

SPECIFICATION SHEET NO.	S0122 – BSS1380000S0SS	
ORIGINAL MFG/PART NO.	MDD Diodes/BSS138	
NEXTGEN PART CODE	BSS1380000S0SS	Indicate This Code For RFQ/ Order
DATE	Jan. 22, 2025	
REVISION	A2	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	N-Channel Enhancement Mode MOSFET, BSS Series, 3 pads BSS138 Type, Case SOT-23 Drain-Source Voltage (V(BR) DSS): 50V Continuous Drain Current (Id): 340mA Power Dissipation (Pd): 350mW Max. Operating Temp. Range -50°C ~+150°C Package in Tape/Reel, 3000pcs/Reel RoHS III/REACH Compliant and Halogen Free (HF)	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE		
Issued/Checked/Approved		
Effective Date: Jan. 22, 2025		

CUSTOMER APPROVE
Date:

MAIN FEATURE

- Trench Power MV MOSFET Technology
- Voltage Controlled Small Signal Switch
- Low Input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage
- Surface Mount Package Ideally Suited for Automatic Insertion
- REACH/RoHS III Complaint and Halogen Free
- Cross Main Competitor Parts in Market

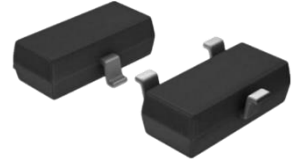


Image shown is a representation only. Exact specifications should be obtained from the product dimension.

APPLICATION

- Battery Operated Systems
- Solid-state Relays
- Direct Logic-level Interface: TTL/CMOS



ELECTRICAL CHARACTERISTICS

- See Page 6 ~ Page 8
- All Products Parameters are Subject To NextGen Components' Final Confirmation.

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code BSS1380000S0SS For RFQ and Order.

PART CODE GUIDE

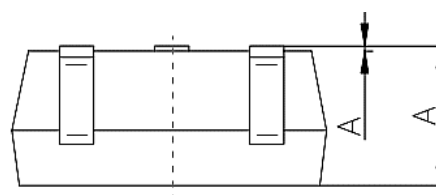
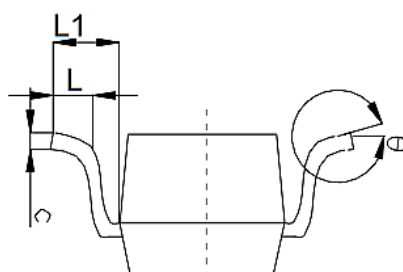
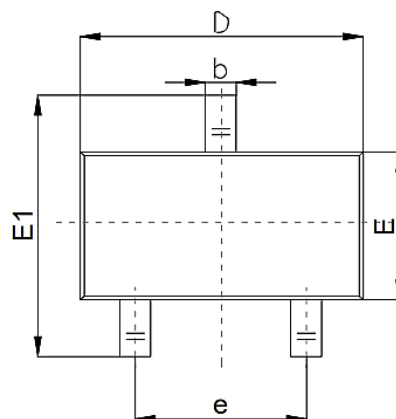
RFQ

[Request For Quotation](#)

CODE	NAME	KEY SPECIFICATION OPTION
BSS	Series Code	SMD N-Channel Enhancement Mode MOSFET 3 pads, Case SOT-23
138	Special/Parameters Code	Letter A~Z, a~z or digits (0~9)
0000S	Internal Control Code	Letter A~Z, a~z or digits (0~9)
0SS	Marking Code	Special Parameters Code Letter A~Z, a~z or digits (1-9)
XX	Special/Custom Parameters	Blank: N/A XX: Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters

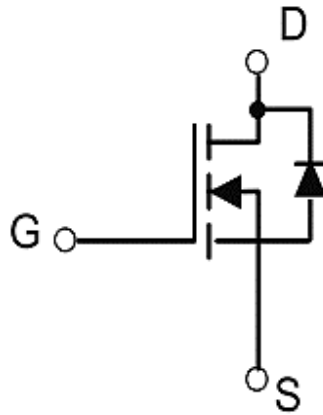
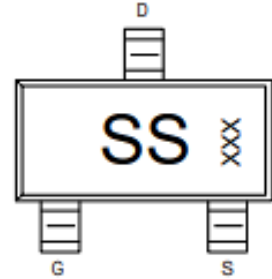
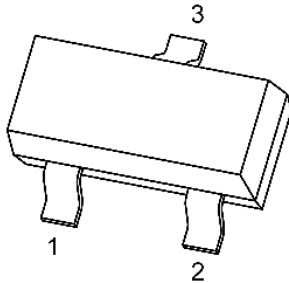
DIMENSION - Unit: mm, Case SOT-23 Outline

SYMBOL	VALUE (MM)		
	MIN.	TYP.	MAX.
A	0.90		1.40
A1	0.00		0.10
b	0.30		0.50
c	0.08		0.20
D	2.80	2.90	3.10
E	1.20		1.60
E1	2.25		2.80
e	1.80	1.90	2.00
L	0.10		0.50
L1	0.40		0.55
θ	0°		10°

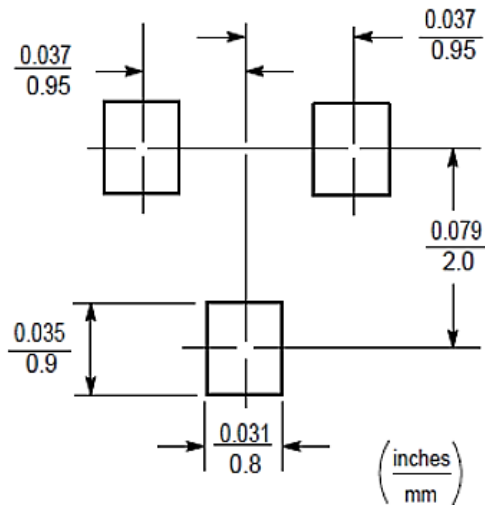


EQUIVALENT CIRCUIT

1. Gate (G) 2. Source (S) 3. Drain (D)



RECOMMEND PAD LAYOUT - For Reference, Unit: Inch/mm, $\pm 0.05\text{mm}$



50V N-CHANNEL ENHANCEMENT MODE MOSFET

V _{(BR)DSS}	R _{DS(on)} Max.	I _D
50V	2.5Ω@ 10V	340mA
	3.0Ω@ 4.5V	340mA

MECHANICAL DATA

CASE	TERMINAL	POLARITY	MOUNTING POSITION	WEIGHT PER PIECE
JEDEC SOT-23 molded plastic body	Matte tin plated	Polarity symbol marking on case	Any	0.00019 Ounce, 0.00591 grams

ABSOLUTE MAXIMUM RATINGS - AT Ta=25 °C , Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE	UNITS
Drain-Source Voltage	V _{DS}	50	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D	340	mA
Pulsed Drain Current (See Page 8 Note 1)	I _{DM}	1.5	A
Power Dissipation (See Page 8 Note 2)	P _D	350	mW
Thermal Resistance from Junction to Ambient (See Page 8 Note 2)	R _{ΘJA}	357	°C/W
Junction Temperature and Storage Temperature	T _J , T _{STG}	-50 ~ +150	°C

Notes

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

MOSFET STATIC CHARACTERISTICS - AT Ta=25 °C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Drain-source Breakdown Voltage	V(BR)DSS	50	-	-	V	V _{GS} =0V, I _D = 250μA
Drain-Source Leakage Current	I _{DSS}	-	-	1.0	μA	V _{DS} =50V, V _{GS} =0V
Gate-Source Leakage Current	I _{GSS}	-	-	±100	nA	V _{GS} =±20V, V _{DS} =0V
Gate threshold Voltage	V _{GS(TH)}	0.8	1.2	1.6	V	V _{DS} = V _{GS} , I _D =250μA
Drain-Source On-State Resistance (See Page 8 Note 3)	R _{DS(ON)}	-	1.1	2.5	Ω	V _{GS} =10V, I _D =300mA
		-	2.0	3.0		V _{GS} =4.5V, I _D =200mA

DYNAMIC ELECTRICAL CHARACTERISTICS - AT Ta=25 °C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Input Capacitance	C _{iss}	-	28.5	-	pF	V _{DS} =25V V _{GS} =0V f=1MHz
Output Capacitance	C _{oss}	-	2.7	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	1.78	-	pF	
Total Gate Charge	Q _g	-	1.7	-	nC	V _{DS} =25V V _{GS} =10V I _D =300mA
Gate Source Charge	Q _{gs}	-	0.40	-	nC	
Gate Drain Charge	Q _{gd}	-	0.24	-	nC	

SWITCHING CHARACTERISTICS - AT Ta=25 °C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Turn on Delay Time	td(on)	-	2.6	-	ns	V _{DS} =25V V _{GS} = 10V I _D = 300mA R _G = 6.0Ω
Turn on Rise Time	tr	-	18.8	-	ns	
Turn Off Delay Time	td(off)	-	9.7	-	ns	
Turn Off Fall Time	tf	-	47	-	ns	

SOURCE DRAIN DIODE CHARACTERISTICS - AT Ta=25 °C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Source drain current (Body Diode)	I _{SD}	-	-	340	mA	Ta=25 °C
Drain-Source Diode Forward Voltage	V _{SD}	-	-	1.2	V	V _{GS} =0V, I _S = 300mA

Notes

1. Pulse width limited by maximum allowable junction temperature
2. The value of P_D & R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, double sided, in a still air environment with Ta=25°C.
3. Pulse test: Pulse width ≤ 300μs, duty cycle ≤2%

TYPICAL PERFORMANCE CHARACTERISTIC CURVES - For Reference Only

Figure 1. Output Characteristics

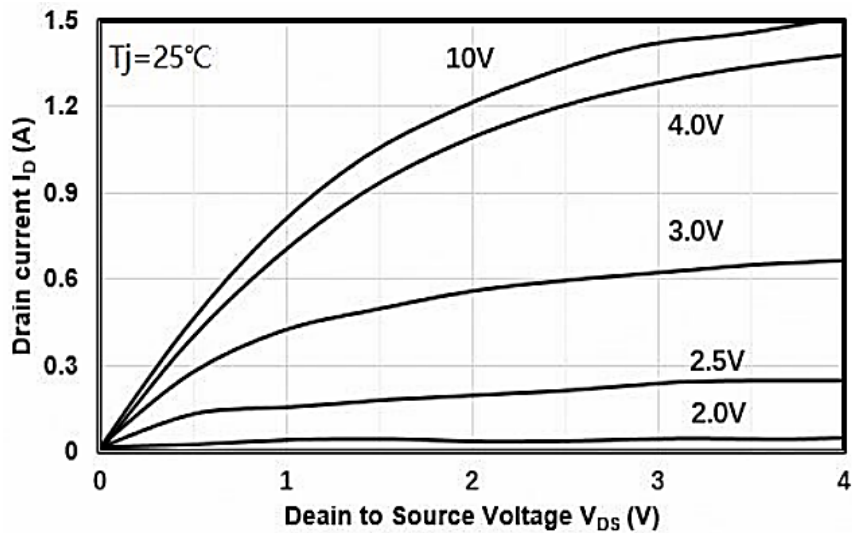
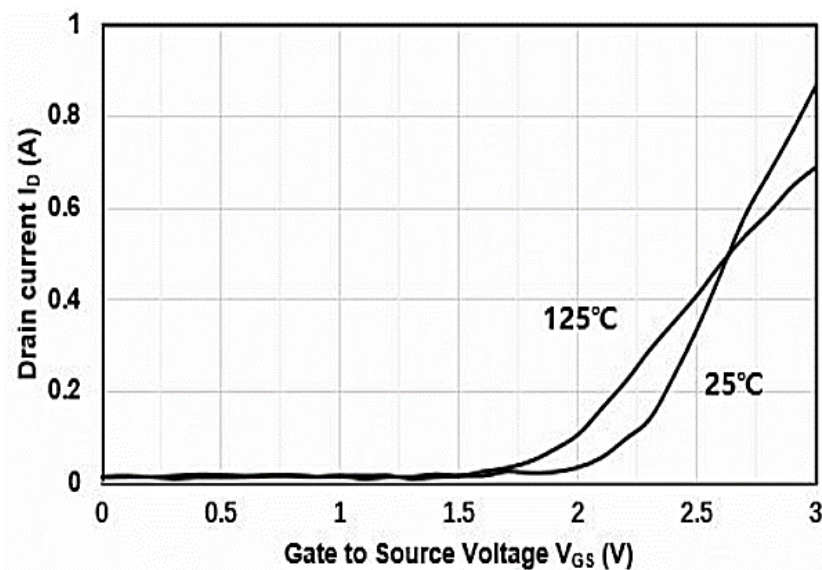


Figure 2. Transfer Characteristics



TYPICAL PERFORMANCE CHARACTERISTIC CURVES - For Reference Only

Figure 3. Capacitance Characteristics

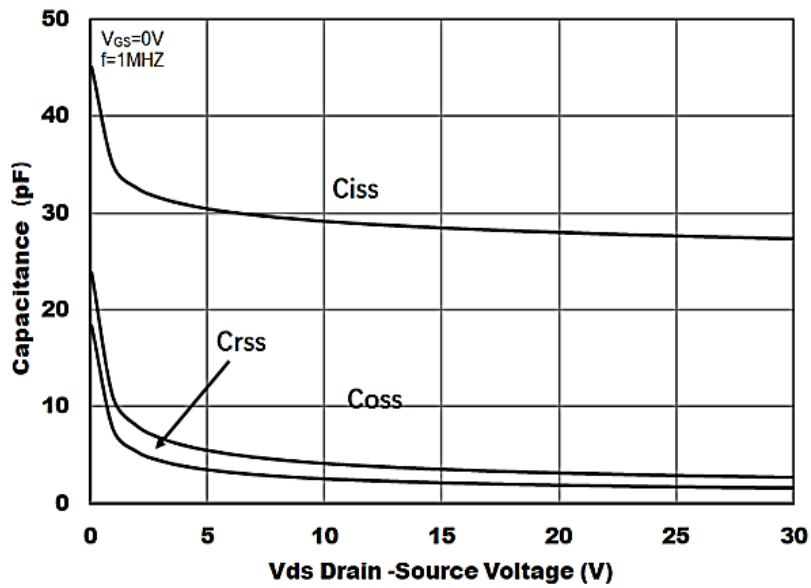
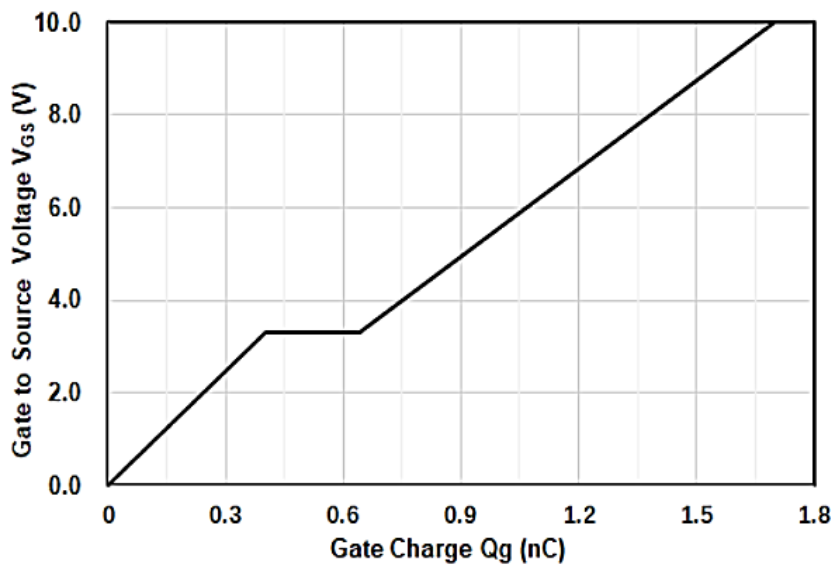


Figure 4. Gate Charge



TYPICAL PERFORMANCE CHARACTERISTIC CURVES - For Reference Only

Figure 5. Drain-Source Current on Resistance

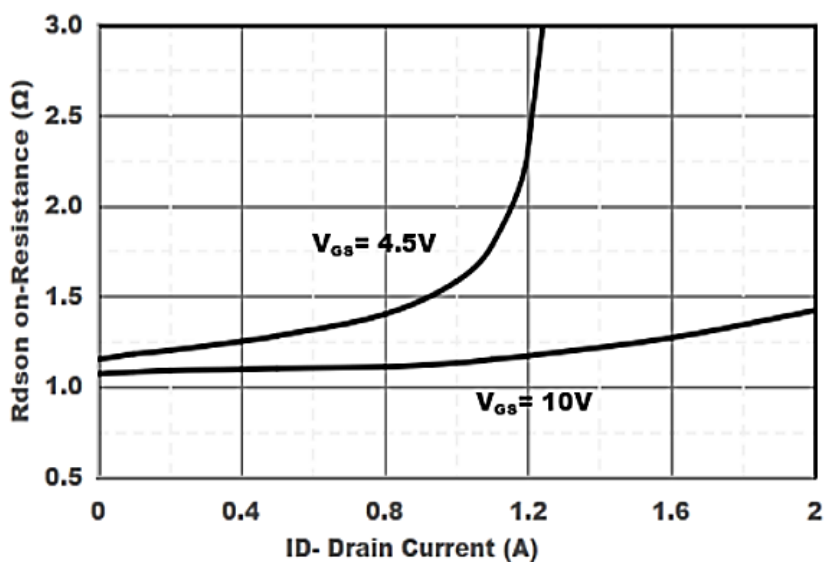
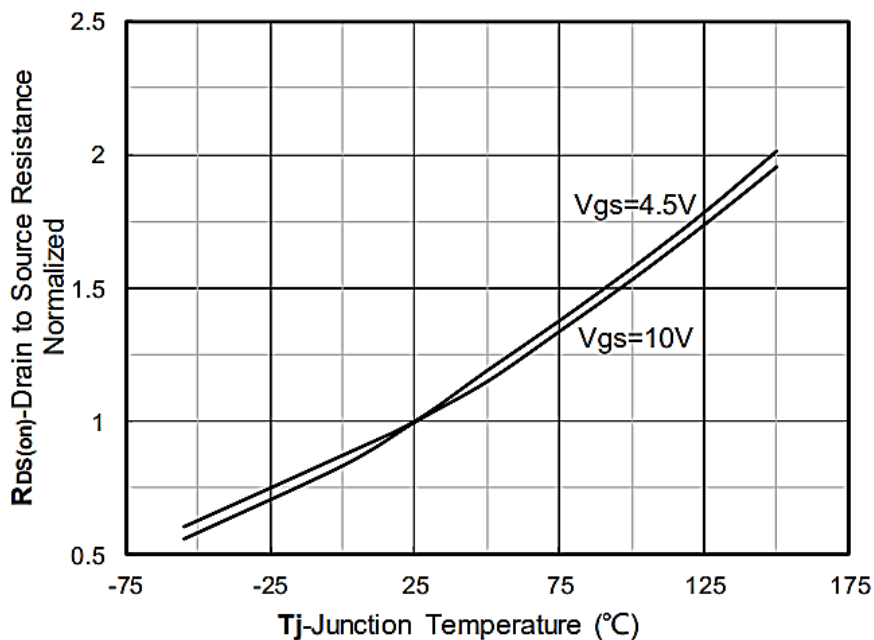


Figure 6. Drain-Source on Resistance



TYPICAL PERFORMANCE CHARACTERISTIC CURVES - For Reference Only

Figure 7. Safe Operation Area

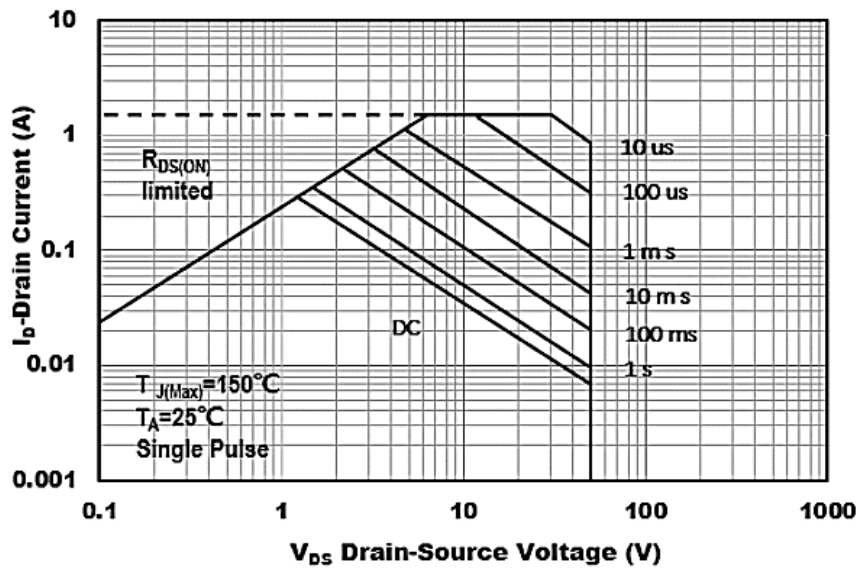
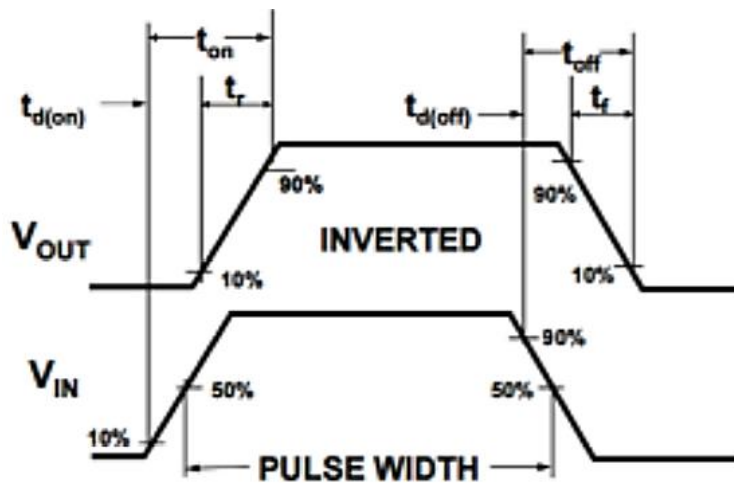


Figure 8. Switching wave



TYPICAL PERFORMANCE CHARACTERISTIC CURVES - For Reference Only

Figure 9. Normalized Threshold voltage

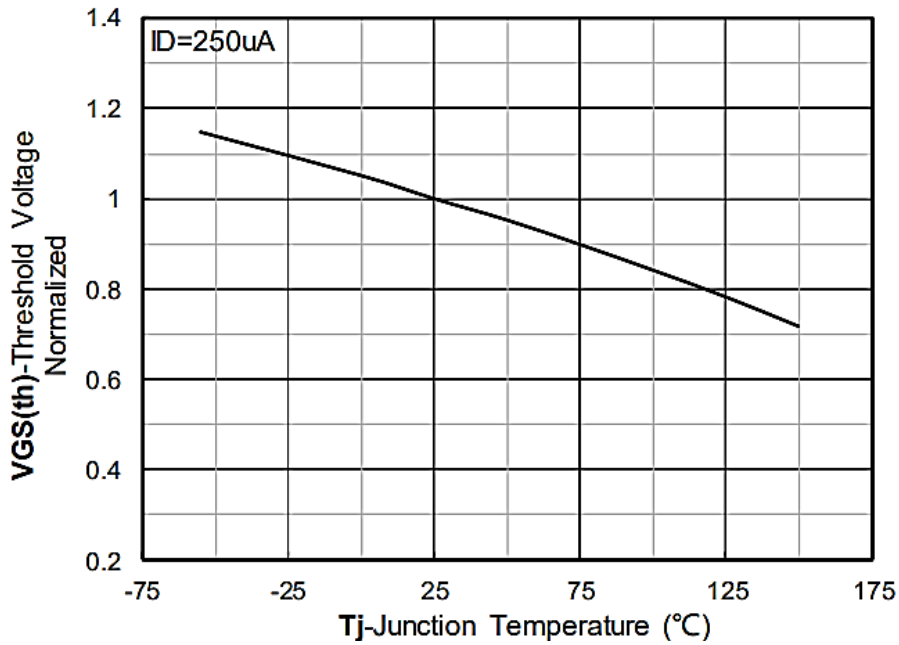
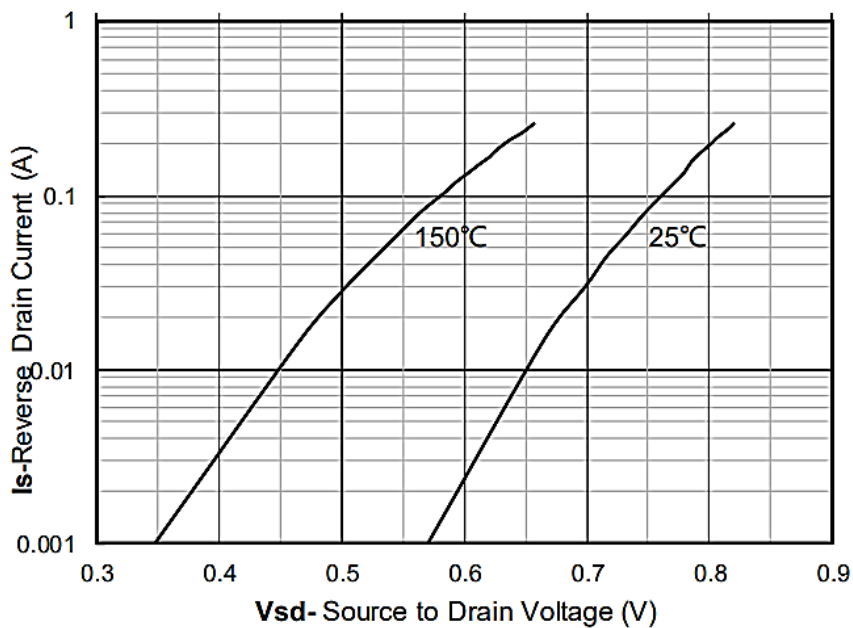
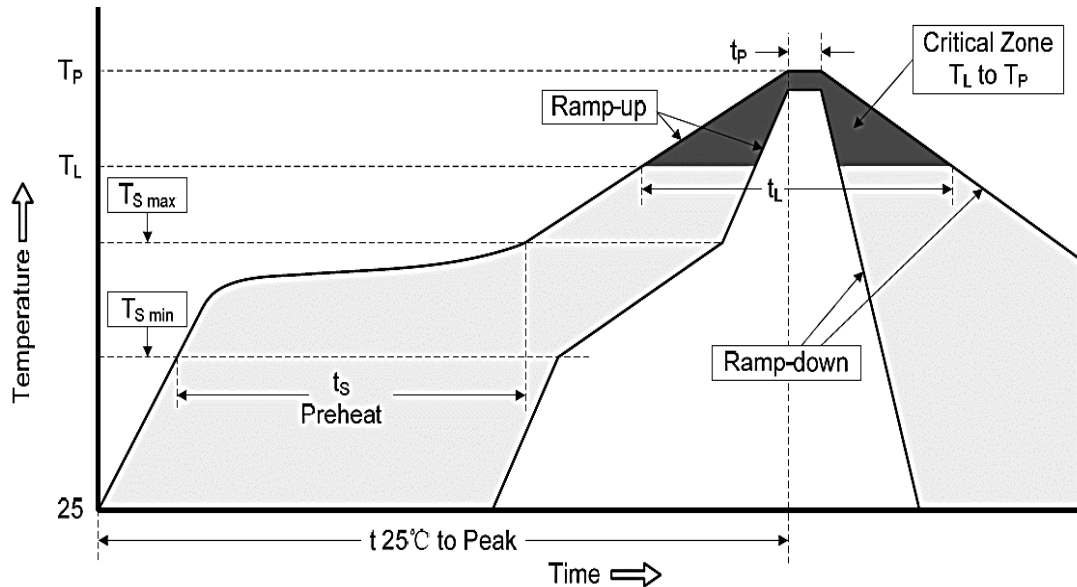


Figure 10. Forward characteristics of reverse diode

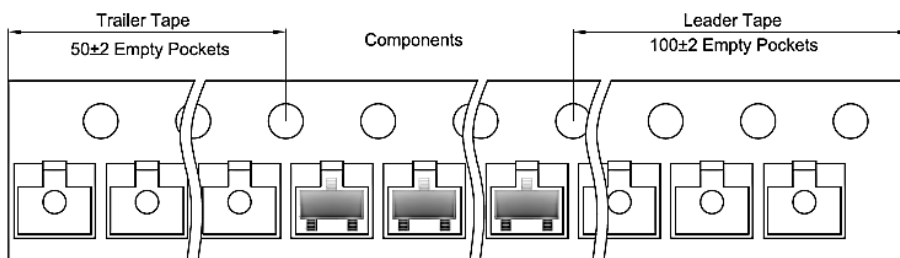
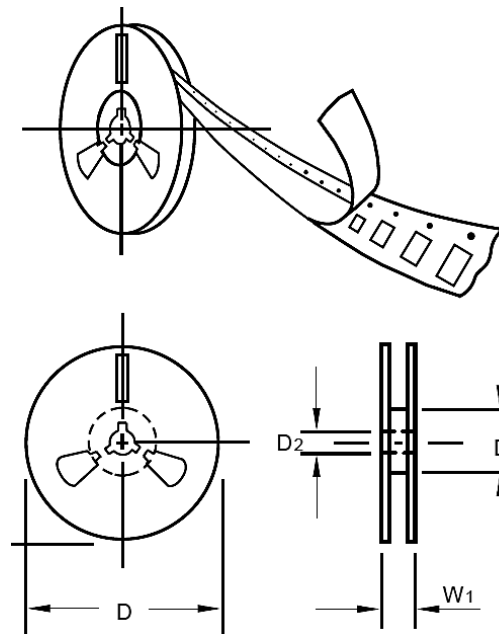
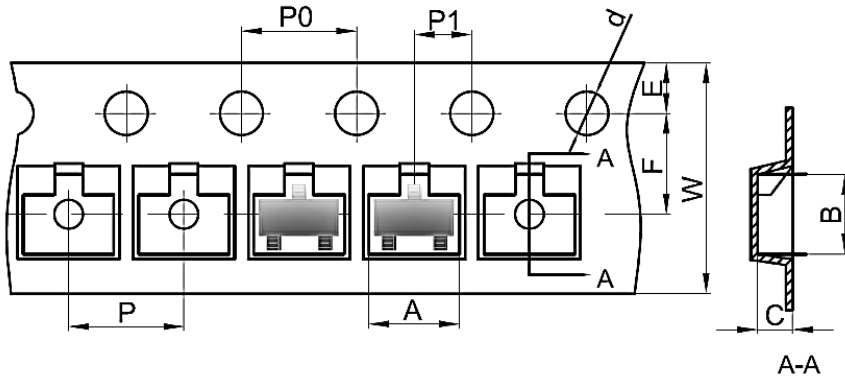


SUGGESTED REFLOW PROFILE - For Reference Only


PROFILE FEATURE		PB-FREE ASSEMBLY
Average Ramp-up Rate (Ts Max to Tp)		3°C/second Max
Preheat	Temperature Min (Ts Min.)	150°C
	Temperature Max (Ts Max.)	200°C
	Time (ts Min. to ts Max.)	60 ~ 180 seconds
Time maintained above	Temperature (Tl)	217°C
	Time (tl)	60 ~ 150 seconds
Peak/Classification Temperature (Tp)		260 °C
Time within 5°C of actual Peak Temperature (tp)		20 ~ 40 seconds
Ramp-down rate		6 °C /Second Max.
Time 25 °C to Peak Temperature		8 minutes Max.
Suggest reflow times		3 Times Max.

TAPE/REEL - Unit: mm, All Devices are packed in accordance with EIA standard RS-481-A and specification.

ITEM	SYMBOL	TOLERANCE	SOT-23
Carrier width	A	0.1	3.15
Carrier Length	B	0.1	2.77
Carrier Depth	C	0.1	1.22
Sprocket hole	d	0.05	1.55
7"Reel outside diameter	D	2.0	178.00
7"Reel inner diameter	D1	Min.	54.4
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.25
Tape width	W	0.3	8.00
Reel width	W1	1.0	19.50
Qty. per Reel	3000pcs		



IMPORTANT NOTES AND DISCLAIMER

1. **ROHS COMPLIANCE:** The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained at Download Center.
2. **REACH COMPLIANCE:** REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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