

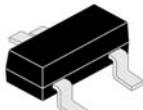


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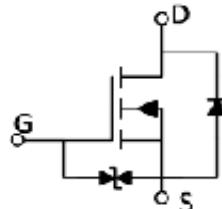
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## N-Channel MOSFET



SOT-23



**BSS138T**

**SOT-23**  
**Leaded Plastic Package**  
**RoHS compliant**

### FEATURES:

1. Low On-Resistance
2. Low Gate Threshold Voltage
3. Low Input Capacitance
4. Fast Switching Speed
5. Low Input/output Leakage
6. Totally Lead-Free & Fully RoHS Compliant
7. Halogen and Antimony Free. "Green" Device
8. ESD protected up to 2KV

### APPLICATION:

1. Power Management
2. LED Display
3. DC-DC System
4. LCD Panel

### ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Drain-Source voltage	V <sub>DSS</sub>	50	V
Drain-Gate Voltage R <sub>GS</sub> ≤ 20KΩ	V <sub>DGR</sub>	50	V
Gate-Source Voltage Continuous	V <sub>GSS</sub>	±20	V
Gate-Source Voltage Non-Repetitive, Pulse Width<50μs		±40	V
Continuous Drain Current	I <sub>D</sub>	0.2	A
Pulsed Drain Current (10μs Pulse Duty Cycle = 1%)	I <sub>DM</sub>	1	A

### Thermal Characteristics

Power Dissipation	P <sub>D</sub>	300	mW
Thermal Resistance from Junction to Ambient	R <sub>θJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

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## ELECTRICAL CHARACTERISTICS at (Ta = 25 °C Unless otherwise specified)

### Off Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA	50	75	--	V
Gate-body Leakage current	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	--	--	±5	µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V	--	--	0.5	µA
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA	0.5	1.2	1.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.22A	--	1.4	3.5	Ω
Forward Trans conductance	g <sub>fs</sub>	V <sub>DS</sub> = 25V, I <sub>D</sub> = 0.2A, f = 1.0KHz	100	--	--	mS
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 10V f = 1.0MHz	--	40	--	pF
Output Capacitance	C <sub>oss</sub>		--	25	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	8	--	
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> = 0.2A, R <sub>GEN</sub> = 50Ω	--	--	5	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		--	--	36	

## TYPICAL CHARACTERISTICS CURVES

Fig 1: Drain-Source Current vs Drain-Source Voltage

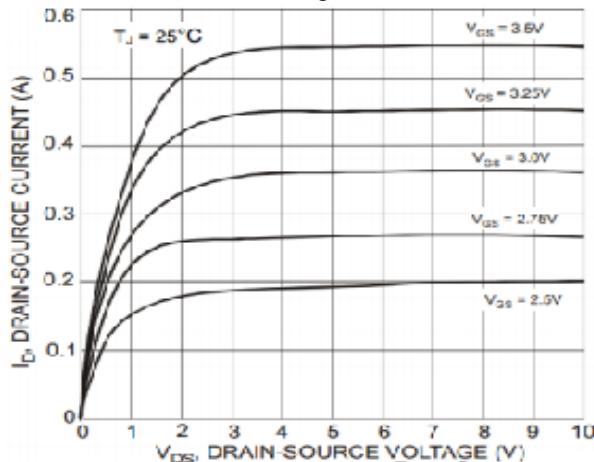


Fig 3: Drain-Source On-Resistance vs Junction Temperature

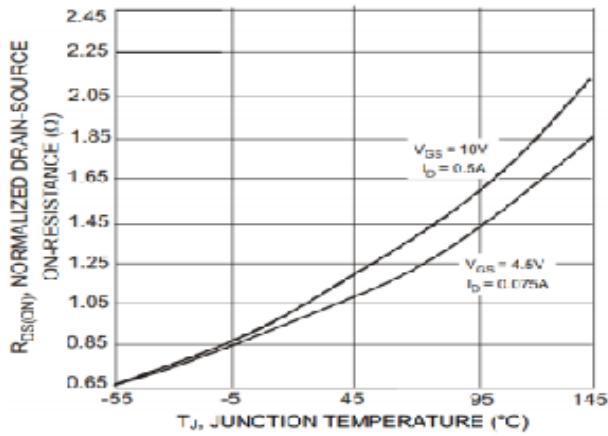


Fig 5: Drain-Source On-Resistance vs Drain Current

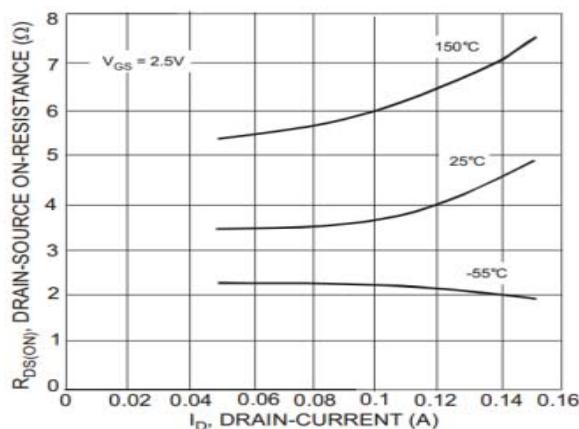


Fig 2: Transfer Characteristics

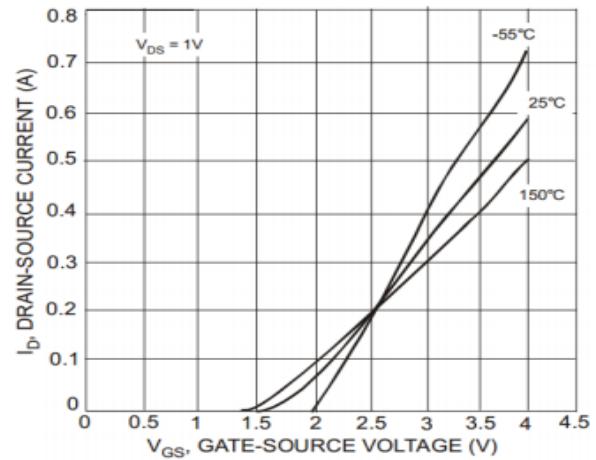


Fig 4: Gate Threshold vs Junction Temperature

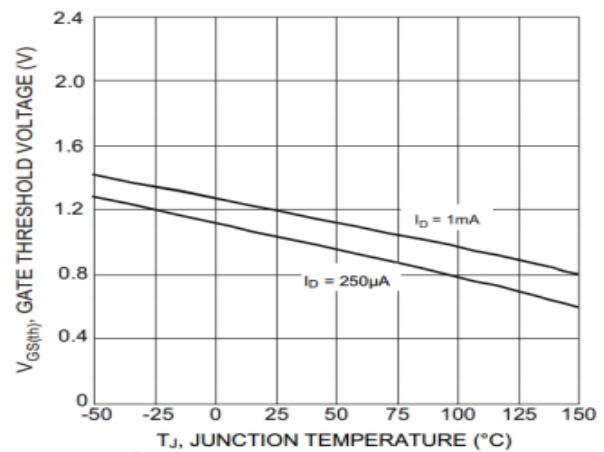
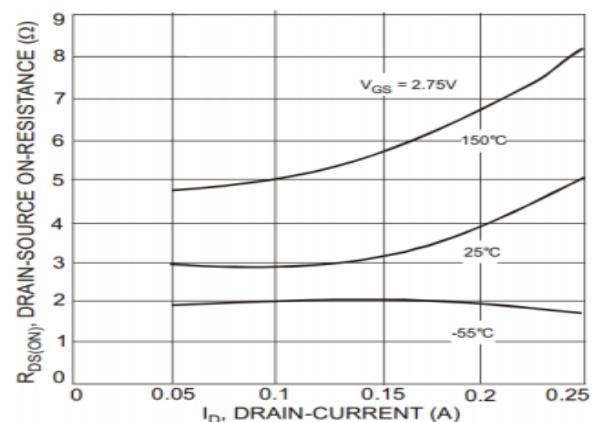


Fig 6: Drain-Source On-Resistance vs Drain Current



## TYPICAL CHARACTERISTICS CURVES

Fig 7: Drain-Source On-Resistance vs Drain Current

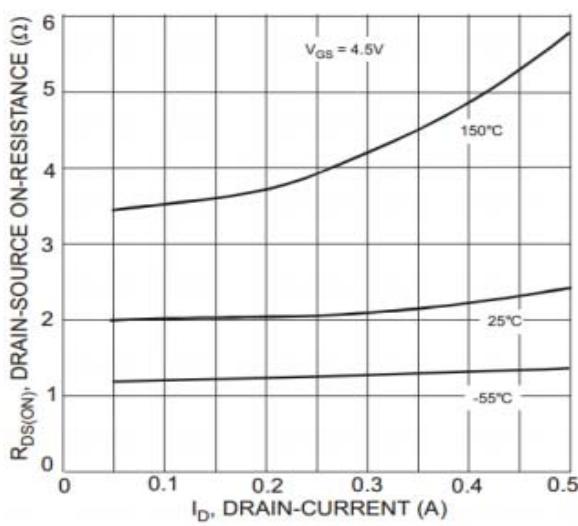


Fig 8: Drain-Source On-Resistance vs Drain Current

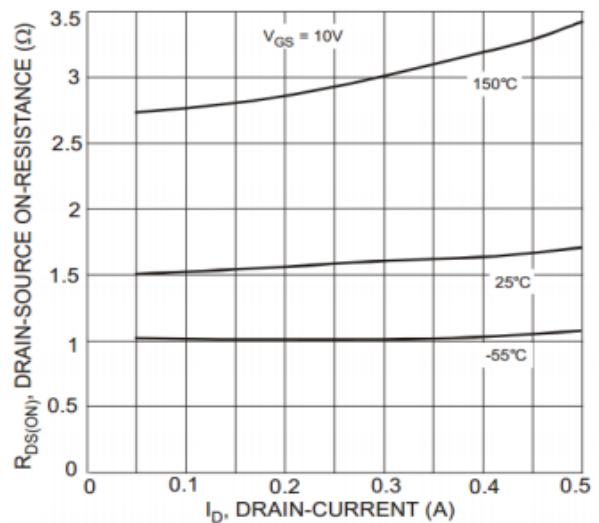


Fig 9: Body Diode Current vs Body Diode Voltage

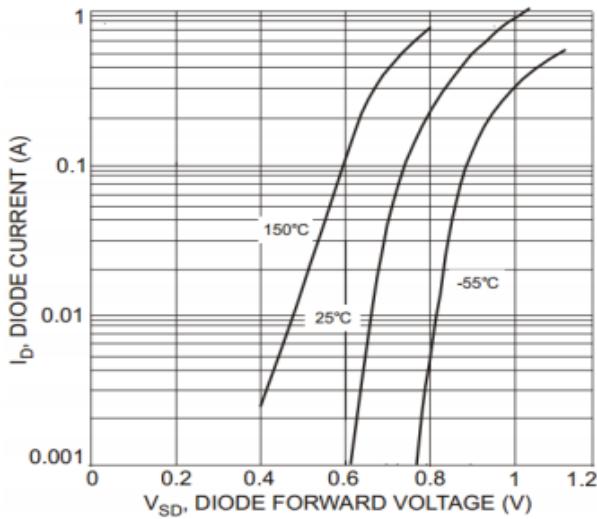
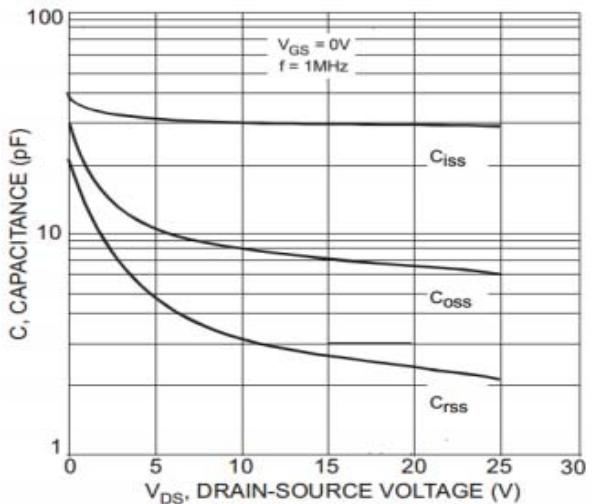


Fig 10: Capacitance vs Drain-Source Voltage





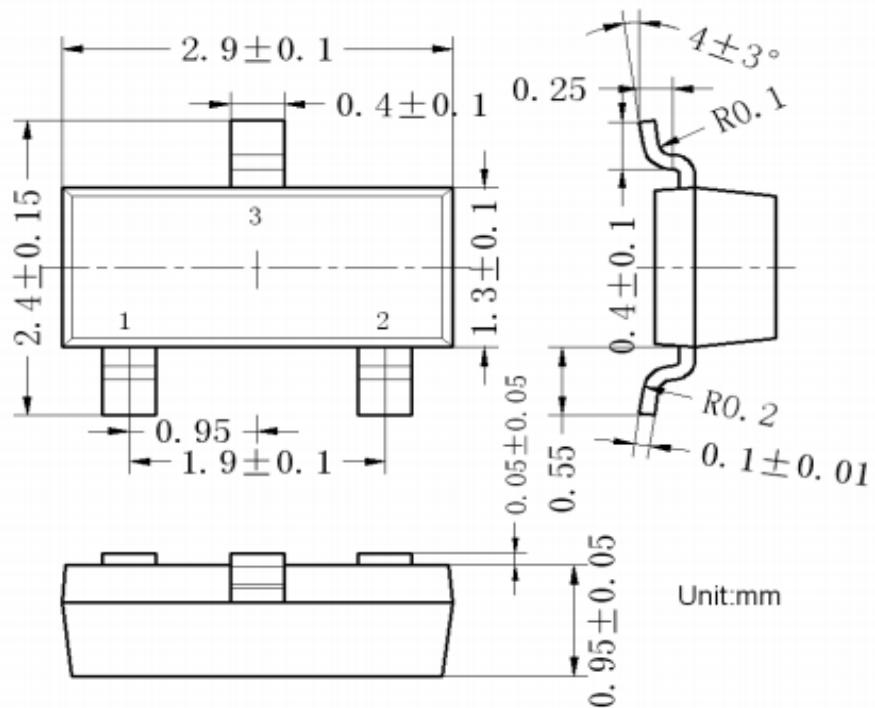
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## PACKAGE DETAILS

SOT-23 Leaded Plastic Package



## PIN CONFIGURATION

1. Gate
2. Source
3. Drain

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## Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

### Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

### Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH



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## Customer Notes

### Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

### Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



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**Continental Device India Pvt. Limited**

C-120 Naraina Industrial Area, New Delhi 110 028, India.

Telephone +91-11-2579 6150, 4141 1112 Fax +91-11-2579 5290, 4141 1119  
email@cdil.com www.cdil.com  
CIN No. U32109DL1964PTC004291

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