

# LBSS138DW1T1G

Power MOSFET

200 mA, 50V N-Channel SC-88

## 1. FEATURES

- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- Low threshold voltage ( $V_{GS(th)}$ : 0.5V...1.5V) makes it ideal for low voltage applications.

## 2. DEVICE MARKING AND ORDERING INFORMATION

| Device        | Marking | Shipping        |
|---------------|---------|-----------------|
| LBSS138DW1T1G | J1      | 3000/Tape&Reel  |
| LBSS138DW1T3G | J1      | 13000/Tape&Reel |

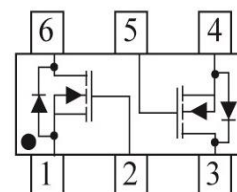
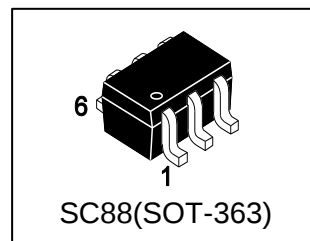
## 3. MAXIMUM RATINGS( $T_a = 25^{\circ}\text{C}$ )

| Parameter                                                    | Symbol | Limits          | Unit               |
|--------------------------------------------------------------|--------|-----------------|--------------------|
| Drain-Source Voltage                                         | VDSS   | 50              | V                  |
| Gate-to-Source Voltage – Continuous                          | VGS    | $\pm 20$        | V                  |
| Drain Current                                                |        |                 | mA                 |
| – Continuous $T_a = 25^{\circ}\text{C}$                      | ID     | 200             |                    |
| – Pulsed ( $t_p \leq 10\mu\text{s}$ )                        | IDM    | 800             |                    |
| Junction temperature                                         | TJ     | $-55 \sim +150$ | $^{\circ}\text{C}$ |
| Storage temperature                                          | Tstg   | $-55 \sim +150$ | $^{\circ}\text{C}$ |
| Maximum Lead Temperature for Solder Purposes, for 10 seconds | TL     | 260             | $^{\circ}\text{C}$ |

## 4. THERMAL CHARACTERISTICS

| Parameter                                                       | Symbol        | Limits | Unit                        |
|-----------------------------------------------------------------|---------------|--------|-----------------------------|
| Total Device Dissipation<br>(Note 1) $T_a = 25^{\circ}\text{C}$ | PD            | 264    | mW                          |
| Derate above $25^{\circ}\text{C}$                               |               | 2.1    | mW/ $^{\circ}\text{C}$      |
| Thermal Resistance,<br>Junction-to-Ambient(Note 1)              | R $\theta$ JA | 474    | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance,<br>Junction-to-Case                         | R $\theta$ JC | 238    | $^{\circ}\text{C}/\text{W}$ |

1. 30.0mm×25.0mm×1.6mm(FR4), Copper foil thickness 35 $\mu\text{m}$ ;



## 5. ELECTRICAL CHARACTERISTICS (Ta= 25°C)

### OFF CHARACTERISTICS

| Characteristic                                                                    | Symbol | Min.   | Typ.   | Max.       | Unit |
|-----------------------------------------------------------------------------------|--------|--------|--------|------------|------|
| Drain–Source Breakdown Voltage<br>(VGS = 0, ID = 250μA)                           | VBRDSS | 50     | -      | -          | V    |
| Zero Gate Voltage Drain Current<br>(VGS = 0, VDS = 25 V)<br>(VGS = 0, VDS = 50 V) | IDSS   | -<br>- | -<br>- | 0.1<br>0.5 | μA   |
| Gate–Body Leakage Current, Forward<br>(VGS = 20 V)                                | IGSSF  | -      | -      | 0.1        | μA   |
| Gate–Body Leakage Current, Reverse<br>(VGS = - 20 V)                              | IGSSR  | -      | -      | -0.1       | μA   |

### ON CHARACTERISTICS (Note 2)

|                                                                                                                              |         |        |          |           |      |
|------------------------------------------------------------------------------------------------------------------------------|---------|--------|----------|-----------|------|
| Gate Threshold Voltage<br>(VDS = VGS, ID = 1.0mA)                                                                            | VGS(th) | 0.5    | -        | 1.5       | V    |
| Static Drain–Source On–State Resistance<br>(VGS = 2.75 V, ID < 200 mA,<br>TA = –40°C to +85°C)<br>(VGS = 5.0 V, ID = 200 mA) | RDS(on) | -<br>- | 5.6<br>- | 10<br>3.5 | Ohms |
| Forward Transconductance<br>(VDS = 25 V, ID = 200 mA, f = 1.0 kHz)                                                           | gfs     | 100    | -        | -         | mS   |

### DYNAMIC CHARACTERISTICS

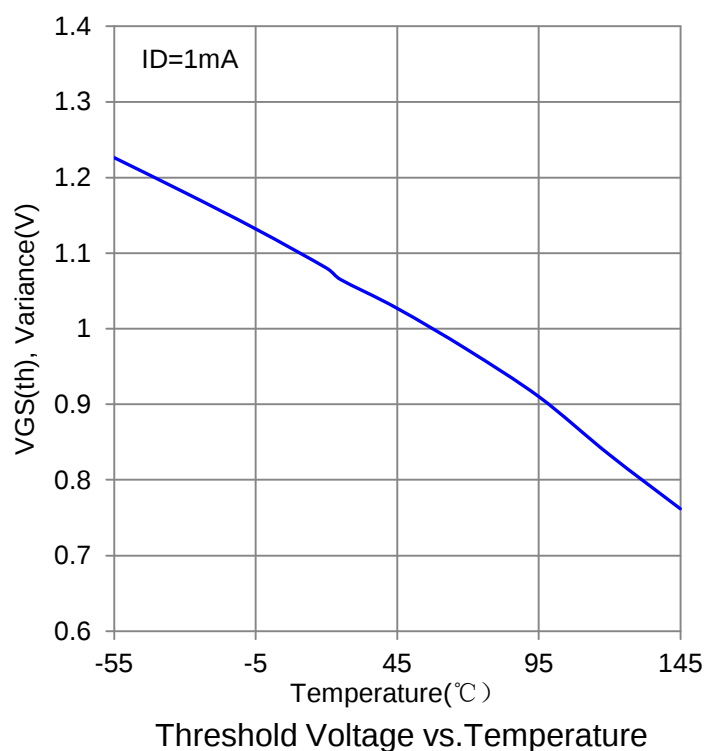
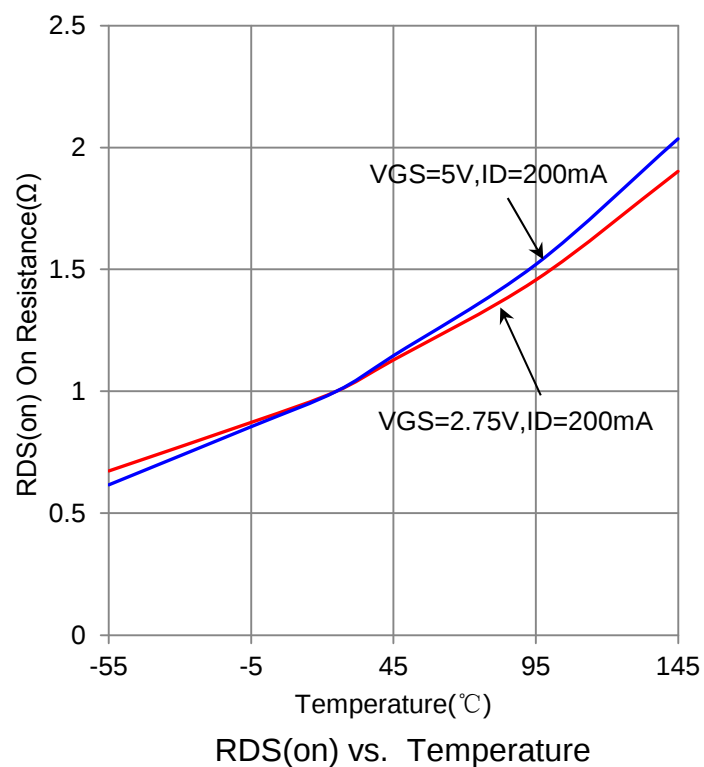
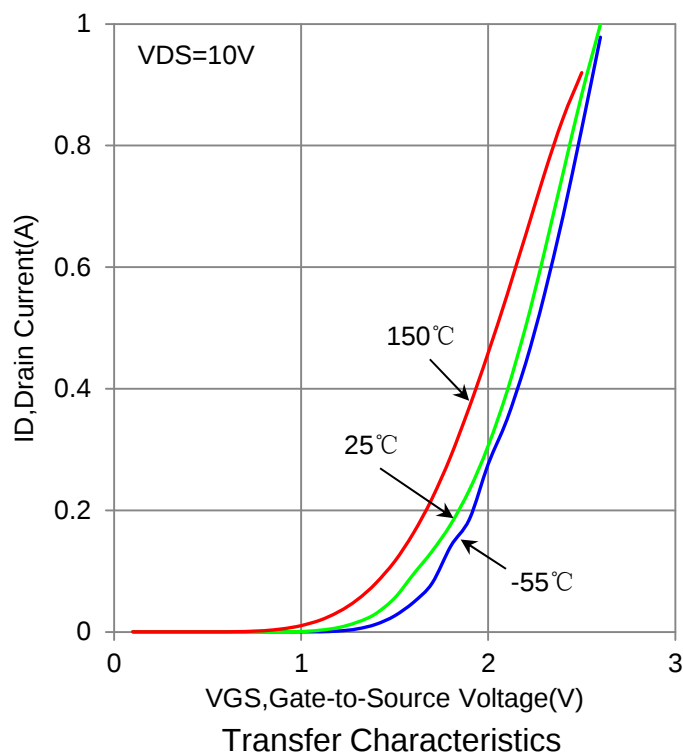
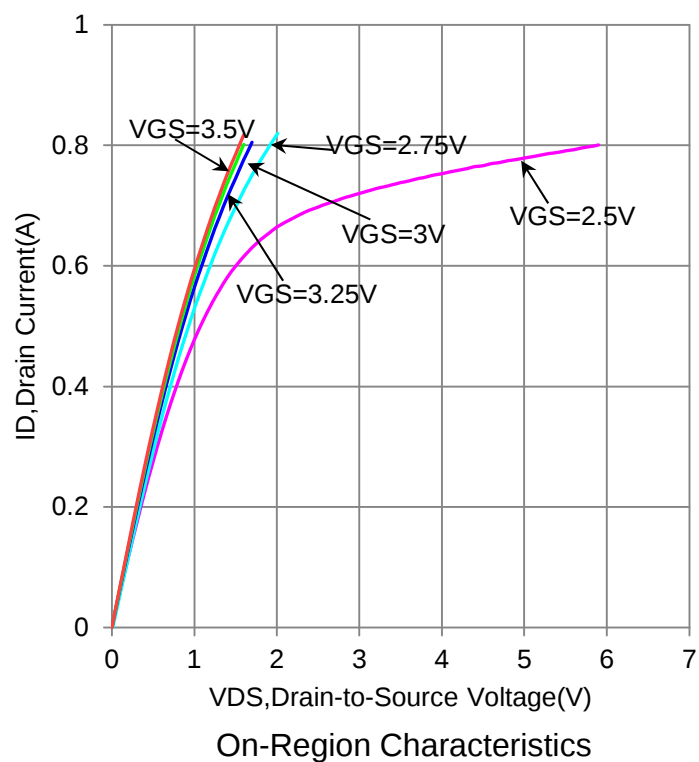
|                                                                    |      |   |     |     |    |
|--------------------------------------------------------------------|------|---|-----|-----|----|
| Input Capacitance<br>(VDS = 25 V, VGS = 0, f = 1.0 MHz)            | Ciss | - | 40  | 50  | pF |
| Output Capacitance<br>(VDS = 25 V, VGS = 0, f = 1.0 MHz)           | Coss | - | 12  | 25  | pF |
| Reverse Transfer Capacitance<br>(VDS = 25 V, VGS = 0, f = 1.0 MHz) | Ciss | - | 3.5 | 5.0 | pF |

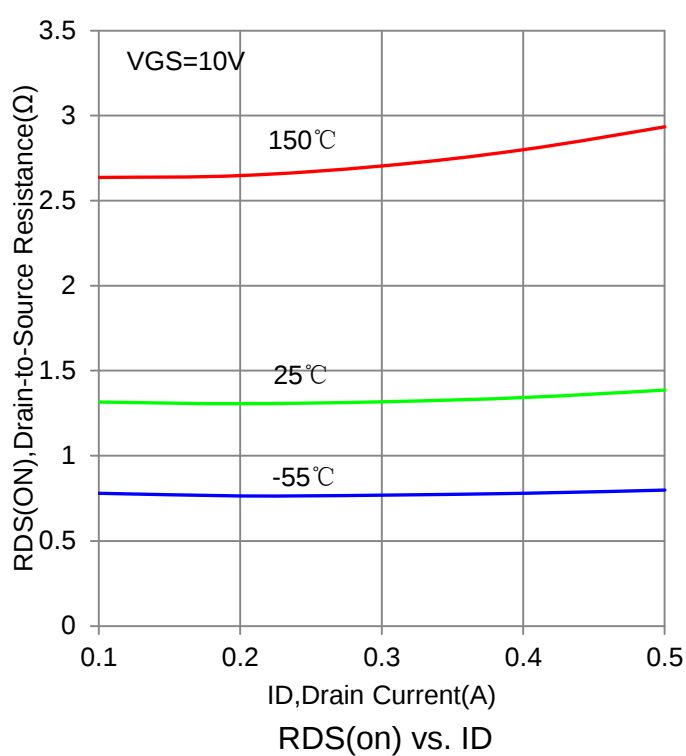
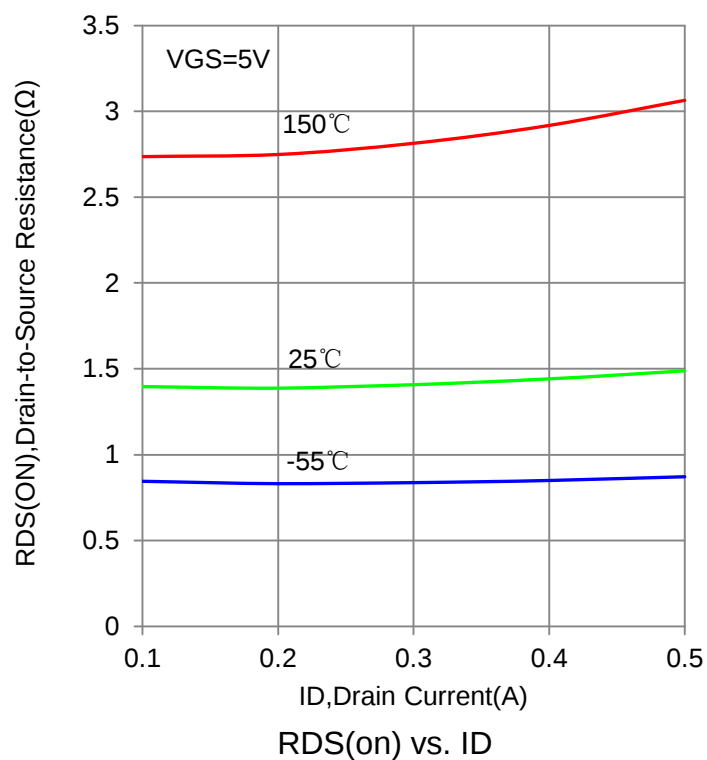
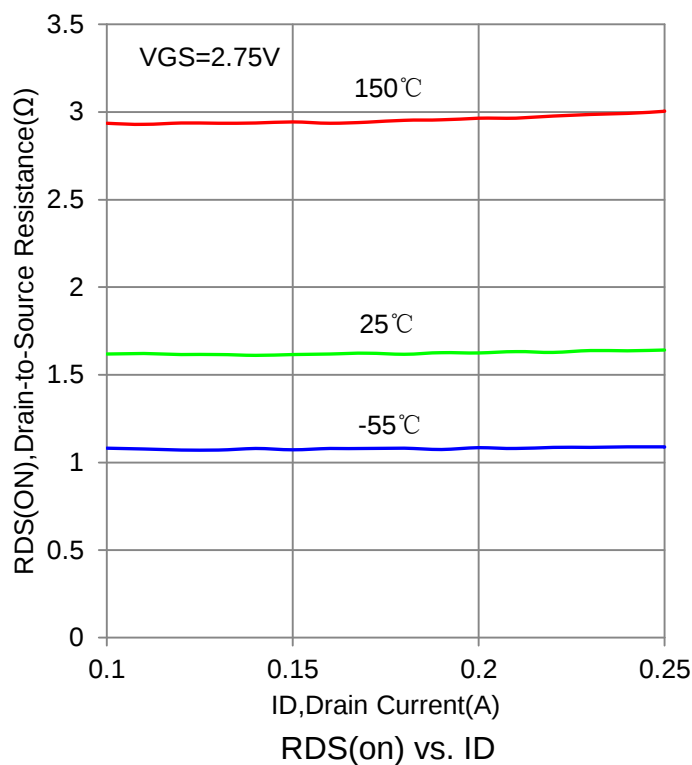
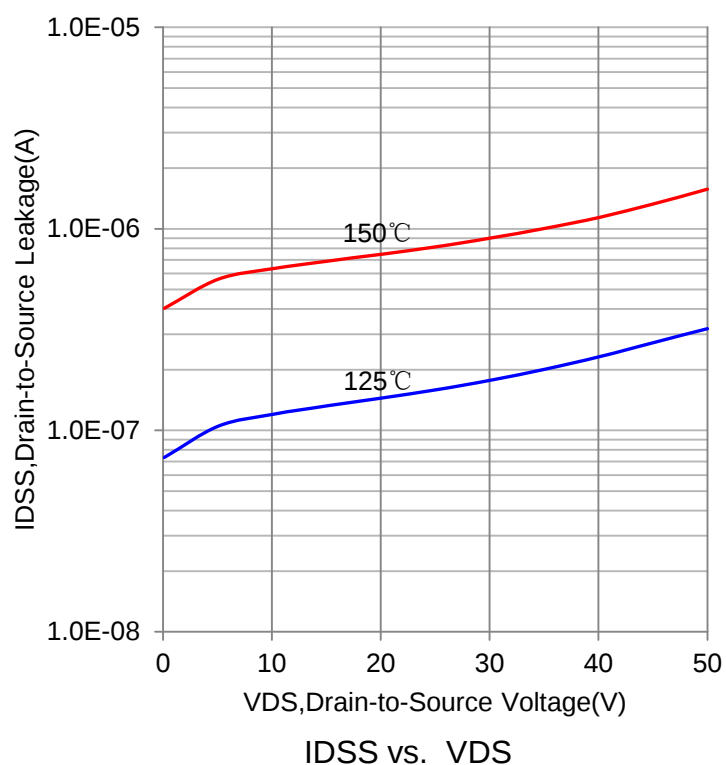
### SWITCHING CHARACTERISTICS

|                     |                           |         |   |   |    |    |
|---------------------|---------------------------|---------|---|---|----|----|
| Turn-On Delay Time  | (VDD = 30 V , ID =200 mA) | td(on)  | - | - | 20 | ns |
| Turn-Off Delay Time |                           | td(off) | - | - | 20 |    |

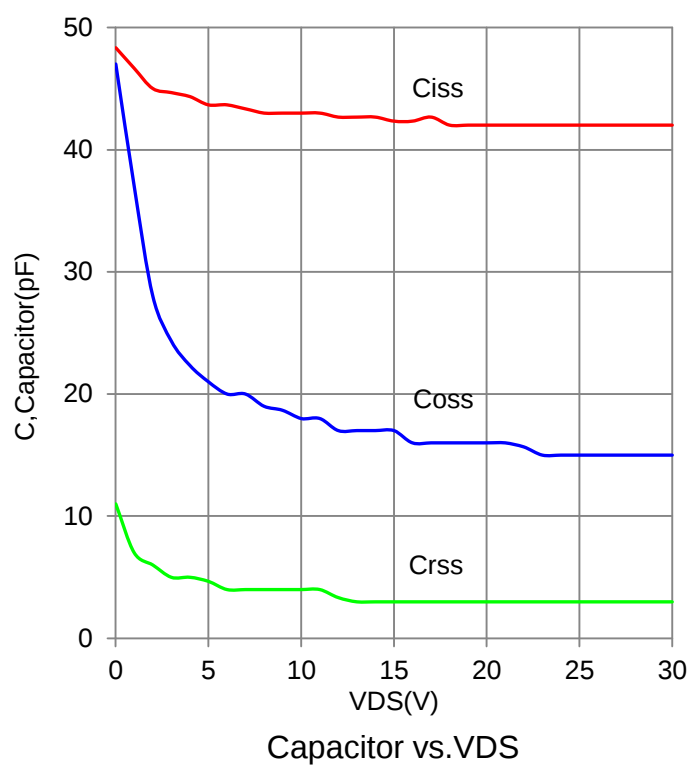
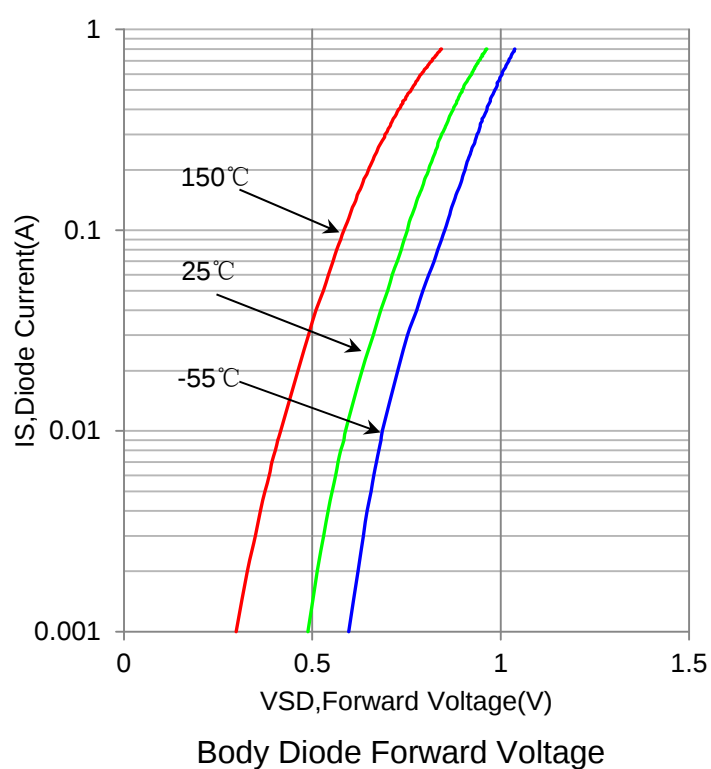
2.Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

## 6. ELECTRICAL CHARACTERISTICS CURVES



**6.ELECTRICAL CHARACTERISTICS CURVES(Con.)**


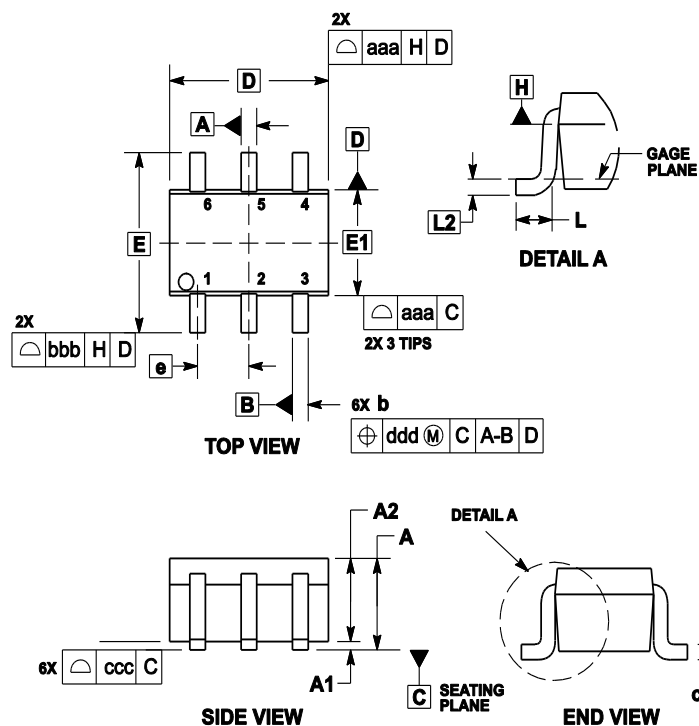
## 6.ELECTRICAL CHARACTERISTICS CURVES(Con.)



## 7.OUTLINE AND DIMENSIONS

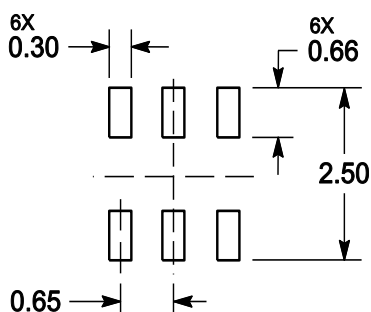
Notes:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.



| DIM | MILLIMETERS |      |      | INCHES    |       |       |
|-----|-------------|------|------|-----------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN       | NOM   | MAX   |
| A   | ---         | ---  | 1.10 | ---       | ---   | 0.043 |
| A1  | 0.00        | ---  | 0.10 | 0         | ---   | 0.004 |
| A2  | 0.70        | 0.90 | 1.00 | 0.027     | 0.035 | 0.039 |
| b   | 0.15        | 0.20 | 0.25 | 0.006     | 0.008 | 0.01  |
| C   | 0.08        | 0.15 | 0.22 | 0.003     | 0.006 | 0.009 |
| D   | 1.80        | 2.00 | 2.20 | 0.07      | 0.078 | 0.086 |
| E   | 2.00        | 2.10 | 2.20 | 0.078     | 0.082 | 0.086 |
| E1  | 1.15        | 1.25 | 1.35 | 0.045     | 0.049 | 0.053 |
| e   | 0.65 BSC    |      |      | 0.026 BSC |       |       |
| L   | 0.26        | 0.36 | 0.46 | 0.010     | 0.014 | 0.018 |
| L2  | 0.15 BSC    |      |      | 0.006 BSC |       |       |
| aaa | 0.15        |      |      | 0.01      |       |       |
| bbb | 0.30        |      |      | 0.01      |       |       |
| ccc | 0.10        |      |      | 0.00      |       |       |
| ddd | 0.10        |      |      | 0.00      |       |       |

## 8.SOLDERING FOOTPRINT



## **DISCLAIMER**

- Curve guarantee in the specification. The curve of test items with electric parameter is used as quality guarantee. The curve of test items without electric parameter is used as reference only.
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