

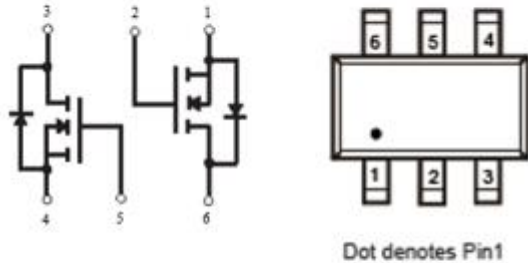
N-Channel Enhancement Mode Field Effect Transistor

Product Summary

- V_{DS} 50V
- I_D 340mA
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <2.5ohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <3.0ohm

General Description

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage



SOT-363

Applications

- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

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

| Parameter | Symbol | Limit | Unit |
|--|-----------------|---------------------------------------|---------------------------|
| Drain-source Voltage | V_{DS} | 50 | V |
| Gate-source Voltage | V_{GS} | ± 20 | V |
| Drain Current | I_D | $T_A=25^\circ\text{C}$ @ Steady State | 340 |
| | | $T_A=70^\circ\text{C}$ @ Steady State | 272 |
| Pulsed Drain Current ^A | I_{DM} | 1.5 | A |
| Total Power Dissipation @ $T_A=25^\circ\text{C}$ | P_D | 350 | mW |
| Thermal Resistance Junction-to-Ambient @ Steady State ^B | $R_{\theta JA}$ | 357 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | $^\circ\text{C}$ |

■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| BSS138DW | F2 | SS | 3000 | 30000 | 120000 | 7" reel |



BSS138DW

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

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|--|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D =250μA | 50 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =50V, V _{GS} =0V | | | 1 | μA |
| Gate-Body Leakage Current | I _{GSS1} | V _{GS} = ±20V, V _{DS} =0V | | | ±100 | nA |
| | I _{GSS2} | V _{GS} = ±10V, V _{DS} =0V | | | ±50 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =250μA | 0.8 | 1.2 | 1.6 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} = 10V, I _D =300mA | | 1.1 | 2.5 | Ω |
| | | V _{GS} = 4.5V, I _D =200mA | | 1.2 | 3.0 | |
| Diode Forward Voltage | V _{SD} | I _S =300mA, V _{GS} =0V | | | 1.2 | V |
| Maximum Body-Diode Continuous Current | I _S | | | | 340 | mA |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1MHZ | | 28.5 | | pF |
| Output Capacitance | C _{oss} | | | 2.7 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 1.78 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =10V, V _{DS} =25V, I _D =0.3A | | 1.7 | | nC |
| Gate-Source Charge | Q _{gs} | | | 0.4 | | |
| Gate-Drain Charge | Q _{gd} | | | 0.24 | | |
| Reverse Recovery Charge | Q _{rr} | I _F =0.3A, di/dt=-100A/us | | 2.65 | | ns |
| Reverse Recovery Time | t _{rr} | | | 12.2 | | |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DD} =25V, I _D =300mA, R _{GEN} =6Ω | | 2.6 | | ns |
| Turn-on Rise Time | t _r | | | 18.8 | | |
| Turn-off Delay Time | t _{D(off)} | | | 9.7 | | |
| Turn-off fall Time | t _f | | | 47 | | |

A. Pulse Test: Pulse Width ≤300us, Duty cycle ≤2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.



■ Typical Performance Characteristics

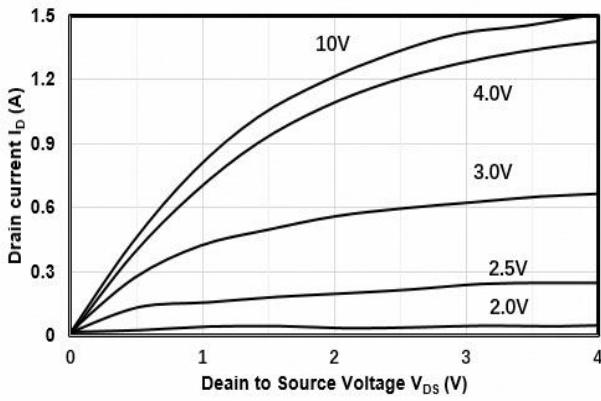


Figure1. Output Characteristics

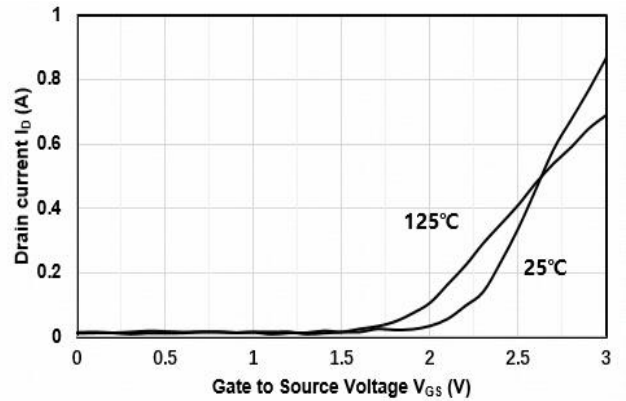


Figure2. Transfer Characteristics

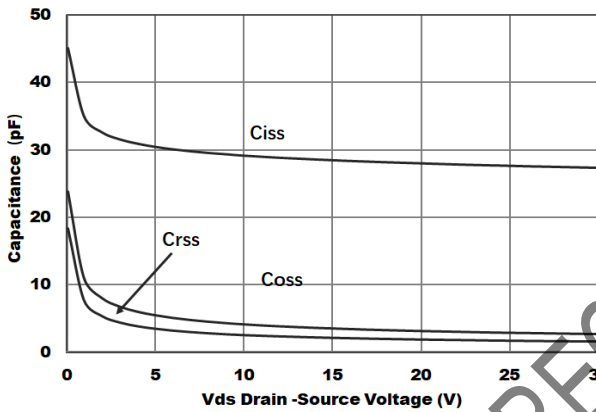


Figure3. Capacitance Characteristics

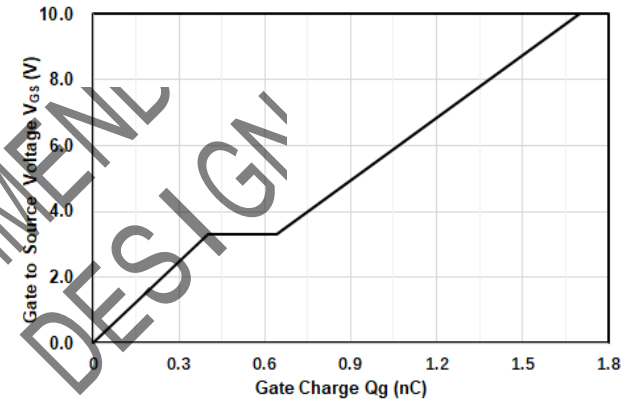


Figure4. Gate Charge

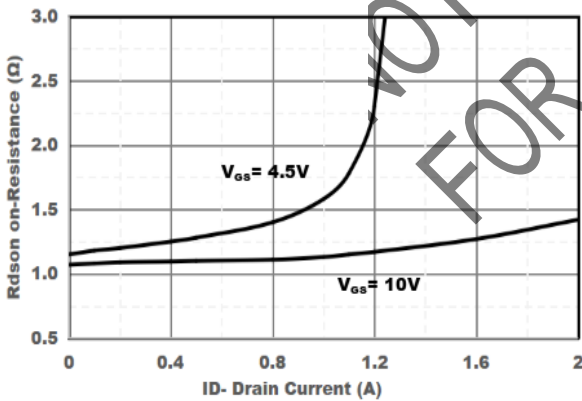


Figure5. Drain-Source on Resistance

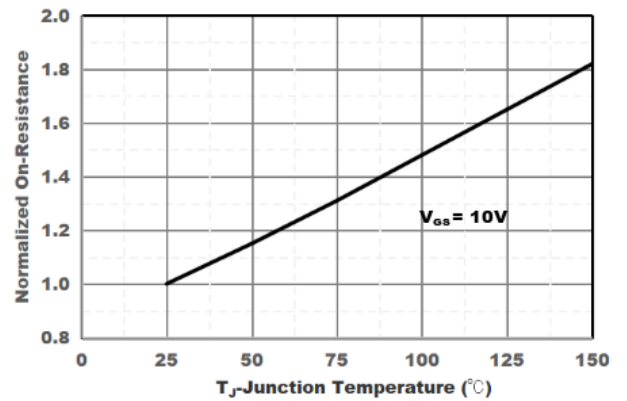


Figure6. Drain-Source on Resistance



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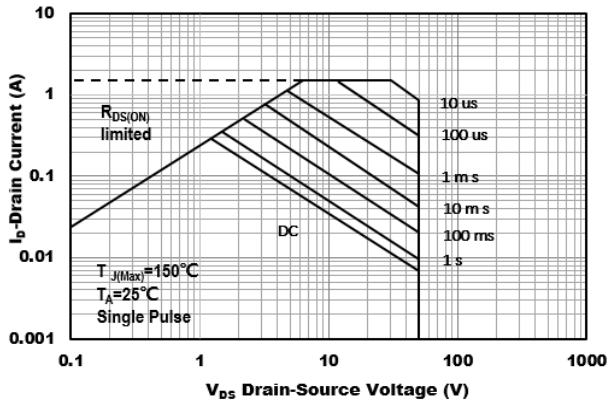


Figure7. Safe Operation Area

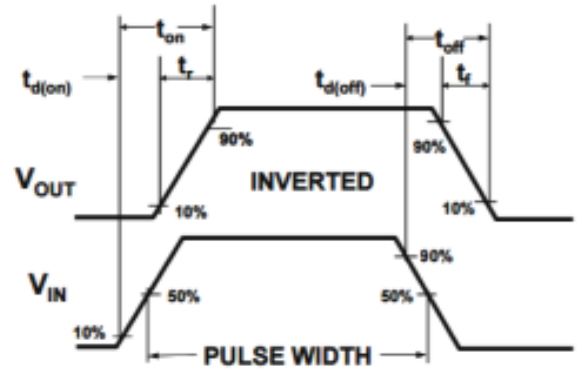
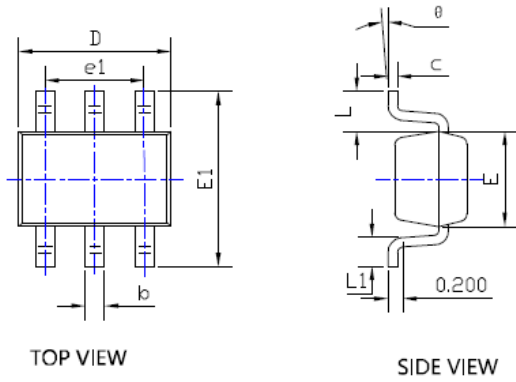


Figure8. Switching wave

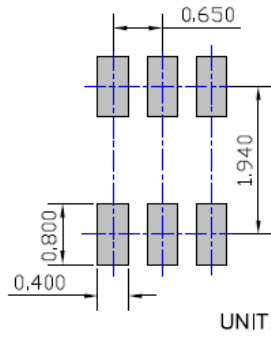
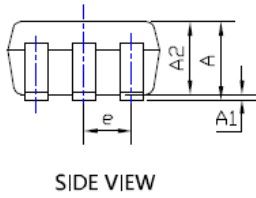
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■ SOT-363 Package information



| SYMBOL | DIMENSIONS | | | | | |
|--------|------------|-------|-------|------------|-------|-------|
| | INCHES | | | MILLimeter | | |
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | 0.035 | --- | 0.043 | 0.900 | --- | 1.100 |
| A1 | 0.000 | --- | 0.004 | 0.000 | --- | 0.100 |
| A2 | 0.035 | 0.037 | 0.039 | 0.900 | 0.950 | 1.000 |
| b | 0.006 | 0.010 | 0.014 | 0.150 | 0.250 | 0.350 |
| c | 0.004 | --- | 0.010 | 0.100 | --- | 0.250 |
| D | 0.071 | 0.079 | 0.087 | 1.800 | 2.000 | 2.200 |
| E | 0.045 | 0.049 | 0.053 | 1.150 | 1.250 | 1.350 |
| E1 | 0.085 | 0.091 | 0.096 | 2.150 | 2.300 | 2.450 |
| e | 0.026 TYP | | | 0.650 TYP | | |
| e1 | 0.047 | 0.051 | 0.055 | 1.200 | 1.300 | 1.400 |
| L | 0.021 REF | | | 0.525 REF | | |
| L1 | 0.010 | 0.014 | 0.018 | 0.260 | 0.360 | 0.460 |
| theta | 0° | --- | 8° | 0° | --- | 8° |



UNIT: mm

SUGGESTED SOLDER PAD LAYOUT

NOTE:
 1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
 2. TOLERANCE: 0.1mm UNLESS OTHERWISE SPECIFIED.
 3. THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.

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