

SPECIFICATION SHEET NO.	S0508- MDD2302000S0S2	
ORIGINAL MFG/PART NO.	MDD Diodes/MDD2302	
NEXTGEN PART CODE	MDD2302000S0S2	Indicate This Code For RFQ /Order
DATE	May 8, 2025	
REVISION	A4	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	SMD MOSFET Case SOT-23 MDD2 Series, 3 Pads N-Channel Enhancement Model Drain-Source Voltage (V_{DS}): 20V. Continuous Drain Current (I_D): 4.0A Max. Power Dissipation (P_D): 1.25W Max. Junction Temperature and Storage Temperature: -50°C ~+150°C Package in Tape/Reel, 3000pcs/Reel RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE
Issued/Checked/Approved   
Effective Date: May 8, 2025

CUSTOMER APPROVE
Date:

MAIN FEATURE

- Advanced trench process technology
- High Density Cell Design For Ultra Low On-Resistance
- Surface Mount Package Ideally Suited for Automatic Insertion
- Meet MSL 1 Requirement
- Cross Competitors Parts and More.
- RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)

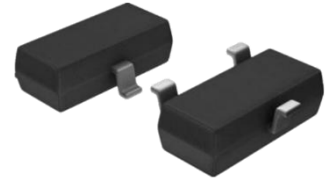


Image shown is a representation only. Exact specifications should be obtained from the product dimension.

APPLICATION

- Load Switch
- Switching circuits
- High-speed line driver
- Power Management Functions



ELECTRICAL CHARACTERISTICS

- See Page 5 ~Page 7
- All Parameters are Subject To NextGen Components' Final Confirmation

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code MDD2302000S0S2 For RFQ and Order.

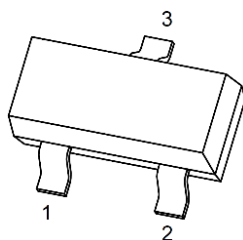
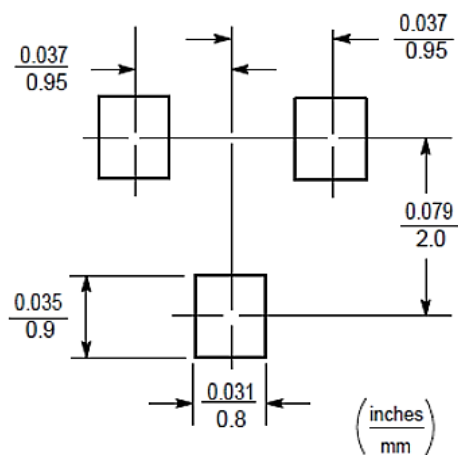
PART CODE GUIDE

RFQ

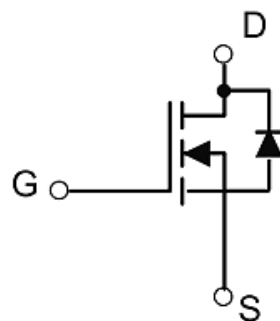
[Request For Quotation](#)

CODE	NAME	KEY SPECIFICATION OPTION
MDD2	Product Series Code	SMD MOSFET Case SOT-23 MDD2 Series, 3 Pads
302	Parameters Code	Letter or Digits (A~Z, a~z or 0~9)
000S0	Internal Control Code	Letter or Digits (A~Z, a~z or 0~9)
S2	Marking Code	Marking "S2"
XX	Special/Custom Parameters Code	Letter or Digits (A~Z, a~z or 0~9) for Special Parametric; Blank: N/A

RECOMMEND PAD LAYOUT - Unit: mm, Tol. ± 0.05 mm.



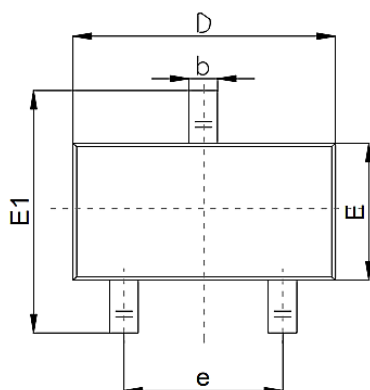
1. Gate (G) 2. Source (S) 3. Drain (D)



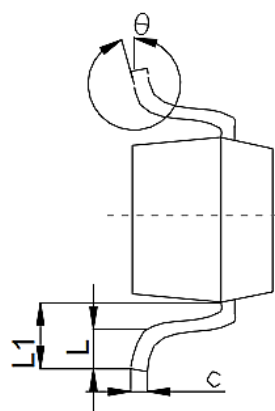
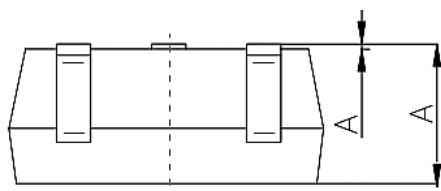
Equivalent Circuit

DIMENSION- Unit: mm, Case SOT-23 Outline

Top View



Side View



SYMBOL	DIMENSION (MM)		
	MIN.	TYP.	MAX.
A	0.65		1.40
A1	0.00		0.20
b	0.30		0.55
c	0.08		0.20
D	2.70		3.10
E	1.15		1.65
E1	2.10		2.80
e	1.70		2.10
L	0.15		0.50
L1	0.35		0.70
θ	0°		12°

20V N-CHANNEL MODE MOSFET

V(BR)DSS	RDS(on) Typ.	ID Max.
20V	25mΩ @4.5V	4A
	28mΩ @2.5V	4A

ABSOLUTE MAXIMUM RATINGS - AT Ta=25 °C , unless otherwise specified

PARAMETERS	SYMBOL	VALUE	UNITS
Drain-Source Voltage	VDS	20	V
Gate-Source Voltage	VGS	±12	V
Continuous Drain Current	ID	4	A
Pulsed Drain Current (See Page 7 Note 1)	IDM	12	A
Power Dissipation (See Page 7 Note 2)	PD	1.25	W
Thermal Resistance from Junction to Ambient (See Page 7 Note 2)	ReJA	100	°C/W
Junction Temperature and Storage Temperature	TJ , TSTG	-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	20	-	-	V	V _{GS} =0V, I _D = 250μA
Drain-Source Leakage Current	I _{DSS}	-	-	1.0	μA	V _{DS} = 20V, V _{GS} =0V
Gate-Source Leakage Current	I _{GSS}	-	-	±100	nA	V _{GS} =±10V, V _{DS} =0V
Gate threshold Voltage	V _{GS(TH)}	0.5	0.8	1.2	V	V _{DS} = V _{GS} , I _D = 250μA
Drain-Source On-State Resistance (See Page 7 Note 3)	R _{DS(ON)}	-	25	30	mΩ	V _{GS} = 4.5V, I _D = 4.0A
		-	28	35		V _{GS} = 2.5V, I _D = 3.0A
		-	-	-		

DYNAMIC ELECTRICAL CHARACTERISTICS - AT Ta=25 °C unless otherwise specified

PARAMETER	SYMBOLS	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Input Capacitance	C _{iss}	-	340	-	pF	V _{DS} = 10V V _{GS} =0V f=1MHz
Output Capacitance	C _{oss}	-	115	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	33	-	pF	
Total Gate Charge	Q _g	-	5.4	-	nC	V _{DS} = 10V V _{GS} = 4.5V I _D = 3.0A
Gate Source Charge	Q _{gs}	-	0.65	-	nC	
Gate Drain Charge	Q _{gd}	-	1.6	-	nC	

SWITCHING CHARACTERISTICS - AT Ta=25 °C unless otherwise specified

PARAMETER	SYMBOLS	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Turn on Delay Time	td(on)	-	12	-	ns	V _{DS} =10V V _{GS} = 4.5V I _D = 3.0A R _G = 6.0Ω R _L = 5.5Ω
Turn on Rise Time	tr	-	36	-	ns	
Turn Off Delay Time	td(off)	-	34	-	ns	
Turn Off Fall Time	tf	-	10	-	ns	

SOURCE DRAIN DIODE CHARACTERISTICS - AT Ta=25 °C unless otherwise specified

PARAMETER	SYMBOLS	VALUE			UNIT	CONDITION
		MIN.	TYP.	MAX.		
Source drain current (Body Diode)	I _{SD}	-	-	1.6	A	Ta=25 °C
Drain-Source Diode Forward Voltage	V _{SD}	-	-	1.2	V	V _{GS} =0V, I _S = 1.0A

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%

RATINGS AND CHARACTERISTICS CURVES - For Reference Only, Ta=25°C Unless Otherwise Specified.

Figure 1. Typical Output Characteristics

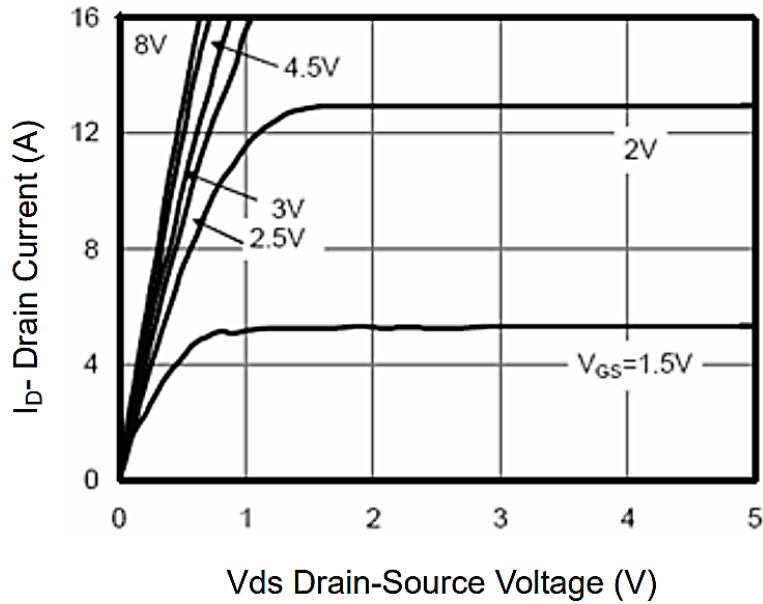
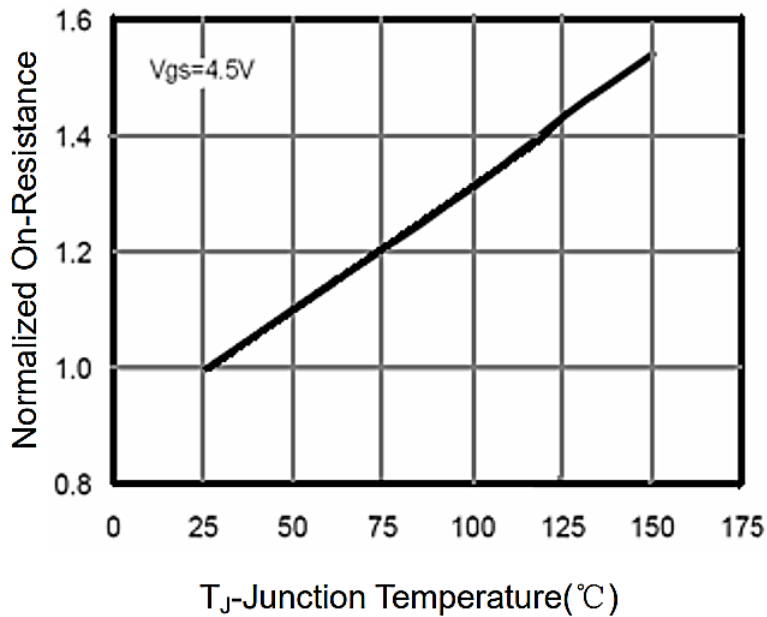


Figure 2. Drain-Source On-Resistance



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, $T_a=25^\circ\text{C}$ Unless Otherwise Specified.

Figure 3. Source- Drain Diode Forward

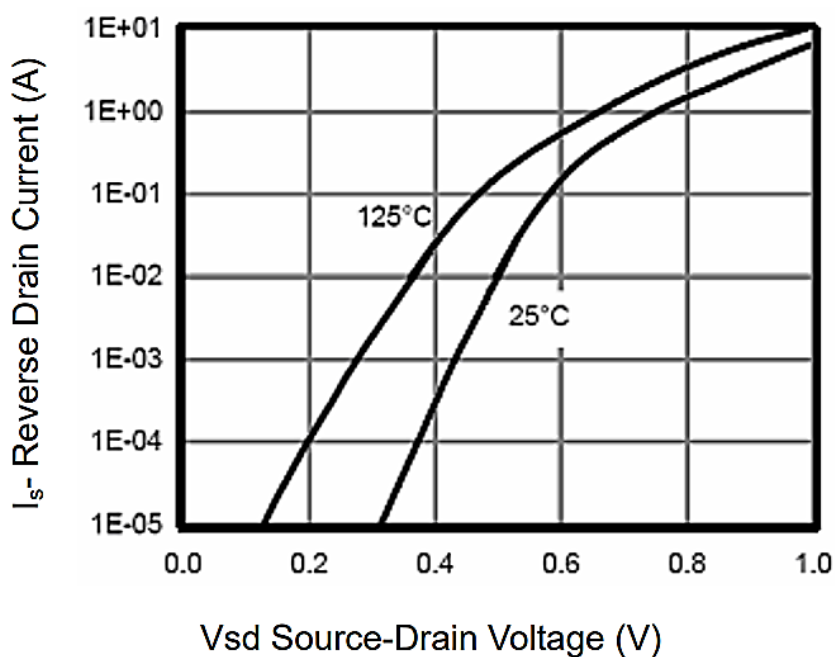
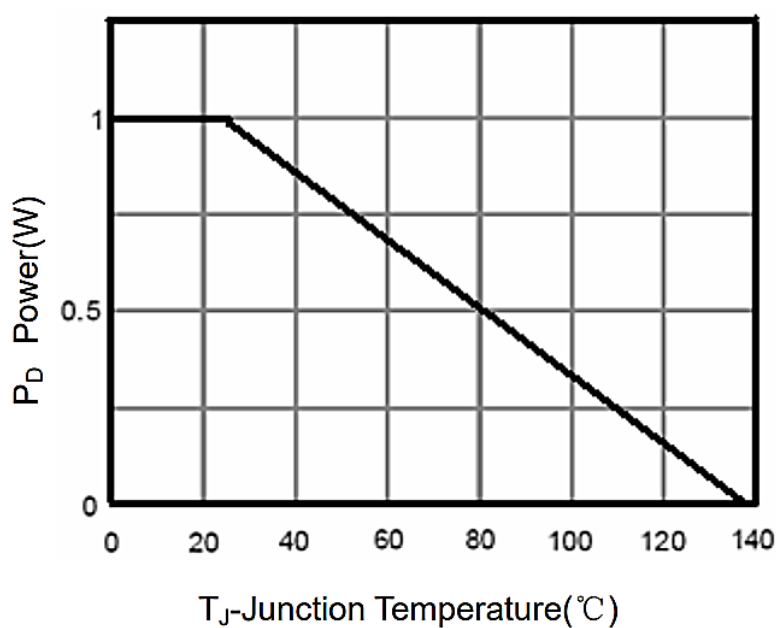


Figure 4. Power Dissipation



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, $T_a=25^{\circ}\text{C}$ Unless Otherwise Specified.

Figure 5. Typical Capacitance Vs. Drain-Source Voltage

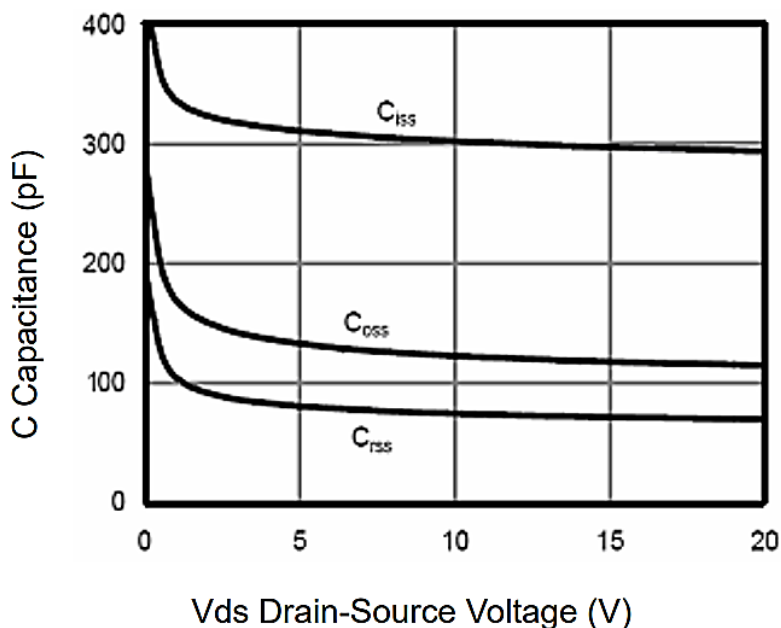
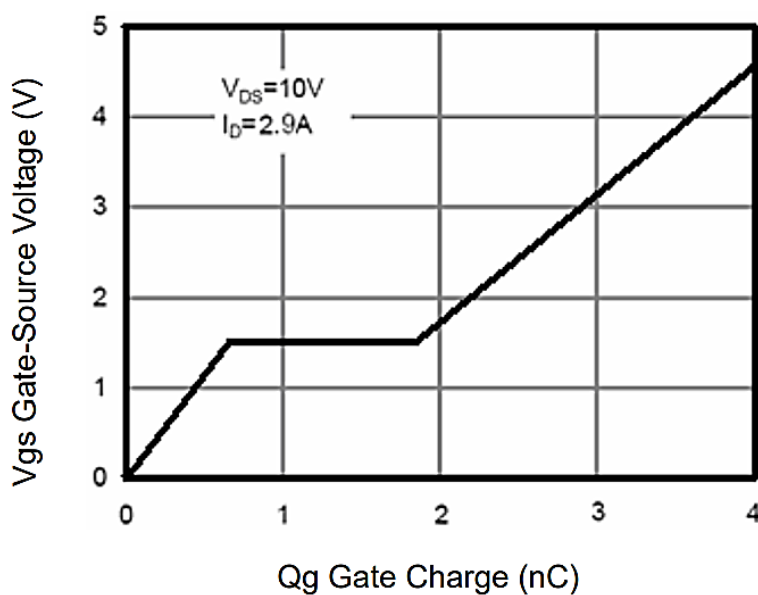


Figure 6. Typical Gate Charge Vs. Gate-Source Voltage



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25°C Unless Otherwise Specified.

Figure 7. Drain-Source On-Resistance

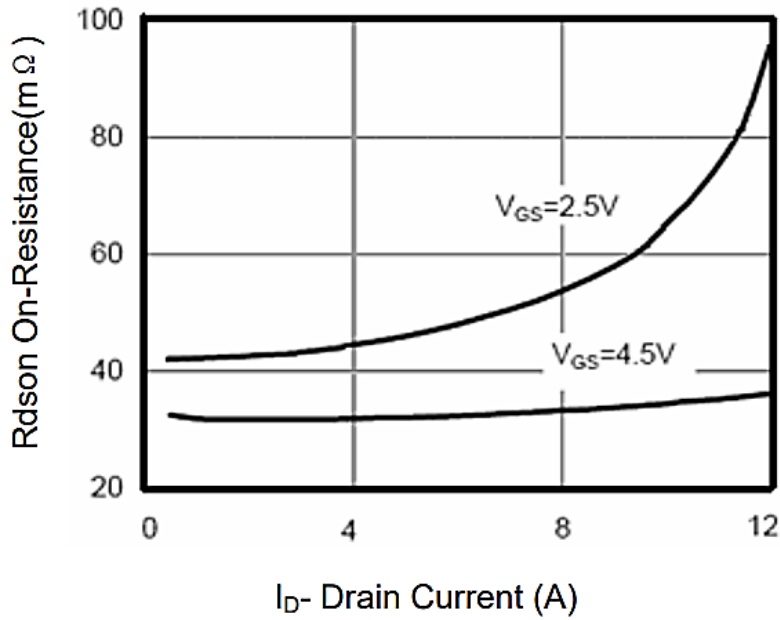
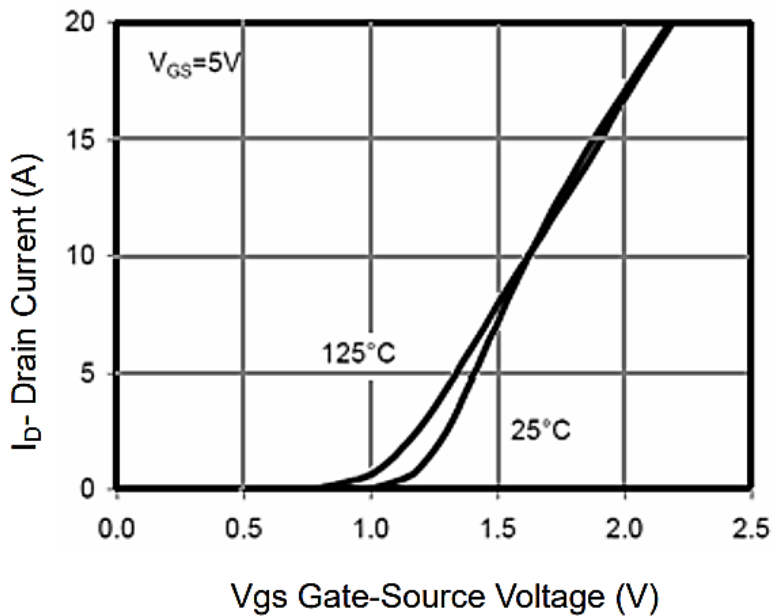


Figure 8. Transfer Characteristics



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, $T_a=25^{\circ}\text{C}$ Unless Otherwise Specified.

Figure 9. Drain Current

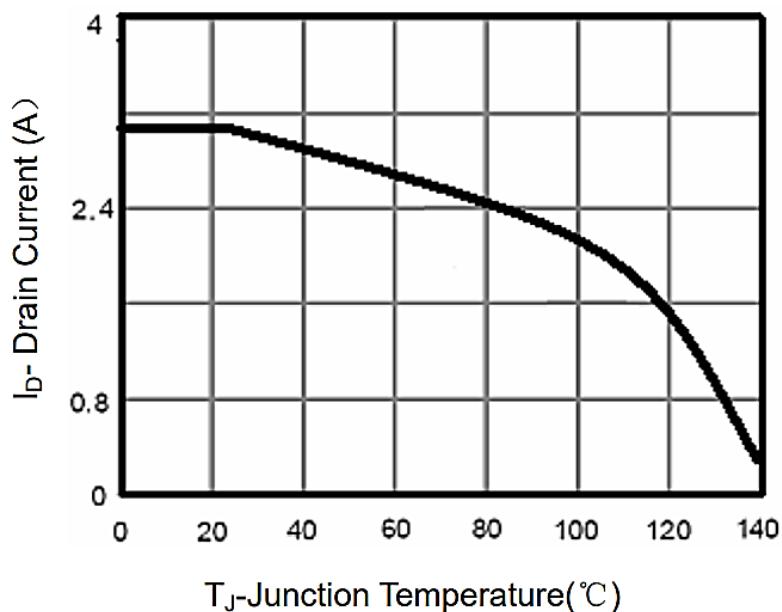
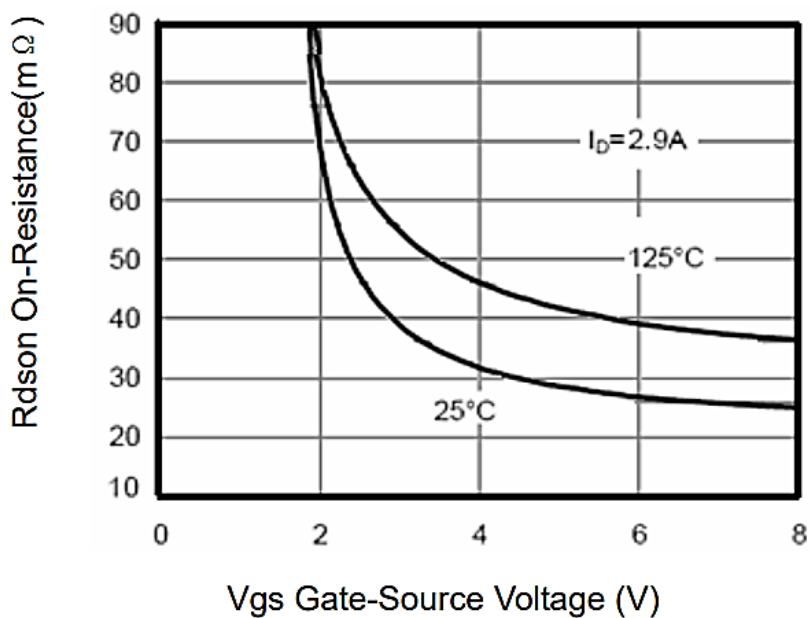


Figure 10. R_{dson} vs V_{gs}



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, $T_a=25^{\circ}\text{C}$ Unless Otherwise Specified.

Figure 11. Maximum Safe Operating Area

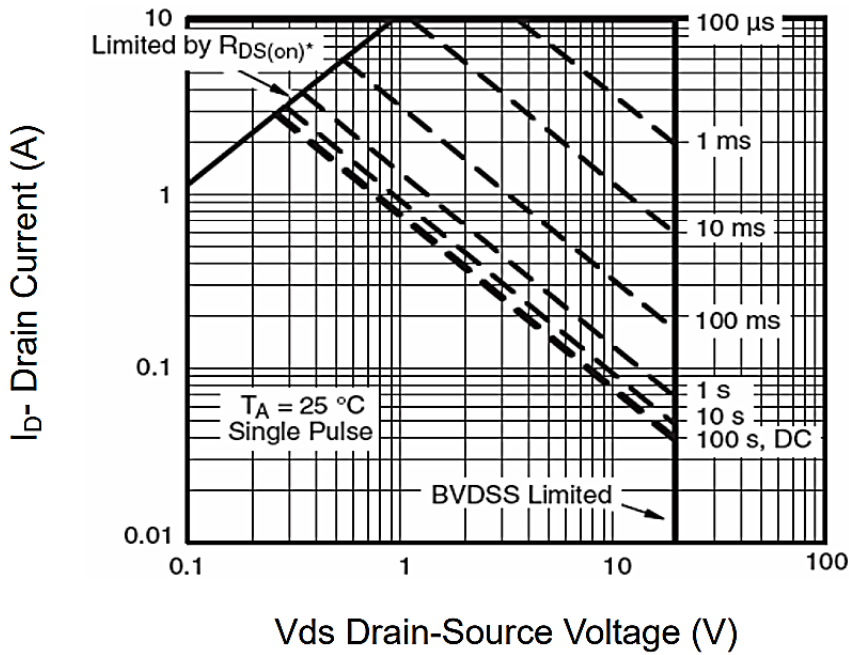
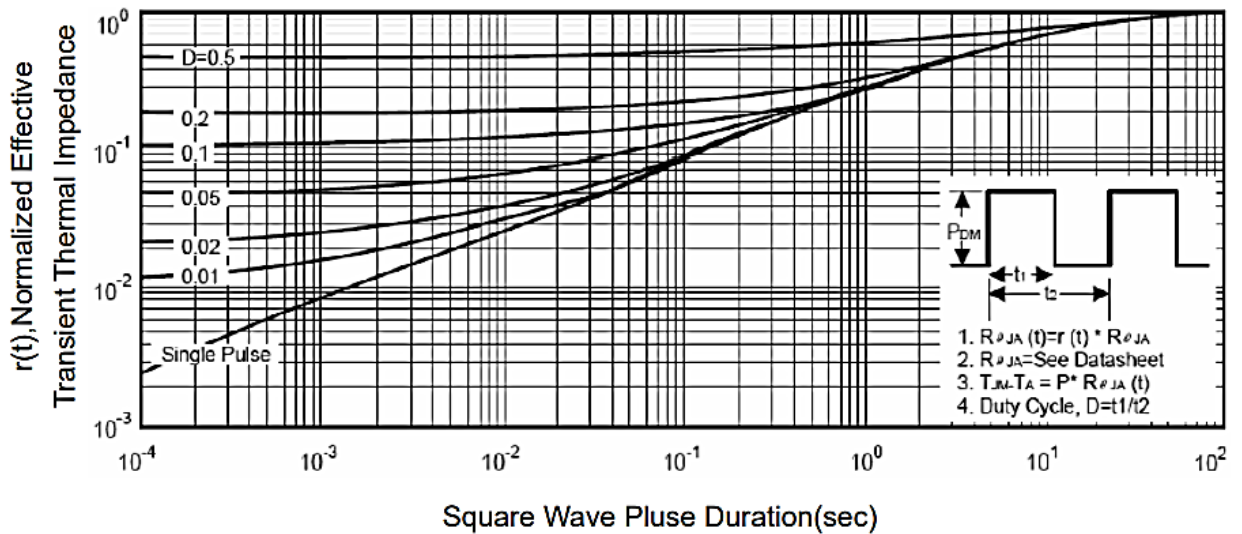


Figure 12. Normalized Maximum Transient Thermal Impedance



TYPICAL PERFORMANCE CHARACTERISTIC CURVES - For Reference Only

Figure 13. :Switching Test Circuit

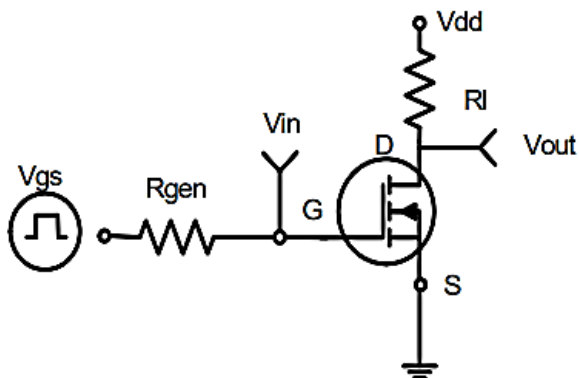
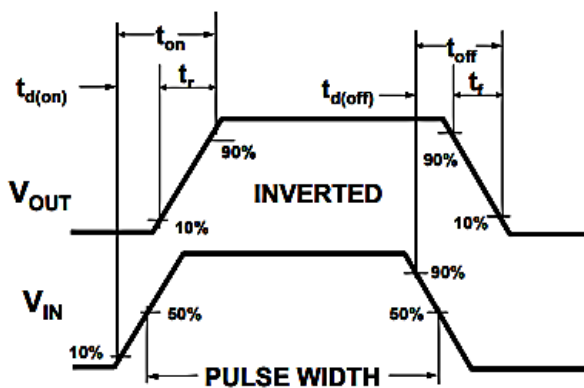
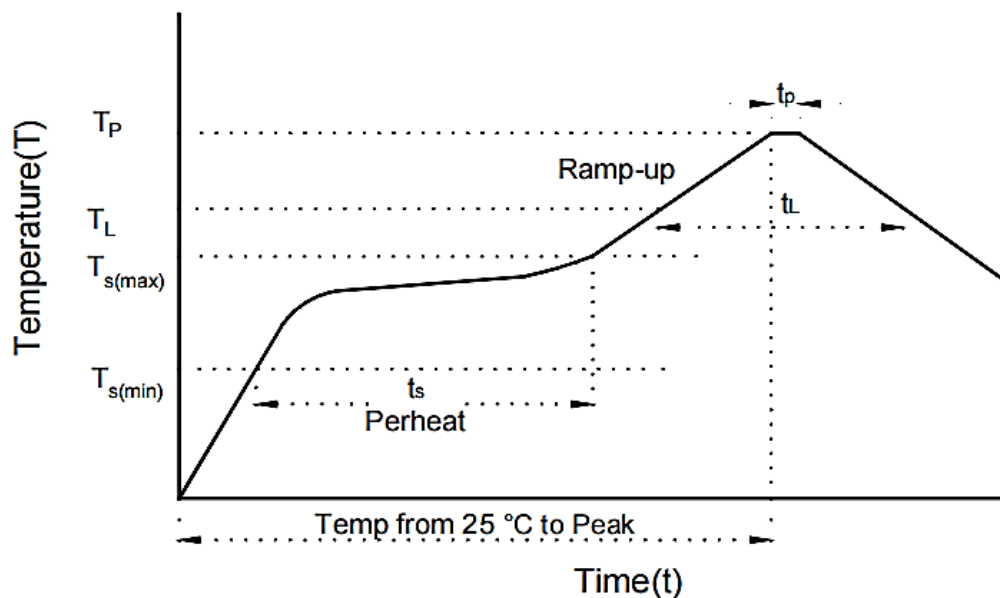


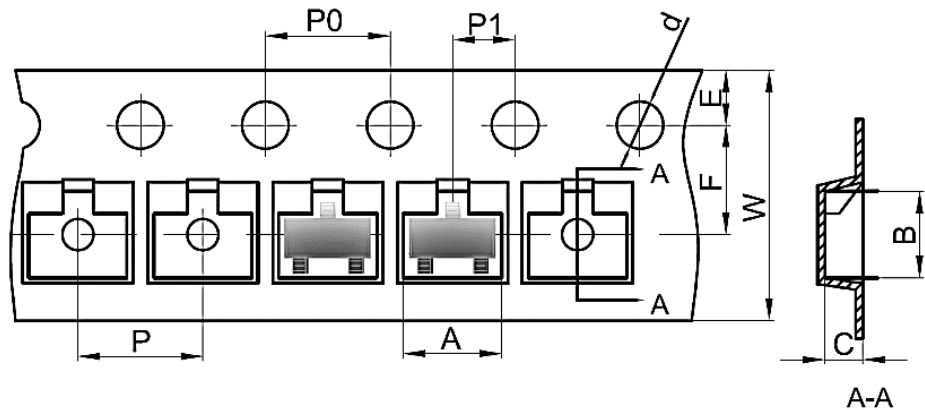
Figure 14. Switching Waveforms



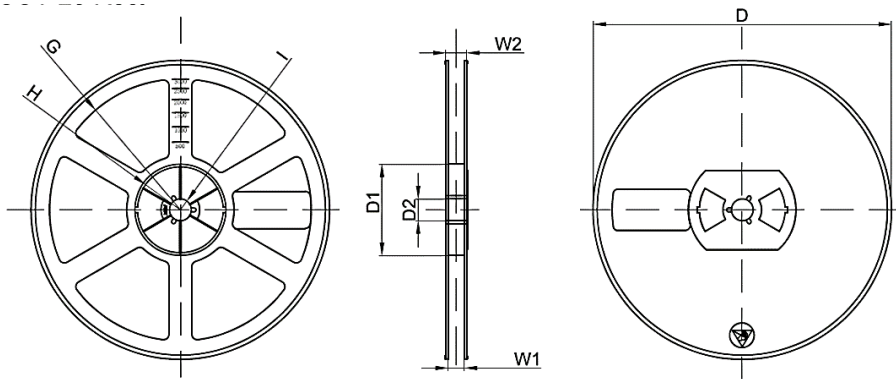
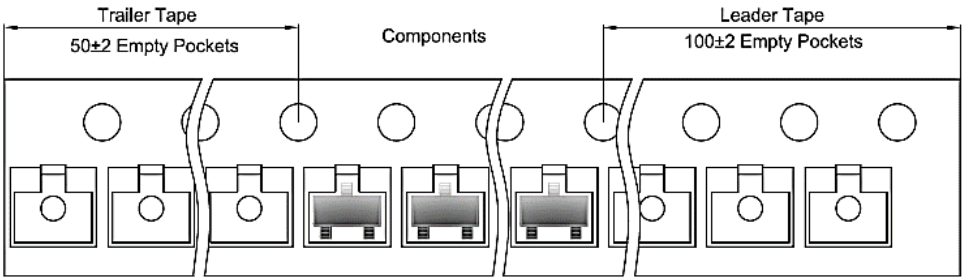
RECOMMENDED SOLDERING PARAMETERS – FOR REFERENCE ONLY


PROFILE FEATURE		PB-FREE ASSEMBLY
Average Ramp-up Rate (T_L Max to T_p)		3°C/second Max
Preheat	Temperature Min (T_s Min.)	150°C
	Temperature Max (T_s Max.)	200°C
	Time (t_s Min. to t_s Max.)	60 ~ 180 seconds
Time maintained above	Temperature (T_L)	217°C
	Time (t_L)	60 ~ 150 seconds
Peak/Classification Temperature (T_p)		260 °C
Time within 5°C of actual Peak Temperature (t_p)		10 seconds Max.
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 specifications



Case	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.5	1.75	3.5	4.0	4.0	2.0	8.0



Reel Size	D	D1	D2	G	H	I	W1	W2	Qty. (pcs)
7"	Ø178	54.4	13.0	R78.0	R25.6	R6.5	9.5	12.3	3000

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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