

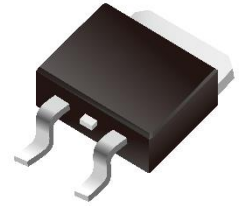
SPECIFICATION SHEET NO.	S0212- MDD4N65D0000SD	
ORIGINAL MFG/PART NO.	MDD Diodes/MDD4N65D	
NEXTGEN PART CODE	MDD4N65D0000SD	Indicate This Code For RFQ/Order
DATE	Feb. 12, 2025	
REVISION	A2	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	650V N-Channel Enhancement Mode MOSFET, MDD4 Series, 3 pins, MDD4N65D Type, Case TO-252 Drain-Source Voltage (V _{BRDSS}):650V Continuous Drain Current (I _D): 4A Max. Power Dissipation (P _d): 77W Max. Junction Temperature (T _J): +150° C Package in Tape/reel, 2500pcs/Reel REACH/RoHS III/Compliant and Halogen Free (HF)	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE
Issued/Checked/Approved   
Effective Date: Feb. 12, 2025

CUSTOMER APPROVE
Date:

MAIN FEATURE

- Ultra Low Gate Charge
- Low Reverse Transfer Capacitance
- Fast Switching Capability
- Avalanche Energy Tested
- Improved Dv/Dt Capability, High Ruggedness
- REACH/RoHS/RoHS III/Compliant
- Halogen Free



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

APPLICATION

- High Efficiency Switch Mode Power Supplies.
- Electronic Lamp Ballasts Based On Half Bridge.
- Led Power Supplies.



ELECTRICAL CHARACTERISTICS

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

HOW TO ORDER

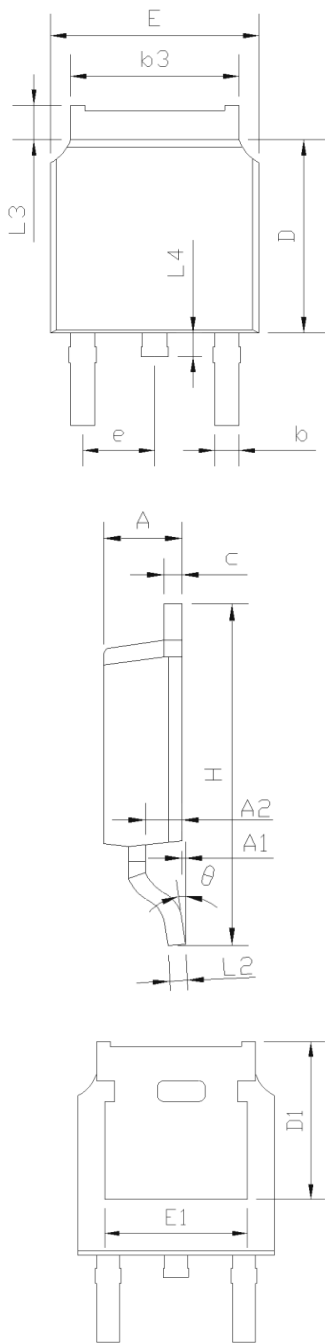
- Please Follow Up Part Code Guide And Indicate NextGen Part Code MDD4N65D0000SD For RFQ and Order.

PART CODE GUIDE

RFQ
[Request For Quotation](#)

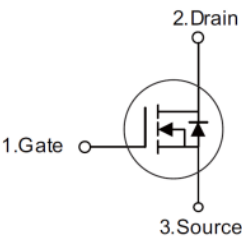
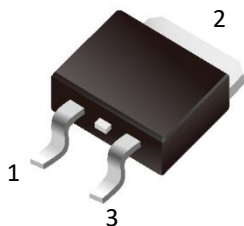
CODE	NAME	KEY SPECIFICATION OPTION
MDD4	Product Series Code	MOSFET, Continuous Drain Current (Id): 4A Max. MDD4 series, 3 pins
N	Enhancement Mode code	N: N-Channel Enhancement Mode
65	Drain-Source Voltage Code	65: 650V
D	Case Code	D: Case TO-252
0000SD	Internal Control Code	Letter or Digits (A~Z, a~z or 1~9)
XX	Special/Custom Parameters Code	Letter or Digits (A~Z, a~z or 1~9) for Special Parametric; Blank: N/A

DIMENSION- Unit: mm, Case TO-252 Outline



SYMBOL	VALUE (MM)		
	MIN.	TYP.	MAX.
A	2.20	2.30	2.38
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.46
c	0.43	0.53	0.61
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.73
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50		1.00
θ	0°		8°

EQUIVALENT CIRCUIT



650V N-CHANNEL ENHANCEMENT MODE MOSFET

V (BR)DSS	ID(Tc=25°C)	RDS (on), Max	Q g,typ
650V	4A	2.8Ω @ VGS=10V	12 nC

MAX. RATINGS @Ta=25 °C (Unless Otherwise Specified)

PARAMETER	SYMBOLS	VALUE	UNIT
Drain-Source Voltage	V DS	650	V
Gate-Source Voltage	V GS	±30	V
Continuous Drain Current	I D	4	A
Pulsed Drain Current (Note 1)	I DM	16	A
Avalanche Energy Single Pulsed (Note 2)	E AS	198	mJ
Continuous diode forward current	IS	4	A
Diode pulse current	IS,pulse	16	A
Peak Diode Recovery dv/dt (Note 3)	dv/dt	5	V/ns
Power Dissipation	P D	77	W
Junction Temperature	T J	150	°C
Storage Temperature Range	T STG	-55 ~ +150	°C

THERMAL CHARACTERISTICS

PARAMETER	SYMBOLS	VALUE	UNIT
Thermal resistance, Junction-to-case	RθJC	1.62	°C/W
Thermal resistance, Junction-to-ambient	RθJA	62.5	°C/W

Note:

- 1) Pulse width limited by maximum junction temperature.
- 2) L=10mH, IAS = 6.3A, Starting Tj= 25° C.
- 3) ISD = 4A, di/dt≤100A/us, VDD≤BVDS, Starting Tj= 25° C.

ELECTRICAL CHARACTERISTICS @Ta=25 °C (Unless Otherwise Specified)

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Drain-Source Breakdown Voltage	V (BR) DSS	VGS=0V, ID=250μA	650	-	-	V
Drain-Source Leakage Current	IDSS	VDS=650V, VDS=0V	-	-	1	uA
Gates-Source Leakage Crurent-Forward	IGSS	VGS=30V, VDS=0V	-	-	100	nA
Gates-Source Leakage Crurent-Reverse	IGSS	VGS=-30V, VDS=0V	-	-	-100	nA
Gate Threshold Voltage	VGS(TH)	VDS=VGS, ID=250μA	2.0	-	4.0	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=2A	-	2.5	2.8	Ω

DYNAMIC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min	Typ.	Max.	
Input Capacitance	Ciss	VDS=25V, VGS=0V f=1MHz	-	600	-	pF
Output Capacitance	Coss		-	55	-	pF
Reverse Transfer Capacitance	Crss		-	3.2	-	pF
Total Gate Charge	Qg	VDS=520V, VGS=10V, ID=4A (Note1, 2)	-	12	-	nC
Gate Source Charge	Qgs		-	3.2	-	nC
Gate Drain Charge	Qgd		-	5.1	-	nC

SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Turn on Delay Time	$t_{d(on)}$	$V_{DS}=325V$, $I_D=4A$, $R_G=10\Omega$ (Note1,2)	-	-	12	ns
Turn on Rise Time	t_r		-	-	31	ns
Turn Off Delay Time	$t_d(off)$		-	-	42	ns
Turn Off Fall Time	t_f		-	-	15	ns

SOURCE DRAIN DIODE CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Source drain current(Body Diode)	I_{SD}		-	-	4	A
Pulsed Current	I_{SM}		-	-	16	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=4A$, $V_{GS}=0V$	-	0.8	1.5	V
Body Diode Reverse Recovery Time	t_{rr}	$V_R=400V$ $I_F=4A$, $-diF/dt = 100A/\mu s$	-	282	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	1.4	-	μC

Note:

- 1) Pulse test ; Pulse width 300us, duty cycle 2%
- 2) Essentially independent of operating temperature

TYPICAL PERFORMANCE - For Reference Only

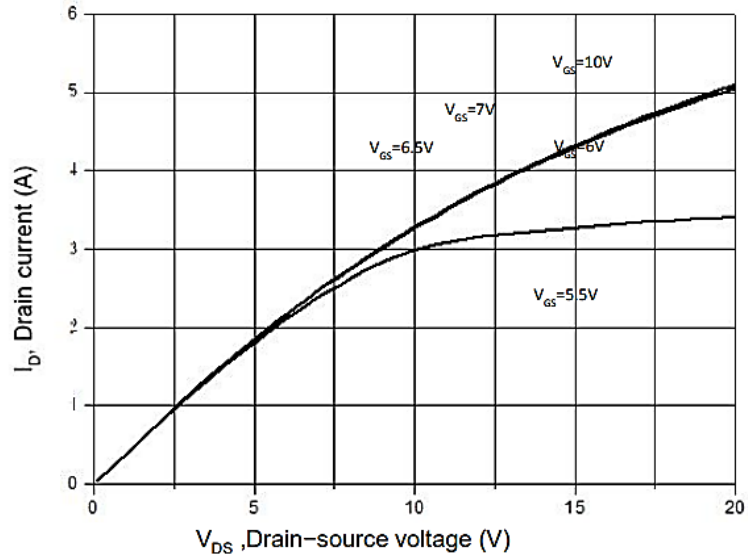


Figure 1. Typical Output Characteristics

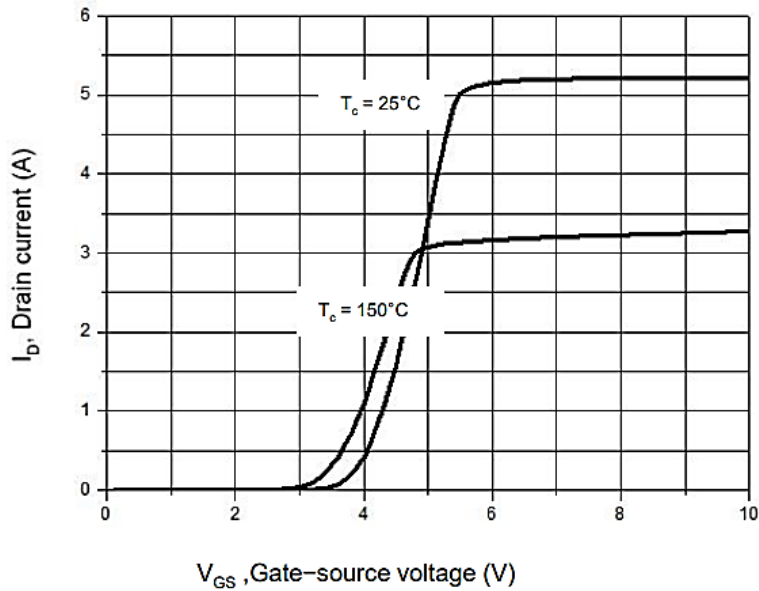


Figure 2. Transfer Characteristics

TYPICAL PERFORMANCE - For Reference Only

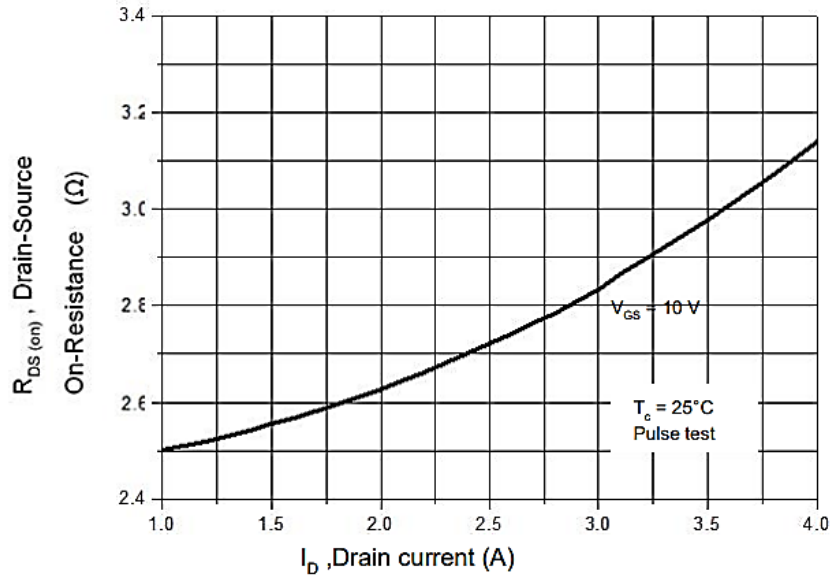


Figure 3. On-Resistance Variation vs. Drain Current

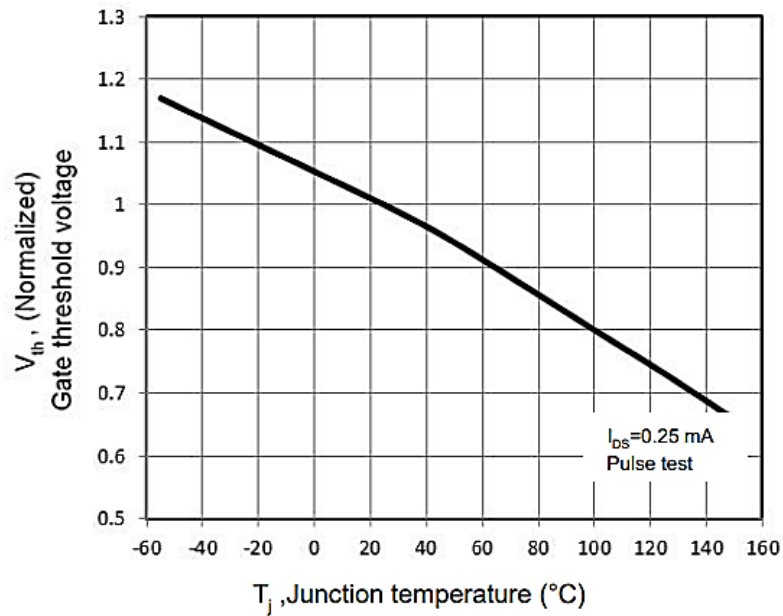


Figure 4. Threshold Voltage vs. Temperature

TYPICAL PERFORMANCE - For Reference Only

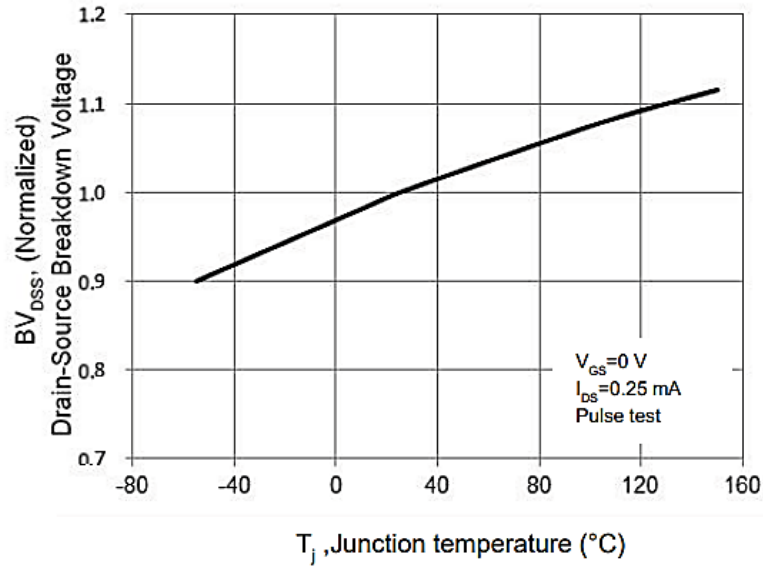


Figure 5. Breakdown Voltage vs. Temperature

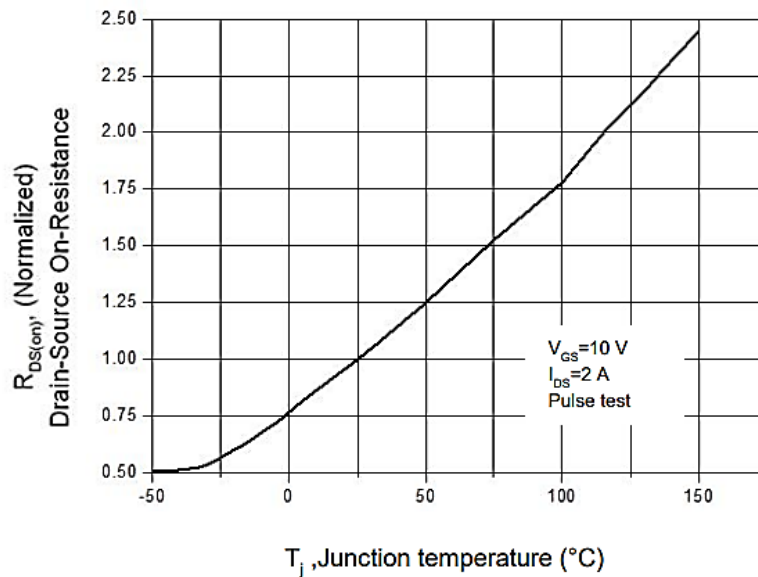


Figure 6. On-Resistance vs. Temperature

TYPICAL PERFORMANCE - For Reference Only

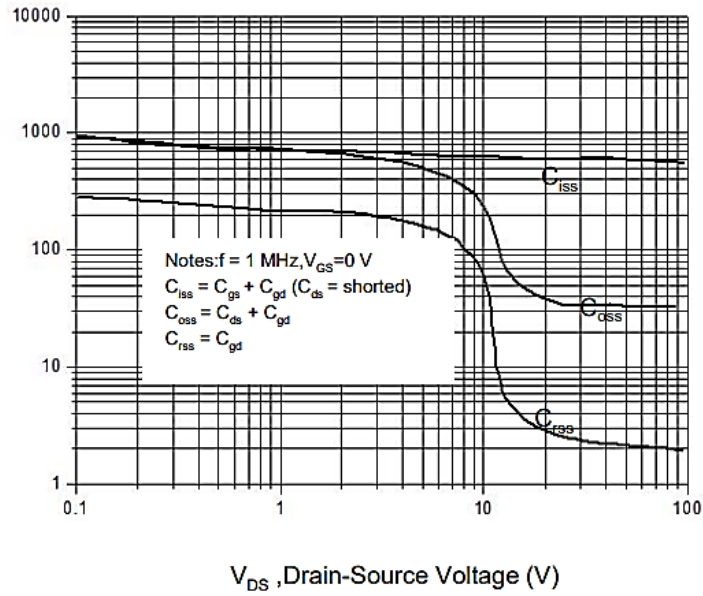


Figure 7. Capacitance Characteristics

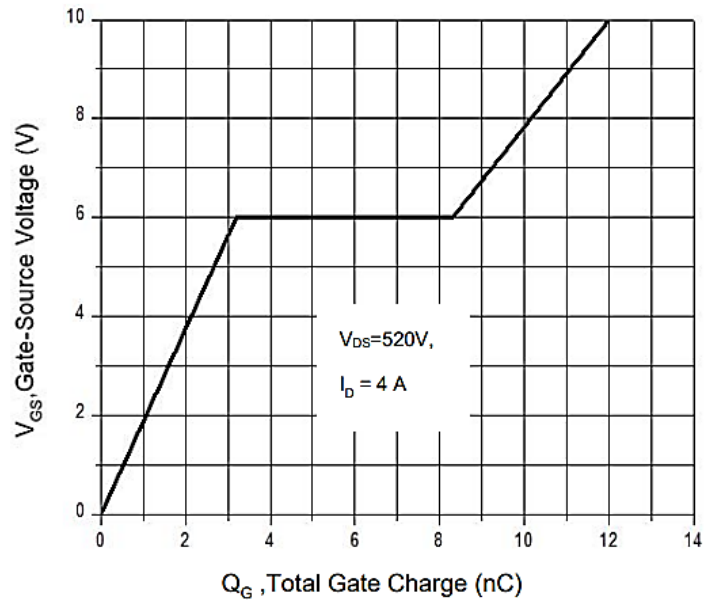


Figure 8. Gate Charge Characterist

TYPICAL PERFORMANCE - For Reference Only

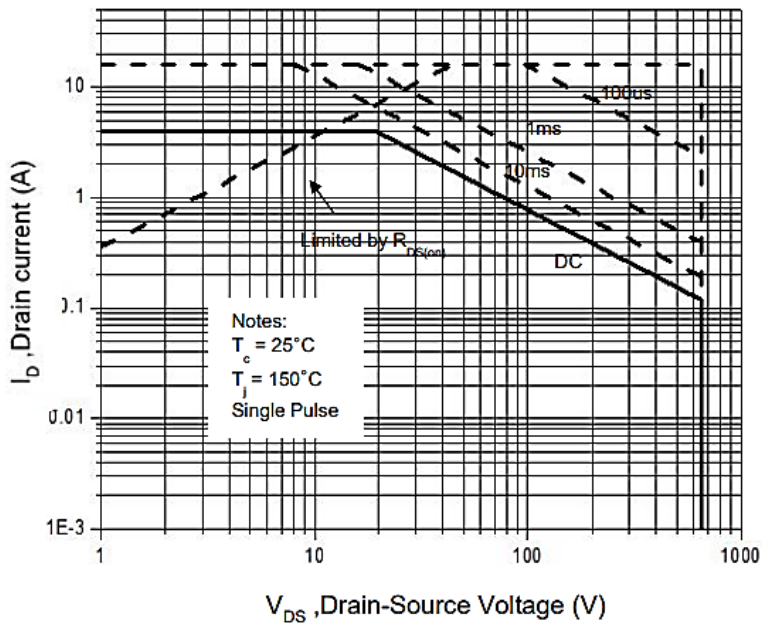


Figure 9. Maximum Safe Operating Area

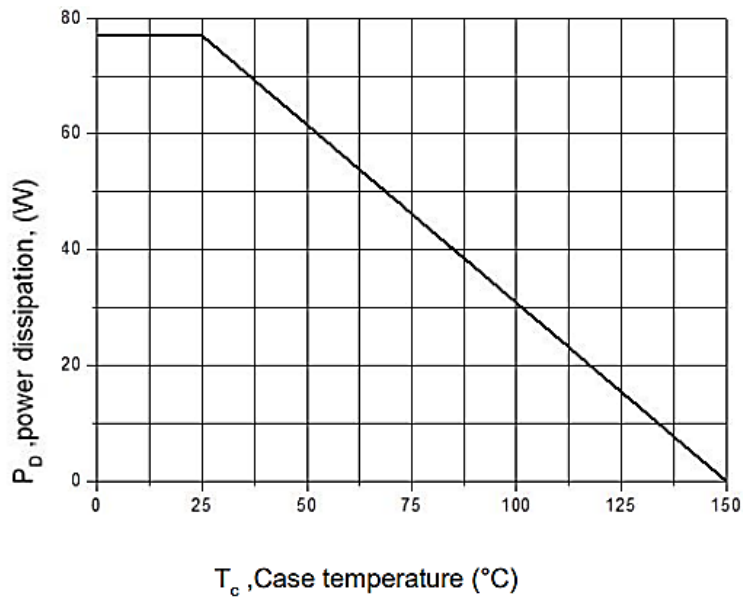


Figure 10. Power Dissipation vs. Temperature

TYPICAL PERFORMANCE - For Reference Only

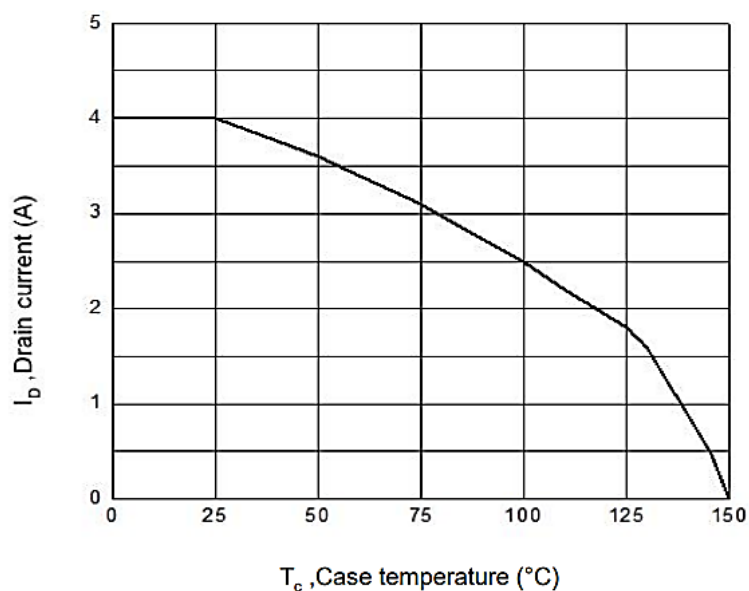


Figure 11. Continuous Drain Current vs. Temperature

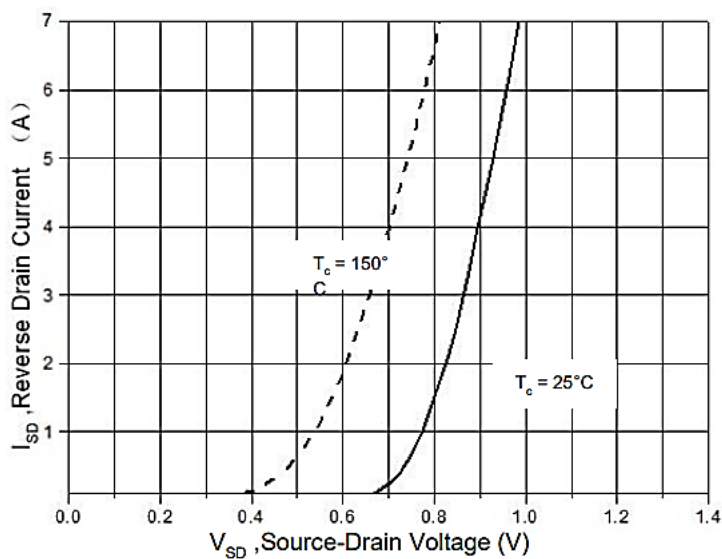


Figure 12. Body Diode Transfer Characteristics

TYPICAL PERFORMANCE - For Reference Only

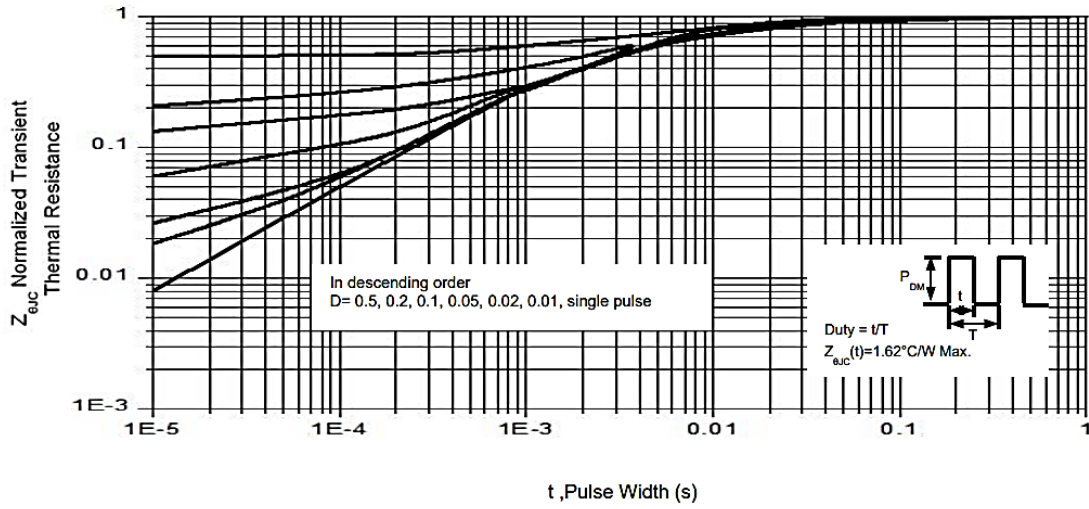
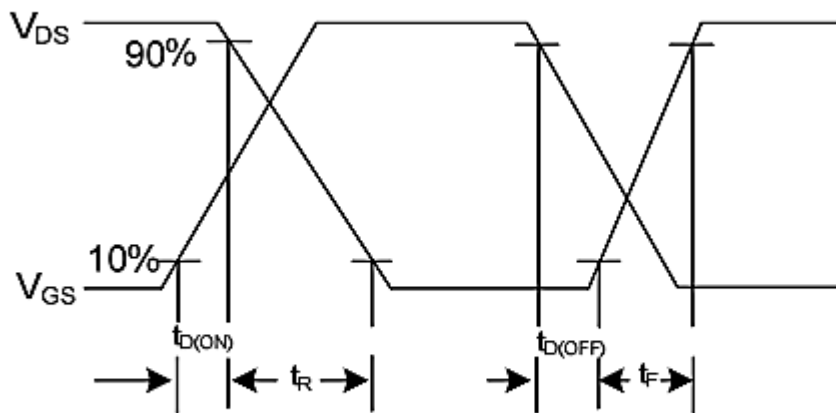
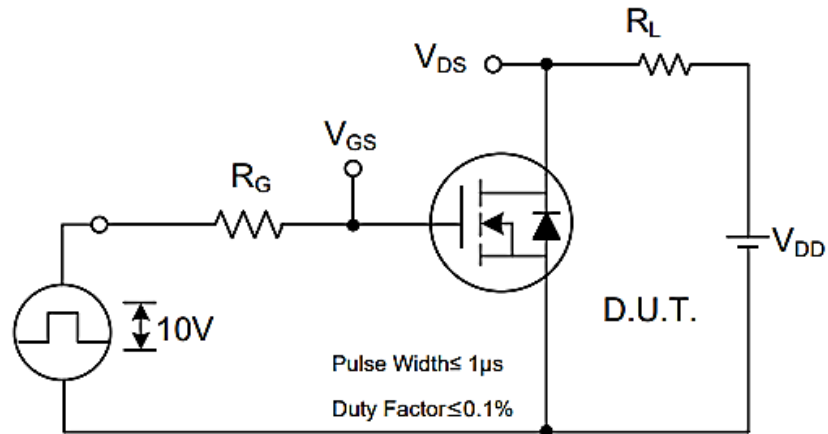
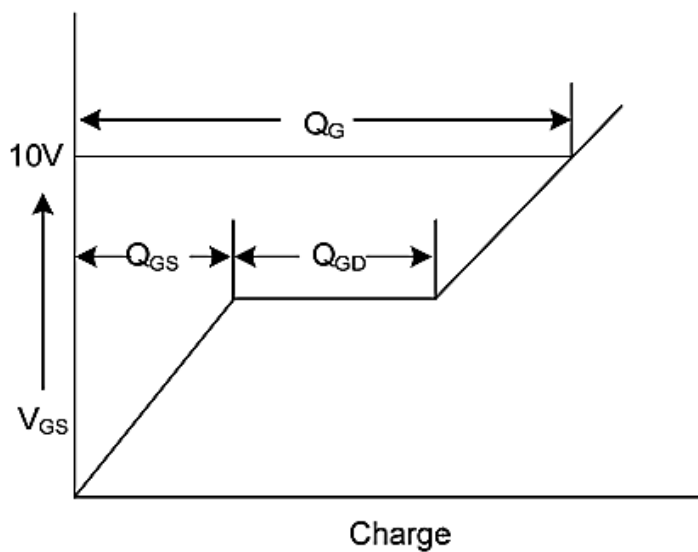
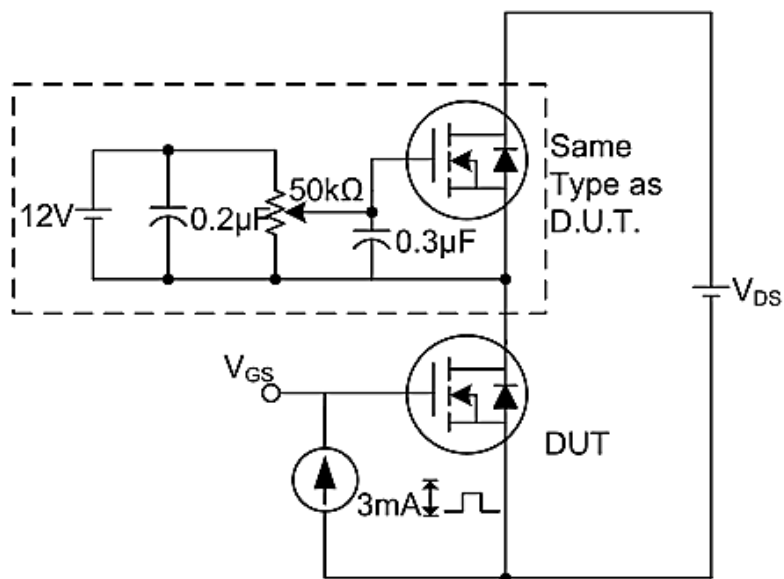


Figure 13. Transient Thermal Impedance, Junction to Case, TO-220/ TO-252

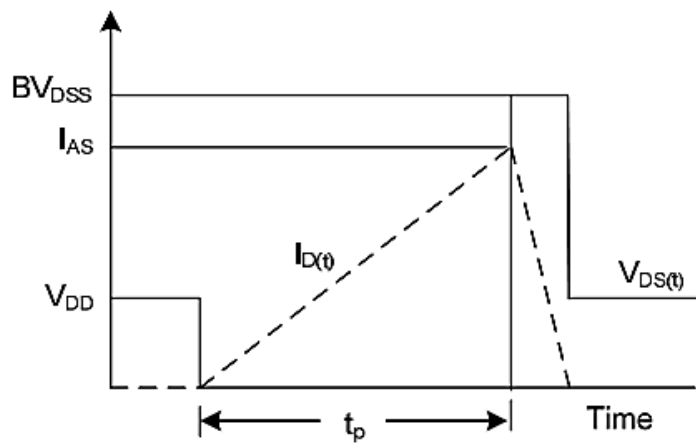
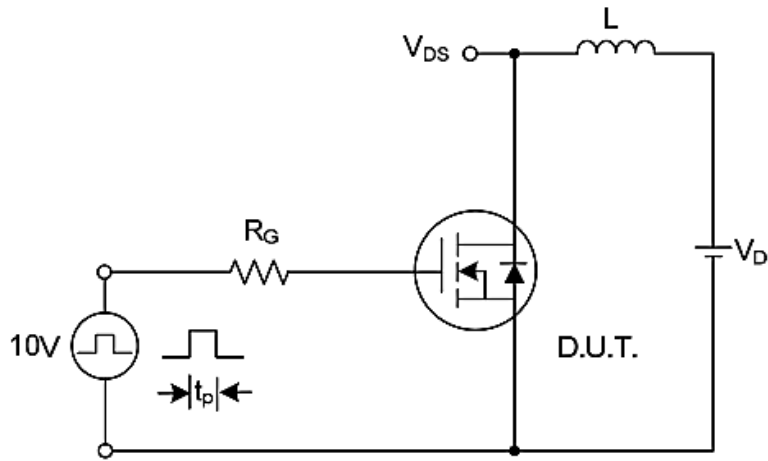
SWITCHING TEST CIRCUIT & WAVEFORMS



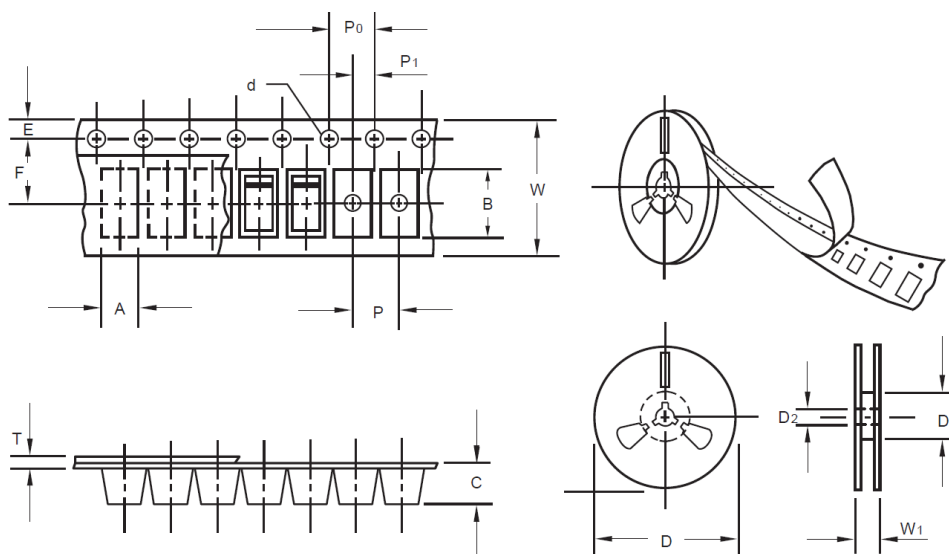
GATE CHARGE TEST CIRCUIT & WAVEFORM



UNCLAMPED INDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORMS



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



ITEM	SYMBOL	TOLERANCE	TO-252
Carrier width	A	0.1	6.15
Carrier Length	B	0.1	8.41
Carrier Depth	C	0.1	2.42
Sprocket hole	d	0.05	1.50
13"Reel outside diameter	D	2.0	330.00
13"Reel inner diameter	D1	Min.	50.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	7.50
Punch hole pitch	P	0.1	8.00
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	16.00
Reel width	W1	1.0	16.50
SPQ Per Reel	2500pcs		

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.
4. NextGen Component, Inc (*NextGen*) reserves the right to make changes to this document and its products and specifications at any time without notice. Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.
5. *NextGen* makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does *NextGen* assume any liability for application assistance or customer product design.
6. *NextGen* does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application. No license is granted by implication or otherwise under any intellectual property rights of NextGen.
7. *NextGen* products are not authorized for use as critical components in life support devices or systems without express written approval by *NextGen*.
8. *NextGen* requires that customers first obtain an RMA (Returned Merchandise Authorization) number prior to returning any products. Returns must be made within 30 days of the date of invoice, be in the original packaging, unused and like-new condition. At the time of quoting or purchasing, a product may say that it is Non-Cancelable/ Non-Returnable (NCNR). These products are not returnable and not refundable.