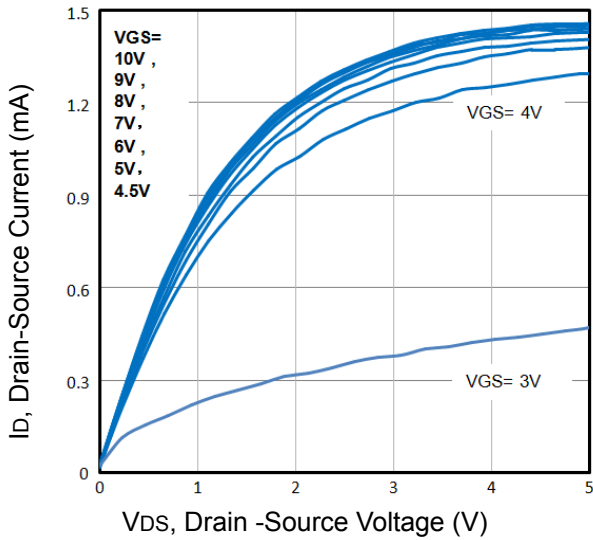


Fig1. Typical Output Characteristics

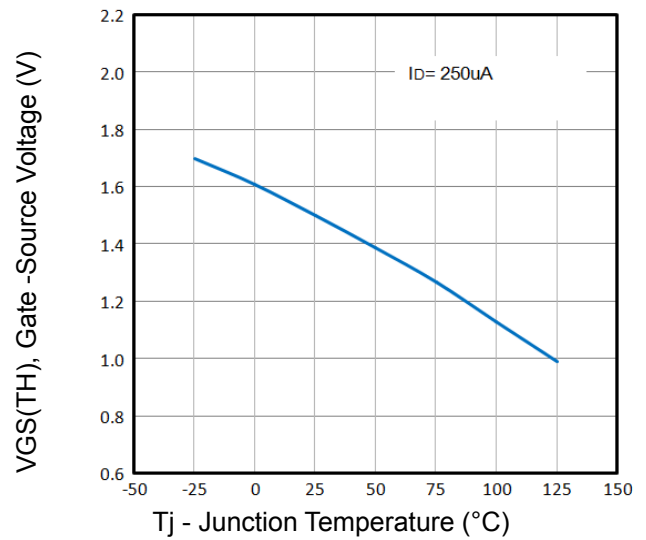


Fig2. Normalized Threshold Voltage Vs. Temperature

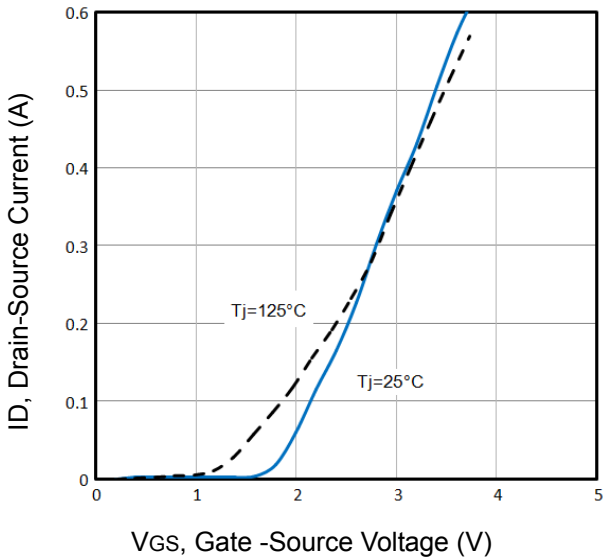


Fig3. Typical Transfer Characteristics

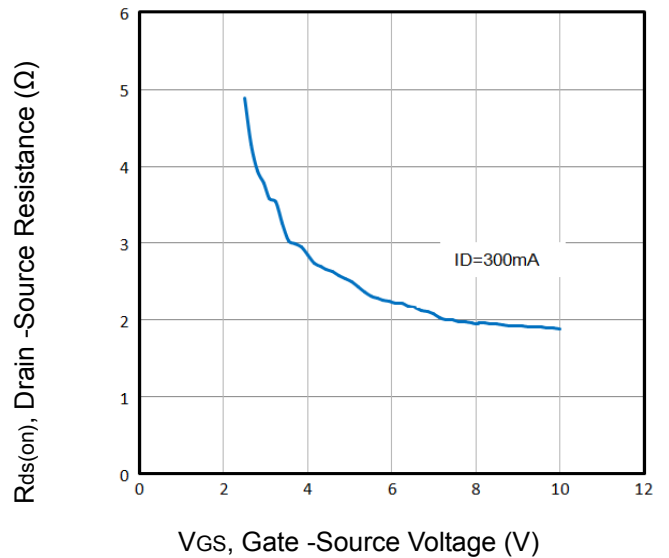


Fig4. Rds(on) vs Gate-Source Voltage

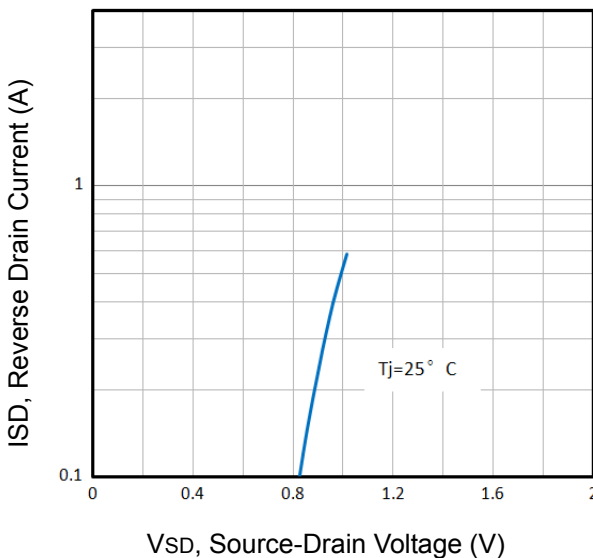


Fig5. Typical Source-Drain Diode Forward Voltage

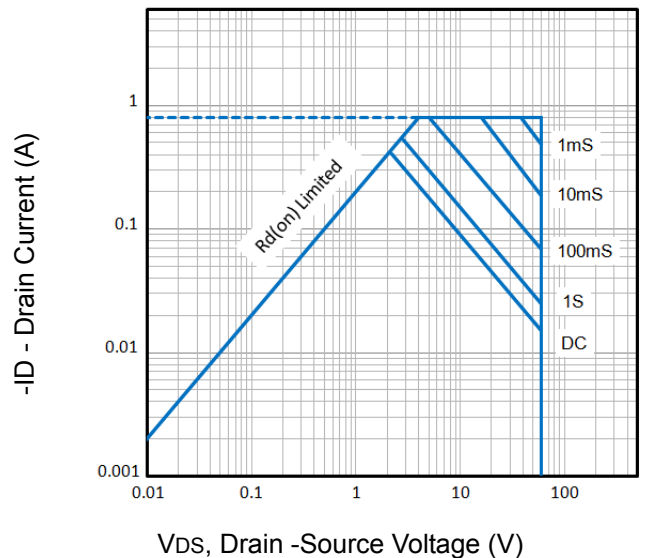


Fig6. Maximum Safe Operating Area



Typical Characteristics

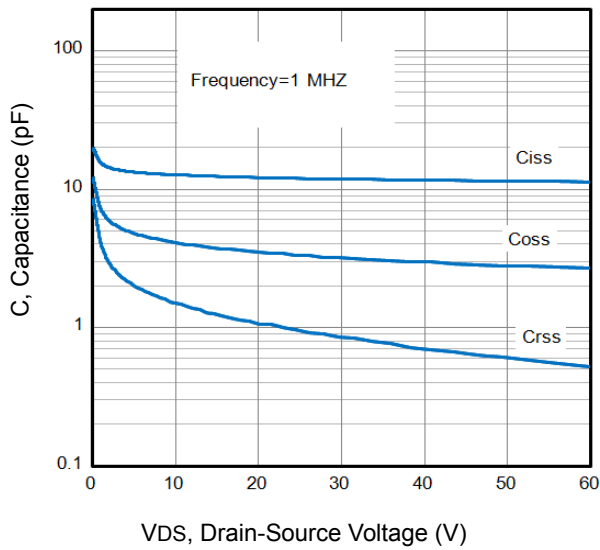


Fig7. Typical Capacitance Vs. Drain-Source Voltage

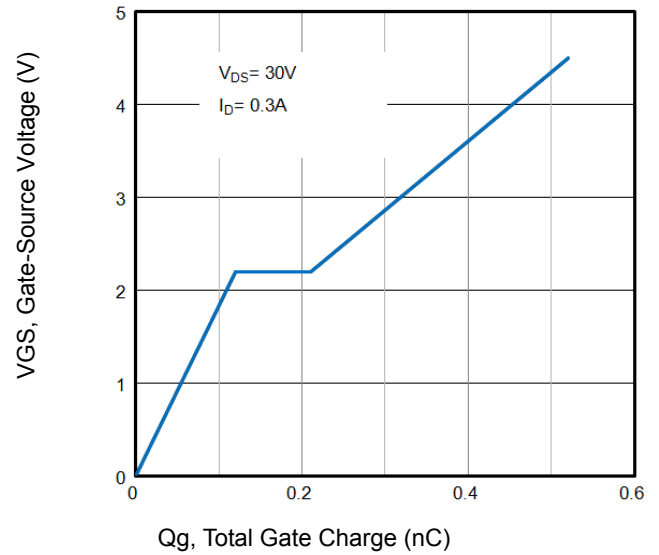


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

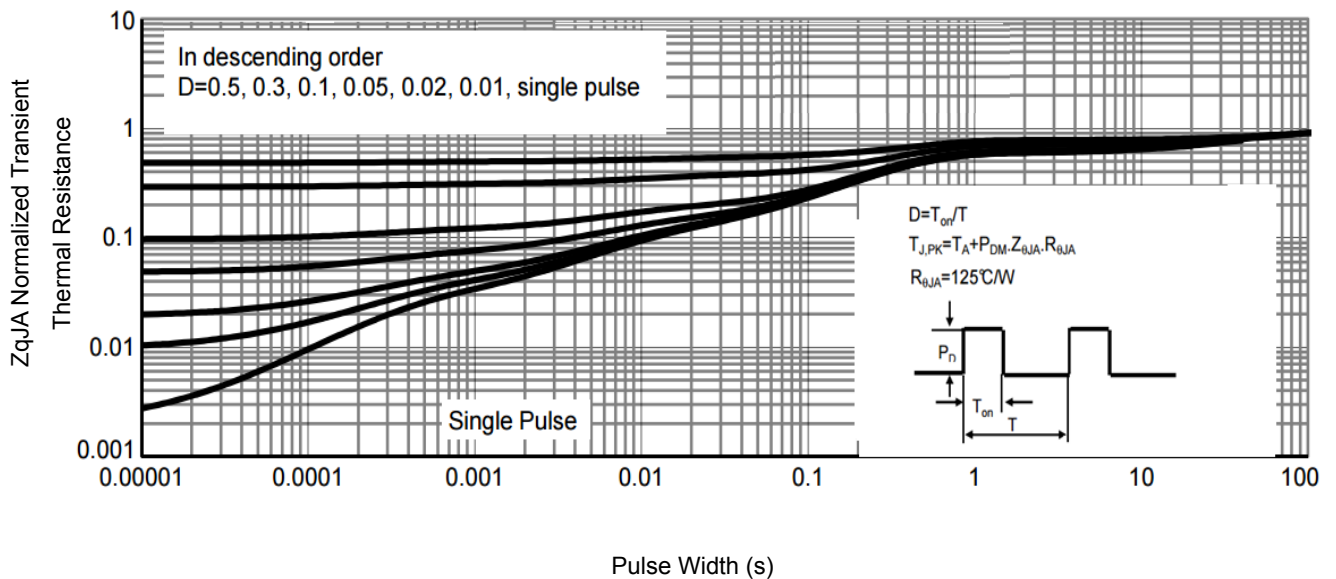


Fig9. Normalized Maximum Transient Thermal Impedance

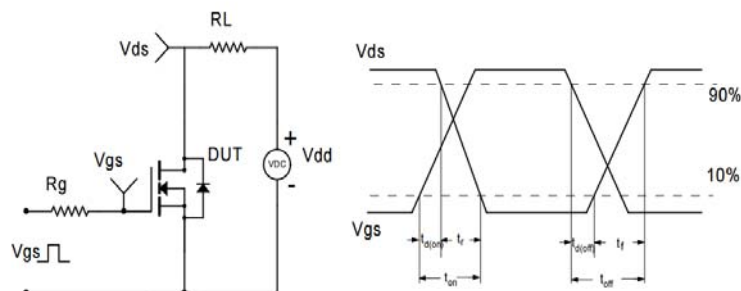
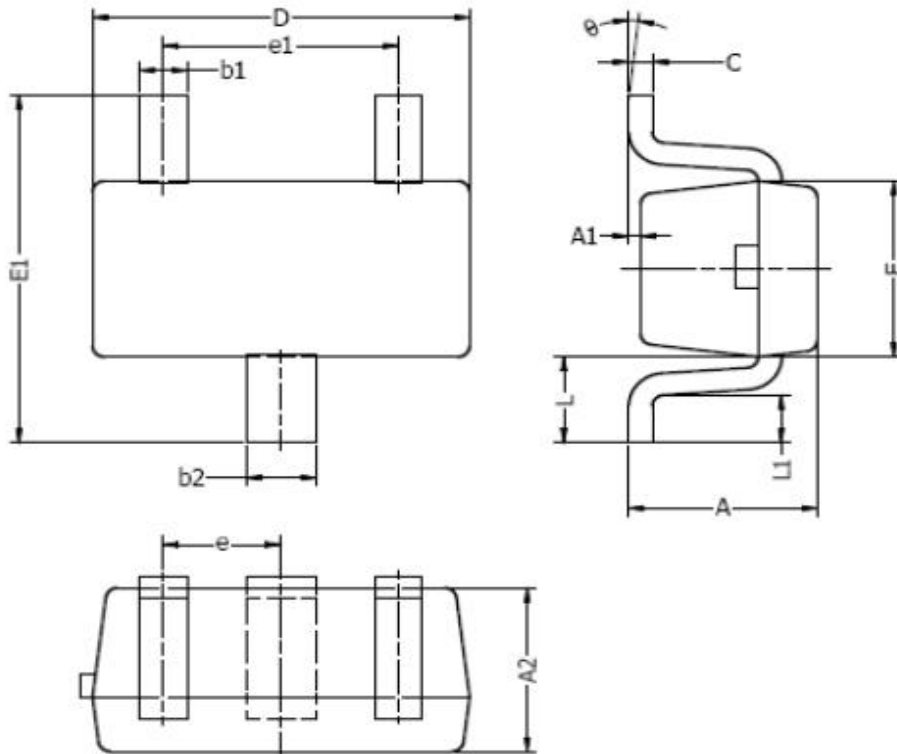


Fig10. Switching Time Test Circuit and waveforms



Package Mechanical Data-SOT-523-3L



| DIM | MILLIMETERS | | INCHES | |
|-------|-------------|------|------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.70 | 0.90 | 0.028 | 0.035 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.70 | 0.80 | 0.028 | 0.031 |
| b1 | 0.15 | 0.25 | 0.006 | 0.010 |
| b2 | 0.25 | 0.35 | 0.010 | 0.014 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.50 | 1.70 | 0.059 | 0.067 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| E1 | 1.45 | 1.75 | 0.057 | 0.069 |
| e | 0.50 TYP. | | 0.020 TYP. | |
| e1 | 0.90 | 1.10 | 0.035 | 0.043 |
| L | 0.40 REF. | | 0.016 REF. | |
| L1 | 0.10 | 0.30 | 0.004 | 0.012 |
| theta | 0° | 8° | 0° | 8° |

NOTES:
 1. Above package outline conforms to JEITA EAJ ED-7500A SC-75A.
 2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.



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