

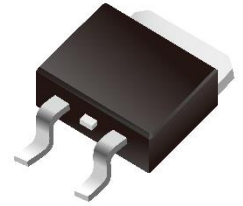
SPECIFICATION SHEET NO.	S0212- MDD50N06D000SD	
ORIGINAL MFG/PART NO.	MDD Diodes/MDD50N06D	
NEXTGEN PART CODE	MDD50N06D000SD	Indicate This Code For RFQ/Order
DATE	Feb. 12, 2025	
REVISION	A2	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	60V N-Channel Enhancement Mode MOSFET, MDD50 Series, 3 pins, MDD50N06D Type, Case TO-252 Drain-Source Voltage (V _{BRDSS}):60V Continuous Drain Current (I _D): 50A Max. Power Dissipation (P _d): 62.5W 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

- $R_{DS(ON)} \leq 17m\ \Omega$ @ $V_{GS}=10V$, $I_D=20A$
- High Switching Speed
- Improved dv/dt capability
- REACH/RoHS/RoHS III/Compliant
- Halogen Free



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

APPLICATION

- Switching application

ELECTRICAL CHARACTERISTICS

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



HOW TO ORDER

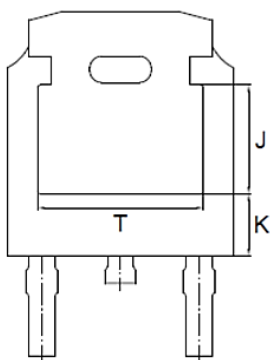
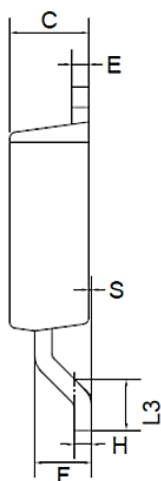
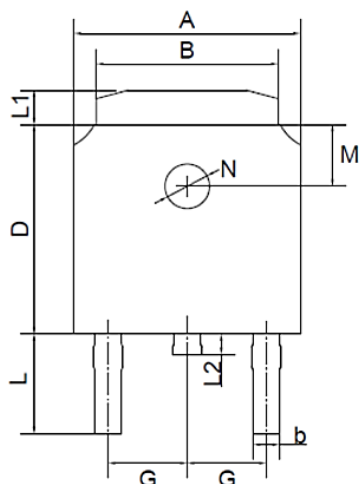
- Please Follow Up Part Code Guide And Indicate NextGen Part Code MDD50N06D000SD For RFQ and Order.

PART CODE GUIDE

RFQ
[Request For Quotation](#)

CODE	NAME	KEY SPECIFICATION OPTION
MDD50	Product Series Code	MOSFET, Continuous Drain Current (Id): 50A Max. MDD50 series, 3 pins
N	Enhancement Mode code	N: N-Channel Enhancement Mode
06	Drain-Source Voltage Code	06: 60V
D	Case Code	D: Case TO-252
000SD	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

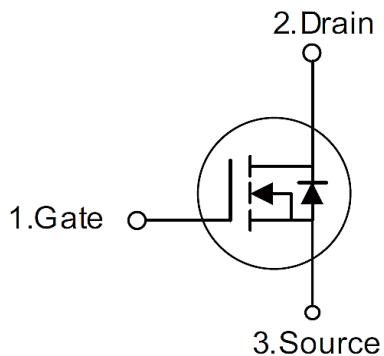
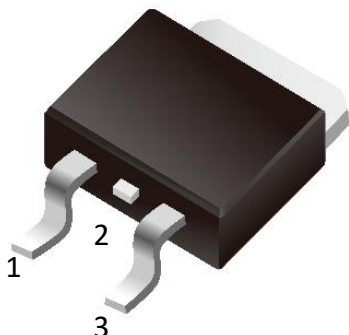
DIMENSION- Unit: mm, Case TO-252 Outline



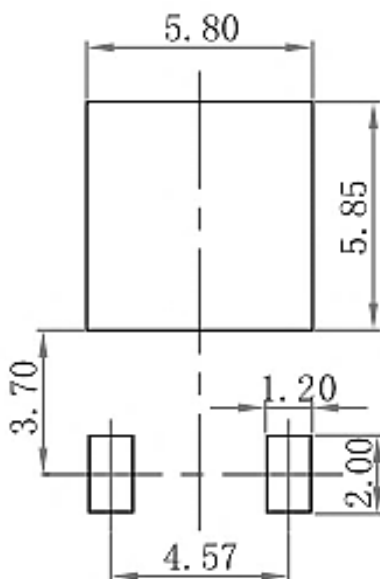
SYMBOL	VALUE (MM)		
	MIN.	TYP.	MAX.
A	6.30	-	6.70
B	5.10	-	5.50
b	0.30	-	0.80
C	2.10	-	2.50
D	5.90	-	6.30
E	0.40	-	0.60
F	1.30	-	1.80
G	2.29 Typical		
H	0.45	-	0.55
L	2.70	-	3.10
L1	0.80	-	1.20
L2	0.60	-	1.00
L3	1.40	-	1.75
S	0.0	-	0.10
M	1.80 Typical		
N	1.30 Typical		
J	3.16 ref.		
K	1.80 ref.		
T	4.83 ref.		

EQUIVALENT CIRCUIT

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



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



60V N-CHANNEL ENHANCEMENT MODE MOSFET

V (BR)DSS	Id Max	RDS (on), Max	Q g,typ
60V	50A	17mΩ @ VGS=10V	40 nC

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

PARAMETER	SYMBOLS	VALUE	UNIT
Drain-Source Voltage	V DS	60	V
Gate-Source Voltage	V GS	±20	V
Continuous Drain Current	I D	50	A
Pulsed Drain Current (Note 2)	I DM	200	A
Avalanche Energy Single Pulsed (Note 3)	E AS	98	mJ
Peak Diode Recovery dv/dt	dv/dt	10	A
Power Dissipation	P D	62.5	W
Thermal Resistance from Junction to Ambient	R θJA	62	°C/W
Thermal Resistance Junction-to-Case	R θJC	2	°C/W
Junction Temperature	T J	150	°C
Storage Temperature Range	T STG	-55 ~ +150	°C

Note:

- 1) Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.
- 2) Repetitive Rating : Pulse width limited by maximum junction temperature.
- 3) L=43mH, IAS=43A, VDD=25V, RG=20Ω, Starting TJ=25° C
- 4) ISD ≤ 30A, VDS=0V, di/dt ≤ 200A/μs, VDD ≤ BVDSS, 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	60	-	-	V
Drain-Source Leakage Current	IDSS	VDS=60V, VGS=0V	-	-	1	uA
Gates-Source Leakage Crurent	IGSS	VGS=±20V, VDS=0V	-	-	± 100	nA
Gate Threshold Voltage	VGS(TH)	VDS=VGS, ID=250μA	1.2	1.8	2.5	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=20A	-	12	17	mΩ
		VGS=4.5V, ID=20A	-	17	23	mΩ

DYNAMIC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Input Capacitance	Ciss	VDS=30V, VGS=0V f=1MHz	-	1889	-	pF
Output Capacitance	Coss		-	113	-	pF
Reverse Transfer Capacitance	Crss		-	92	-	pF
Total Gate Charge	Qg	VDS=30V, VGS=10V, ID=20A (Note1, 2)	-	40	-	nC
Gate Source Charge	Qgs		-	7.8	-	nC
Gate Drain Charge	Qgd		-	8.3	-	nC

SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Turn on Delay Time	$t_{d(on)}$	$V_{DS}=30V$, $V_{GS}=10V$, $I_D=20A$, $R_G=3\Omega$ (Note1,2)	-	13	-	ns
Turn on Rise Time	t_r		-	25	-	ns
Turn Off Delay Time	$t_d(off)$		-	60	-	ns
Turn Off Fall Time	t_f		-	9	-	ns

SOURCE DRAIN DIODE CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Source drain current(Body Diode)	I_{SD}		-	-	50	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=20A$, $V_{GS}=0V$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=20A$, $V_{GS}=0V$ $dI/dt=100A/\mu s$	-	29	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	21	-	nC

Note:

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

TYPICAL PERFORMANCE - For Reference Only

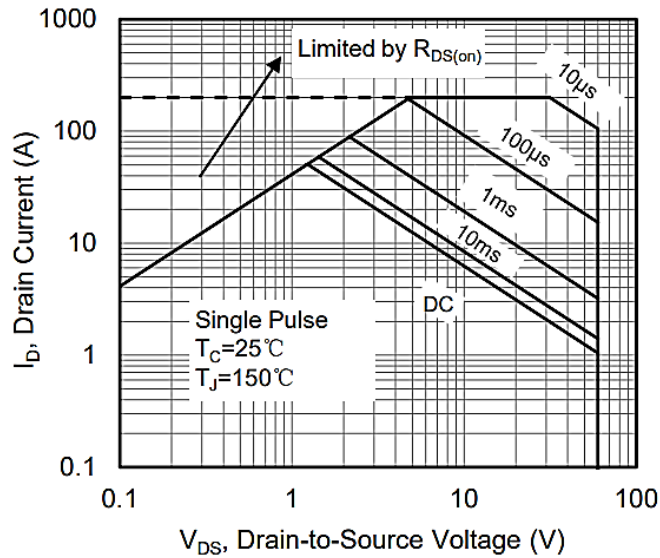


Figure 1. Maximum Safe Operating Area

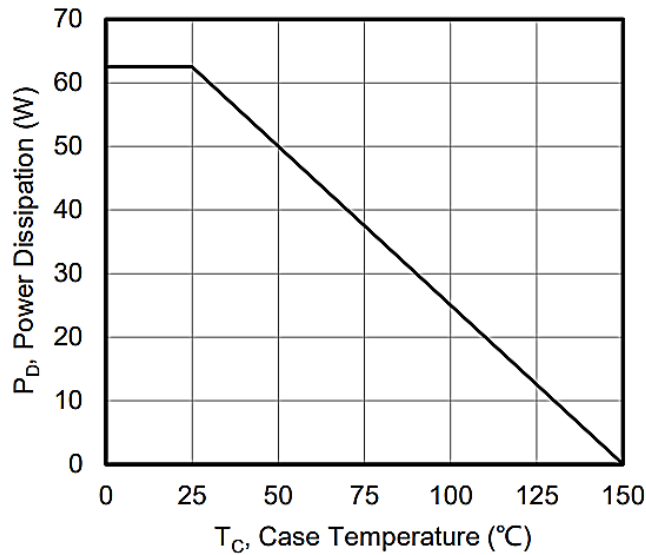


Figure 2. Maximum Power Dissipation vs Case Temperature

TYPICAL PERFORMANCE - For Reference Only

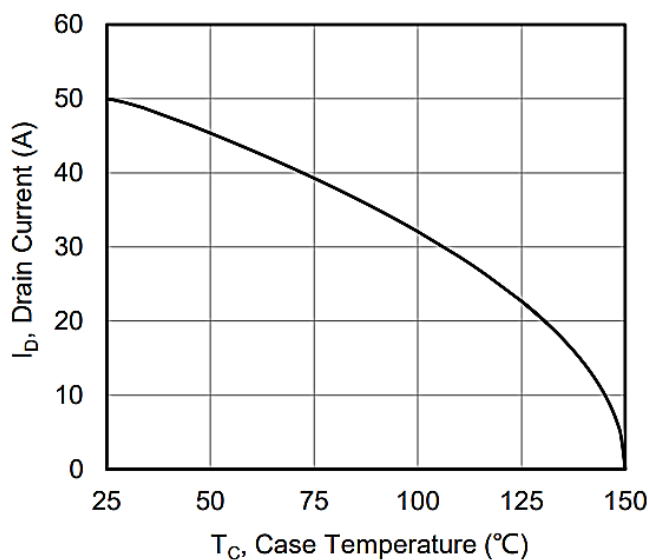


Figure 3. Maximum Continuous Drain Current vs Case Temperature

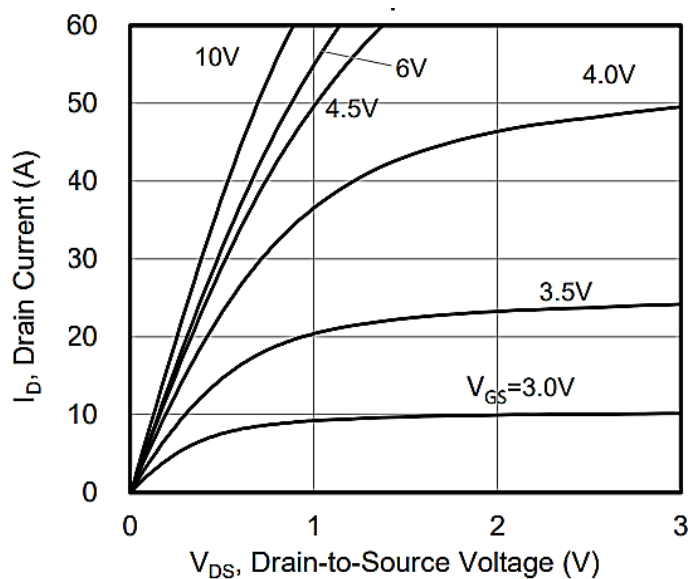


Figure 4. Typical output Characteristics

TYPICAL PERFORMANCE - For Reference Only

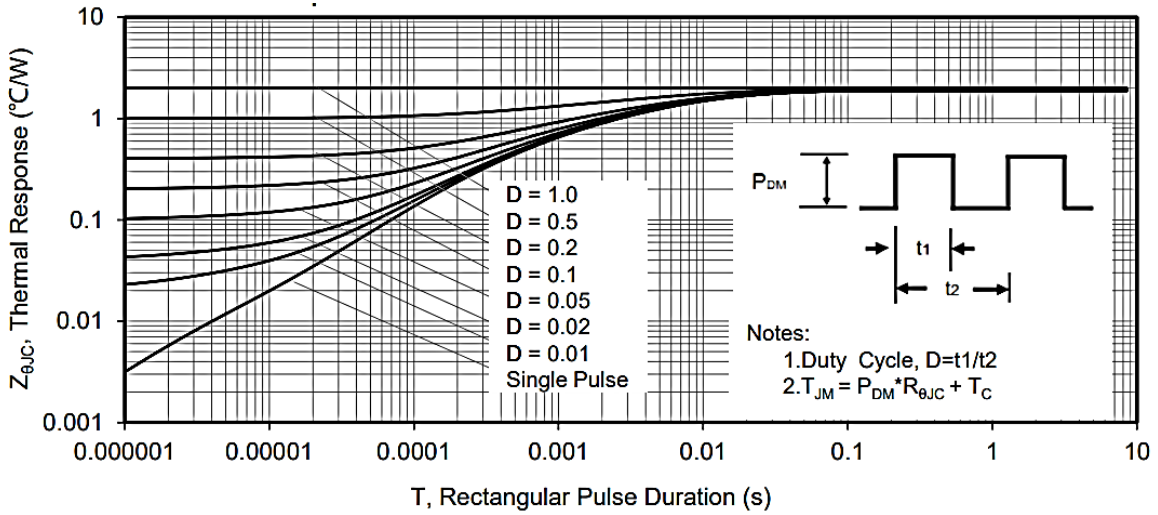


Figure 5. Maximum Effective Thermal Impedance, Junction to Case

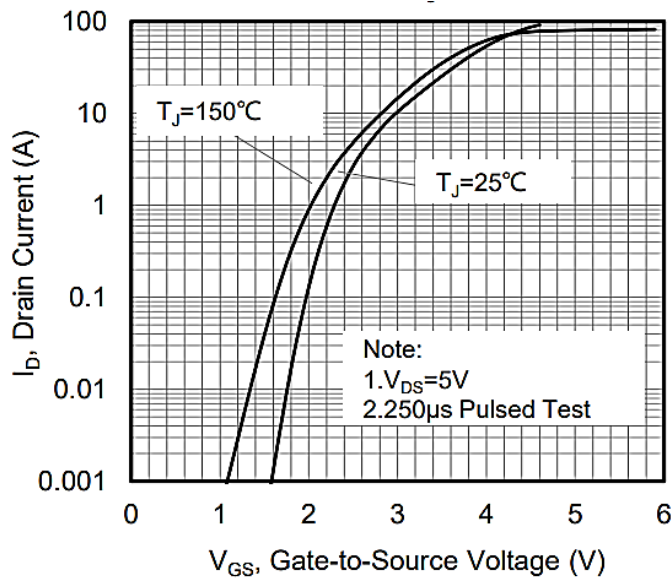


Figure 6. Typical Transfer Characteristics

TYPICAL PERFORMANCE - For Reference Only

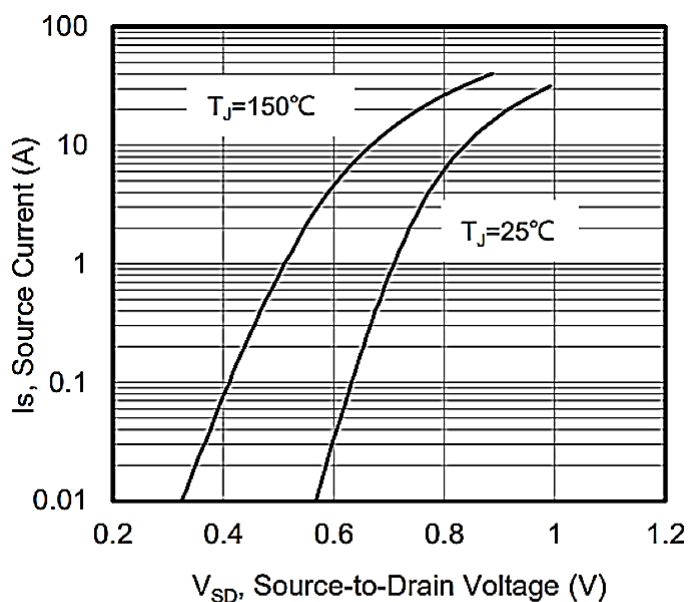


Figure 7. Typical Body Diode Transfer Characteristics

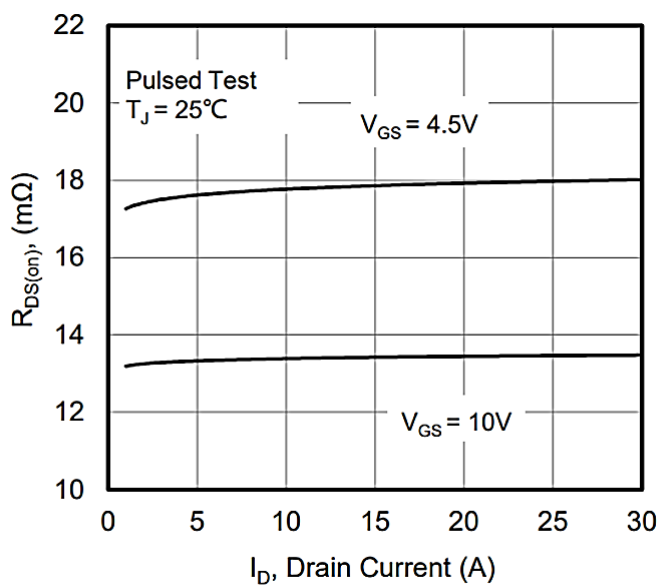


Figure 8. Drain-to-Source On Resistance vs Drain Current

TYPICAL PERFORMANCE - For Reference Only

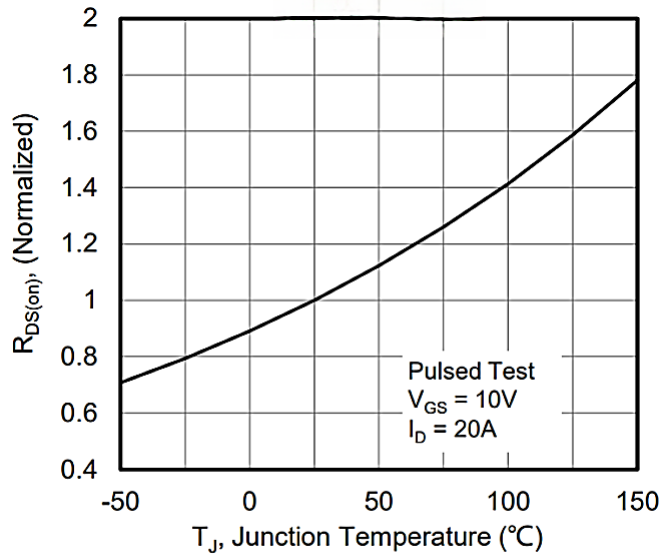


Figure 9. Normalized On Resistance vs Junction Temperature

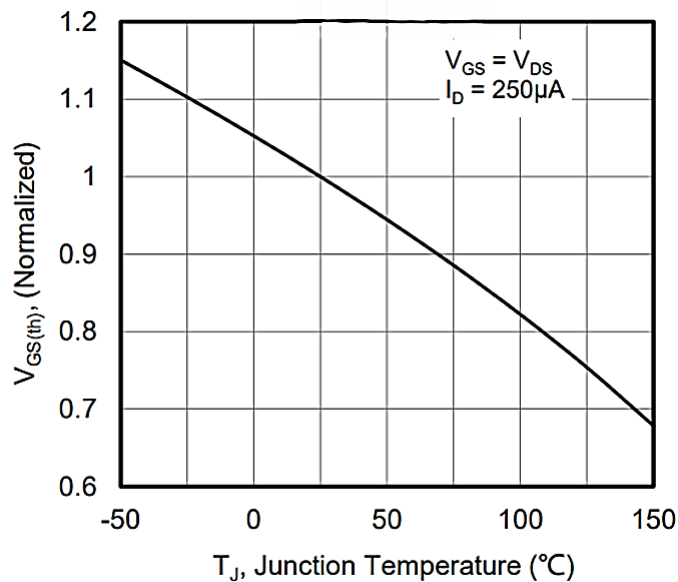


Figure 10. Normalized Threshold Voltage vs Junction Temperature

TYPICAL PERFORMANCE - For Reference Only

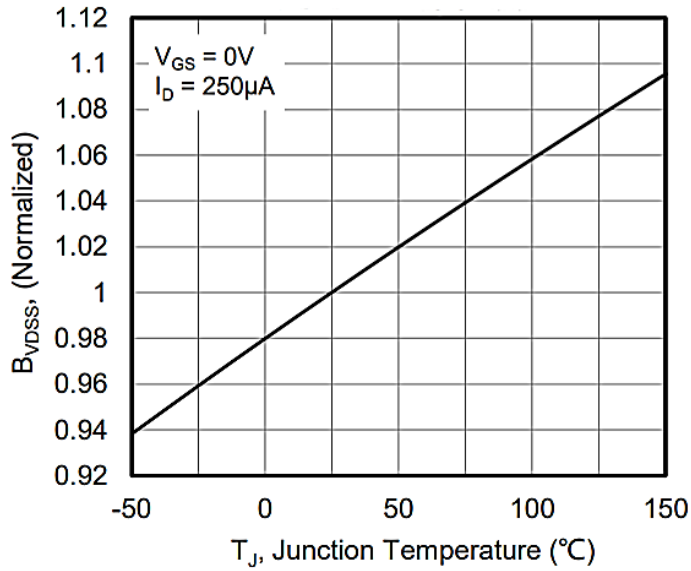


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

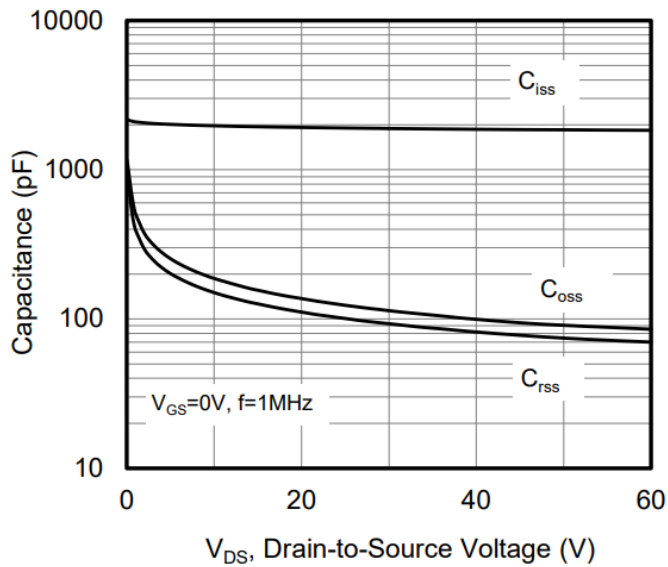
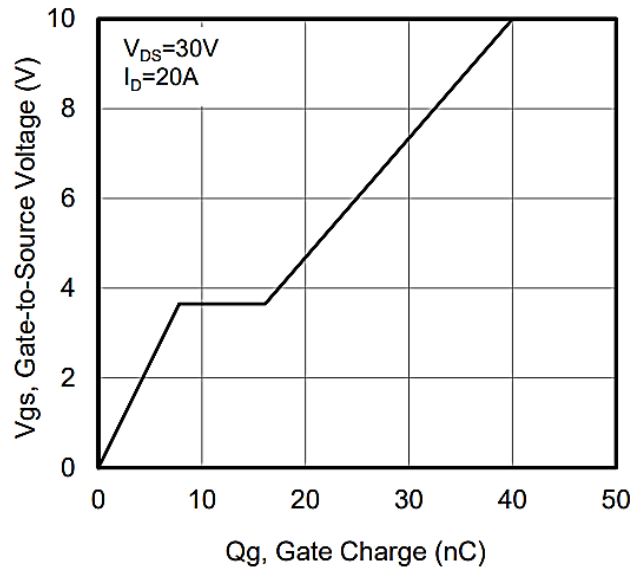


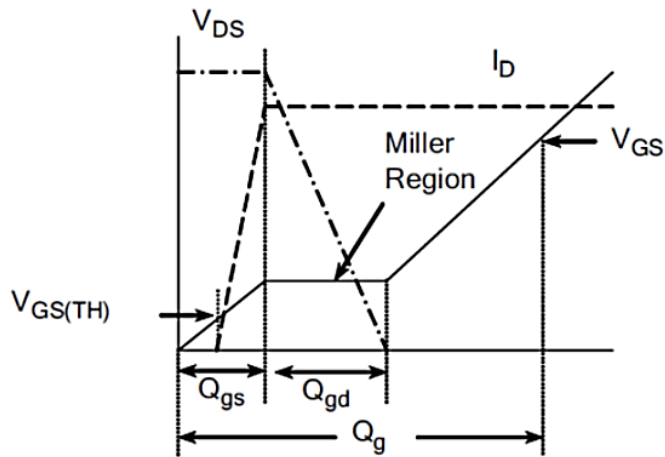
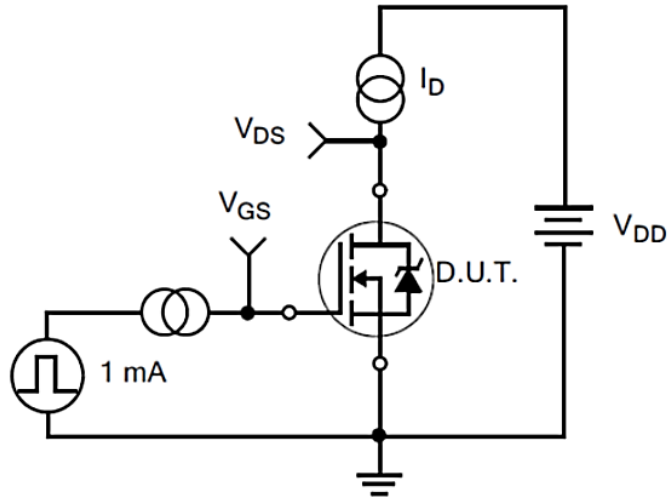
Figure 12. Capacitance Characteristics

TYPICAL PERFORMANCE - For Reference Only

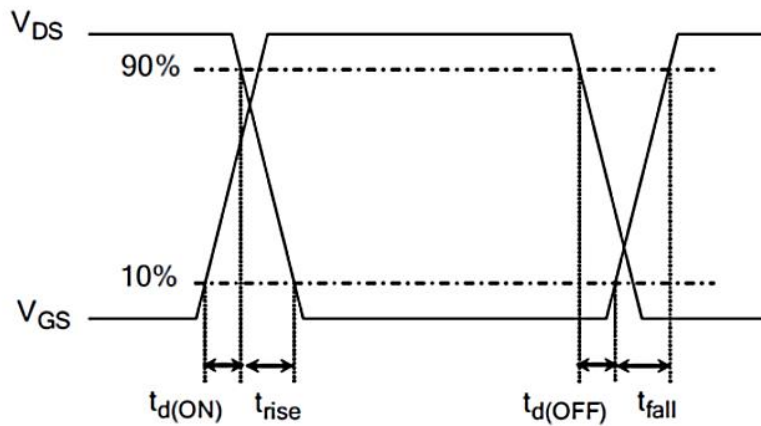
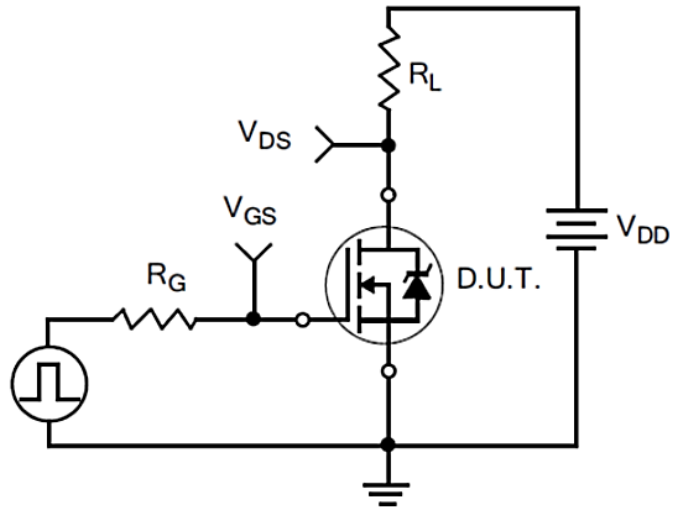


**Figure 13. Typical Gate Charge vs
Gate to Source Voltage**

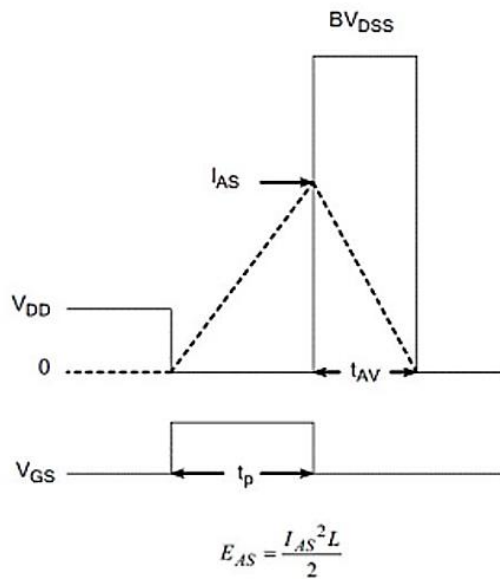
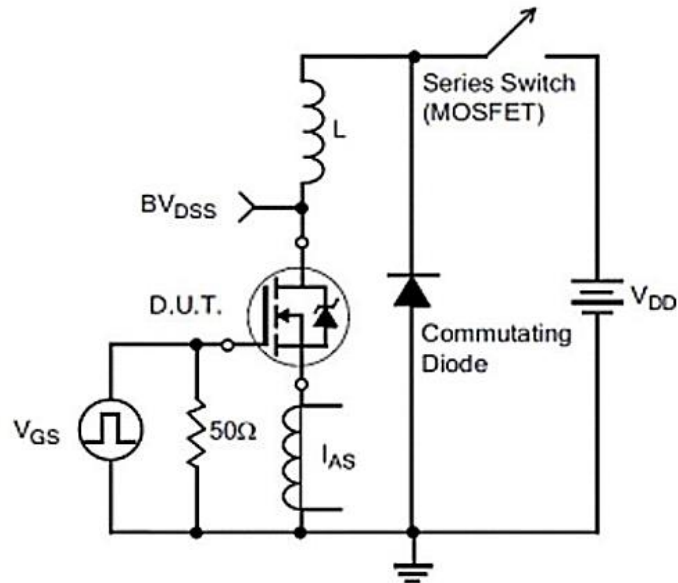
GATE CHARGE TEST CIRCUIT & WAVEFORMS



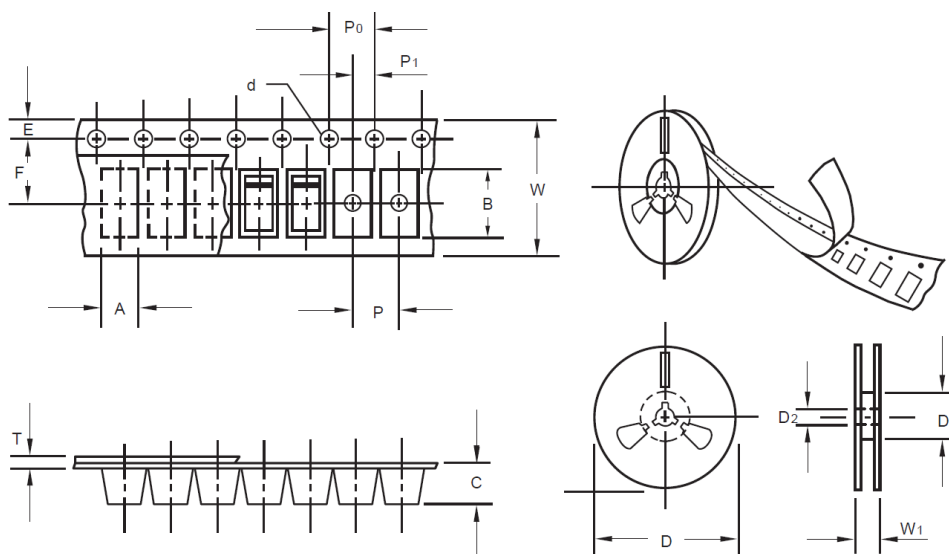
RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS



UNCLAMPED INDUCTIVE SWITCHING TEST CIRCUIT & WAVEFORM



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.
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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.