



ESD



TVS



TSS



MOV



GDT



PLED

BSS138LT1G-MS
Product specification

Features

- 55V,0.3A, RDS(ON) =1.2Ω@VGS=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded
- ESD protected up to 2KV

Applications

- Motor Drive
- Power Tools
- LED Lighting

| BVDSS | RDS _{ON} | ID |
|-------|-------------------|------|
| 55V | 1.2Ω | 0.3A |

Reference News

| PACKAGE OUTLINE | N-Channel MOSFET | Marking |
|-----------------|------------------|---------|
| SOT-23 | | |

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|------------------|---|------------|-------|
| V _{DS} | Drain-Source Voltage | 55 | V |
| V _{GS} | Gate-Source Voltage | ±20 | V |
| I _D | Drain Current – Continuous (T _A =25°C) | 0.3 | A |
| | Drain Current – Continuous (T _A =70°C) | 0.16 | A |
| I _{DM} | Drain Current – Pulsed ¹ | 0.8 | A |
| P _D | Power Dissipation (T _A =25°C) | 0.35 | W |
| | Power Dissipation – Derate above 25°C | 0.003 | W/°C |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C |
| T _J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance Junction to ambient | --- | 357 | °C/W |

Electrical Characteristics (T_J=25 °C, unless otherwise noted)
Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------|--------------------------------|--|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 55 | --- | --- | V |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =55V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =40V, V _{GS} =0V, T _J =125°C | --- | --- | 100 | uA |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} = ±20V, V _{DS} =0V | --- | --- | ±10 | uA |

On Characteristics

| | | | | | | |
|-------------------|-----------------------------------|--|-----|-----|-----|---|
| R _{DSON} | Static Drain-Source On-Resistance | V _{GS} = 10V, I _D =0.2A | --- | 1.2 | 1.5 | Ω |
| | | V _{GS} =4.5V, I _D =0.1A | --- | 1.5 | 2.5 | Ω |
| V _{Gsth} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250uA | 0.8 | 1.1 | 1.5 | V |
| g _{fs} | Forward Transconductance | V _{DS} = 10V, I _D =0.2A | --- | 0.5 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|---------------------|-------------------------------------|--|-----|------|-----|----|
| Q _g | Total Gate Charge ^{2, 3} | V _{DS} =30V, V _{GS} =10V, I _D =0.2A | --- | 3.7 | --- | nC |
| Q _{gs} | Gate-Source Charge ^{2, 3} | | --- | 0.9 | --- | |
| Q _{gd} | Gate-Drain Charge ^{2, 3} | | --- | 0.4 | --- | |
| T _{d(on)} | Turn-On Delay Time ^{2, 3} | V _{DD} =30V, V _{GS} =10V, R _G =6Ω I _D =0.2A | --- | 3 | --- | ns |
| T _r | Rise Time ^{2, 3} | | --- | 5 | --- | |
| T _{d(off)} | Turn-Off Delay Time ^{2, 3} | | --- | 14 | --- | |
| T _f | Fall Time ^{2, 3} | | --- | 9 | --- | |
| C _{iss} | Input Capacitance | V _{DS} =30V, V _{GS} =0V, F=1MHz | --- | 25.5 | --- | pF |
| C _{oss} | Output Capacitance | | --- | 17 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 7.8 | --- | |

Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|---|------|------|------|------|
| I _s | Continuous Source Current | V _G =V _D =0V, Force Current | --- | --- | 0.3 | A |
| I _{SM} | Pulsed Source Current | | --- | --- | 0.6 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _s =0.2A, T _J =25°C | --- | --- | 1.4 | V |
| t _{rr} | Reverse Recovery Time | V _R =50V, I _s =0.2A | --- | 3.4 | --- | ns |
| Q _{rr} | Reverse Recovery Charge | dl/dt= 100A/μs, T _J =25°C | --- | 0.7 | --- | nC |

Note :

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

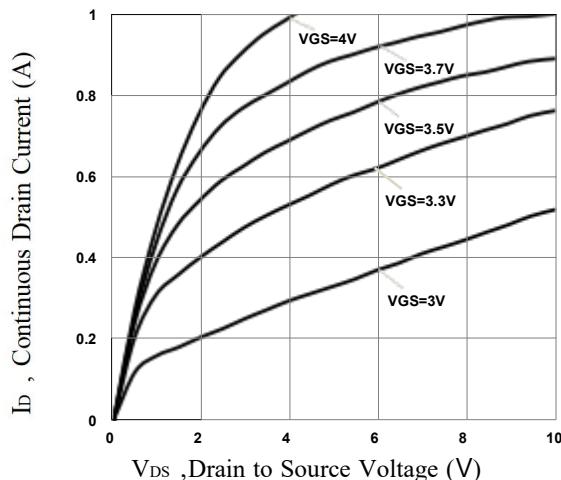


Fig. 1 Typical Output Characteristics

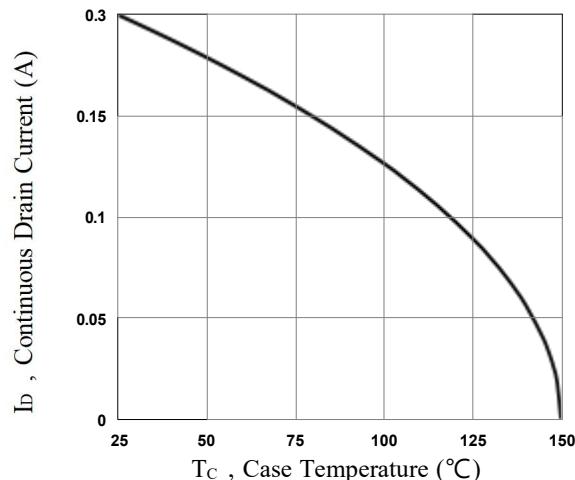


Fig. 2 Continuous Drain Current vs. T_c

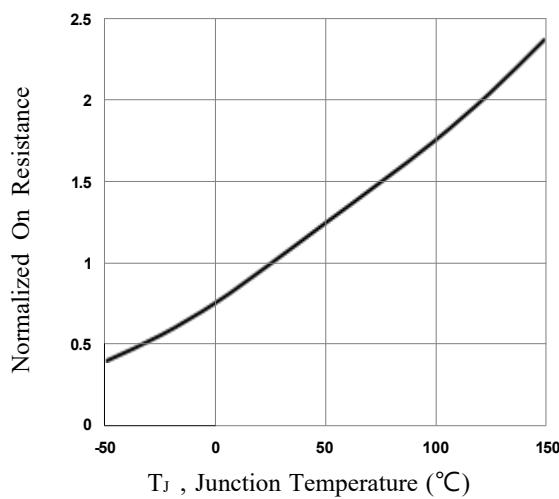


Fig. 3 Normalized $R_{DS(ON)}$ vs. T_j

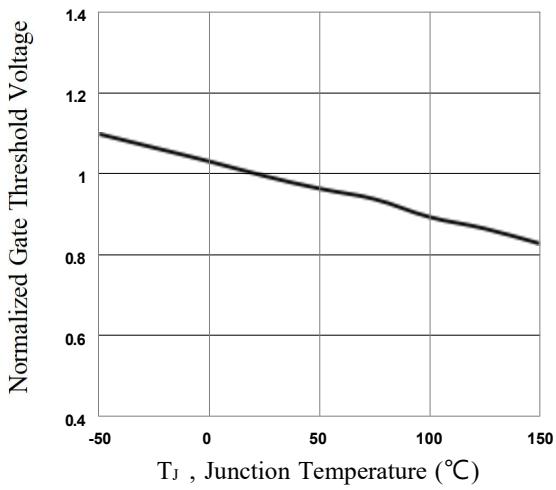


Fig. 4 Normalized V_{th} vs. T_j

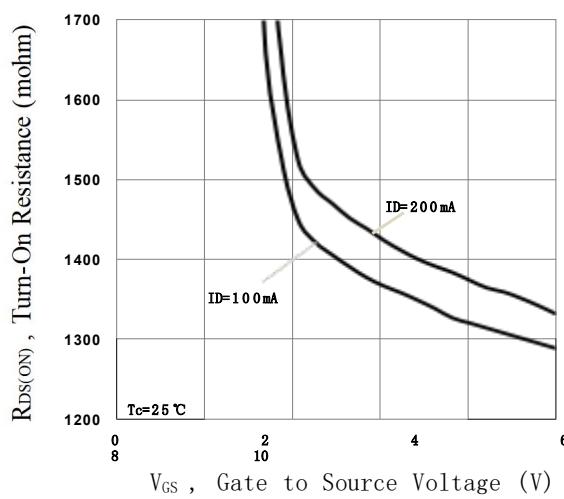


Fig. 5 Turn-On Resistance vs. V_{GS}

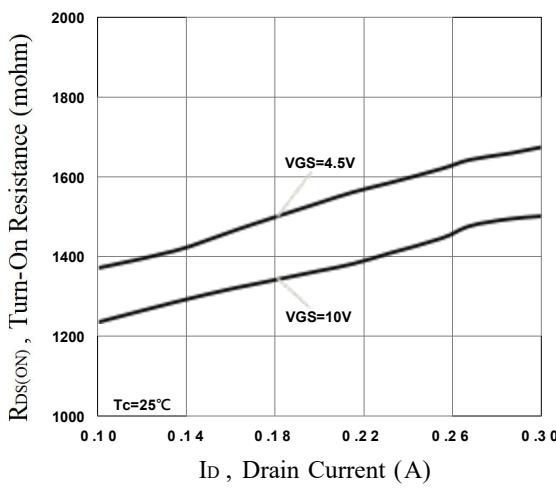


Fig. 6 Turn-On Resistance vs. I_D

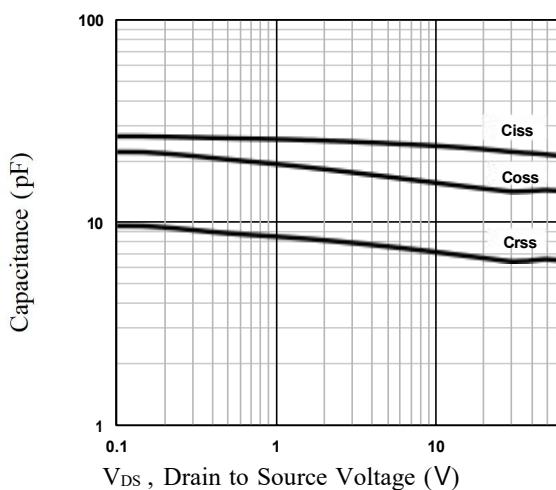


Fig. 7 Capacitance Characteristics

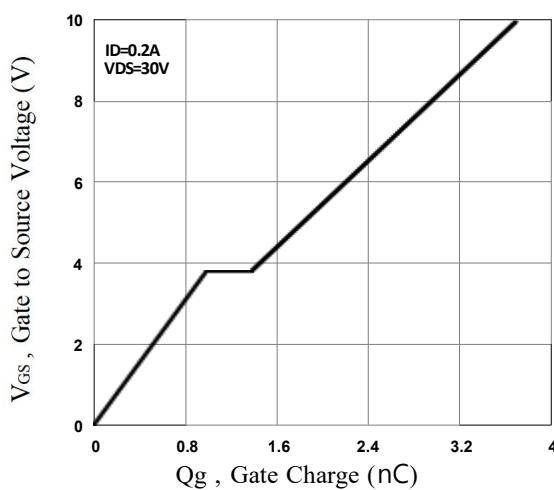


Fig. 8 Gate Charge Characteristics

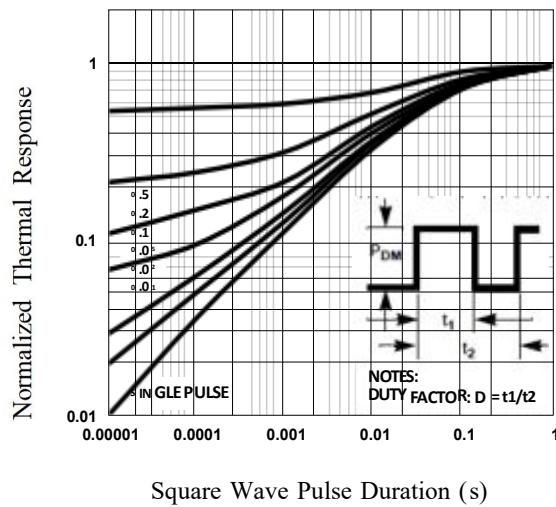


Fig. 9 Normalized Transient

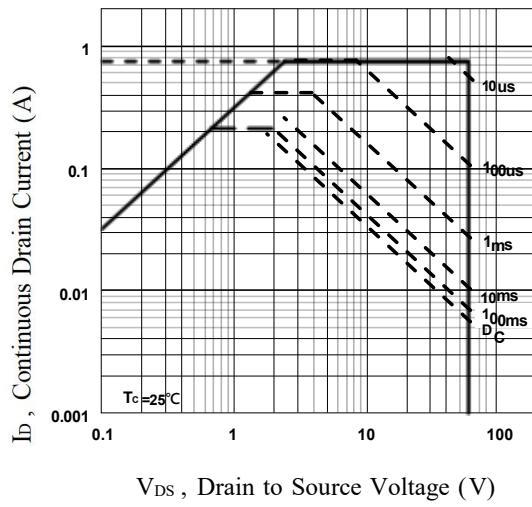
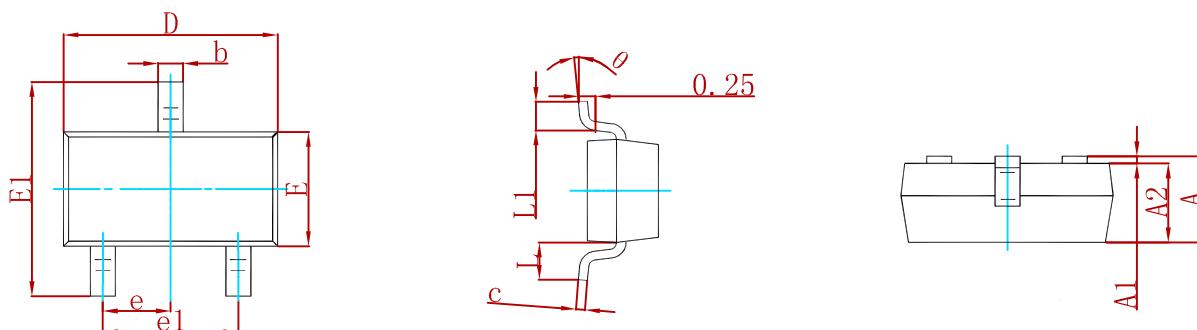


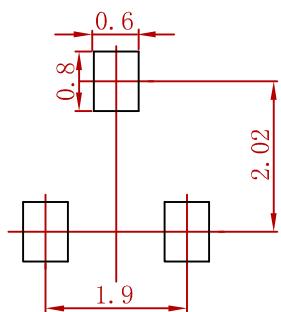
Fig. 10 Maximum Safe Operation Area

PACKAGE MECHANICAL DATA



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| 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 | 0° | 8° | 0° | 8° |

Suggested Pad Layout



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.05 mm.
 3. The pad layout is for reference purposes only.

REELSPECIFICATION

| P/N | PKG | QTY |
|---------------|--------|------|
| BSS138LT1G-MS | SOT-23 | 3000 |

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