

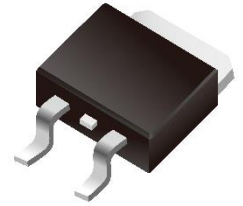
SPECIFICATION SHEET NO.	S0212- MDD20N06D000SD	
ORIGINAL MFG/PART NO.	MDD Diodes/MDD20N06D	
NEXTGEN PART CODE	MDD20N06D000SD	Indicate This Code For RFQ/Order
DATE	Feb. 12, 2025	
REVISION	A2	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	60V N-Channel Enhancement Mode MOSFET, MDD20 Series, 3 pins, MDD20N06D Type, Case TO-252 Drain-Source Voltage (V _{BRDSS}):60V Continuous Drain Current (I _D): 20A Max. Power Dissipation (P _d): 40W 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

- Excellent Package For Good Heat Dissipation
- Ultra Low Gate Charge
- Low Reverse Transfer Capacitance
- Fast Switching Capability
- Avalanche Energy Specified
- REACH/RoHS/RoHS III/Compliant
- Halogen Free



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

APPLICATION

- Power Switching Application

ELECTRICAL CHARACTERISTICS

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



HOW TO ORDER

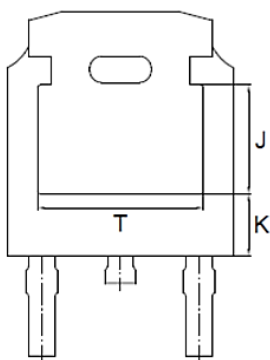
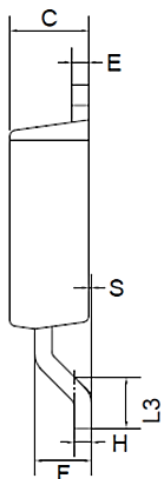
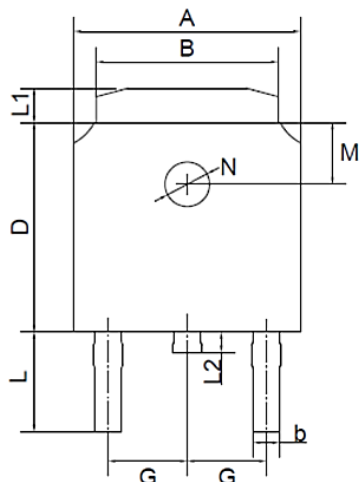
- Please Follow Up Part Code Guide And Indicate NextGen Part Code MDD20N06D000SD For RFQ and Order.

PART CODE GUIDE

RFQ
[Request For Quotation](#)

CODE	NAME	KEY SPECIFICATION OPTION
MDD20	Product Series Code	MOSFET, Continuous Drain Current (Id): 20A Max. MDD20 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

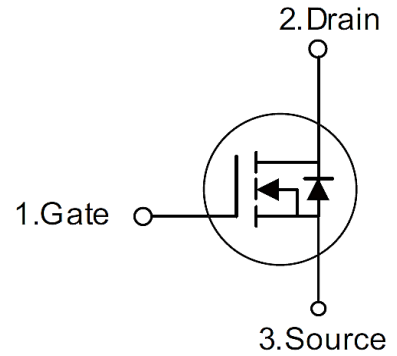
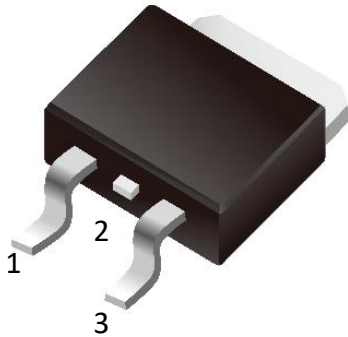
DIMENSION- Unit: mm, Case TO-252 Outline



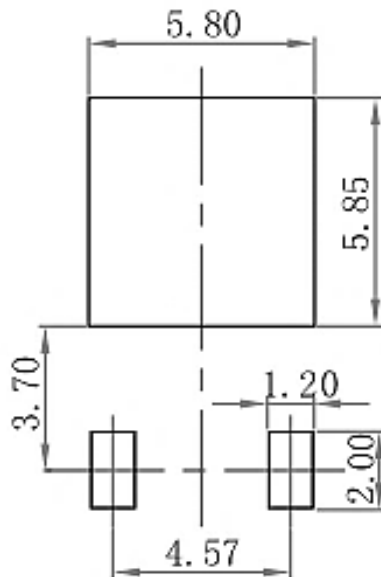
SYMBOL	VALUE (MM)		
	MIN.	TYP.	MAX.
A	6.30	-	6.70
B	5.10	-	5.50
b	0.30	-	0.80
C	2.10	-	2.50
D	5.90	-	6.30
E	0.40	-	0.60
F	1.30	-	1.80
G	2.29 Typical		
H	0.45	-	0.55
L	2.70	-	3.10
L1	0.80	-	1.20
L2	0.60	-	1.00
L3	1.40	-	1.75
S	0.0	-	0.10
M	1.80 Typical		
N	1.30 Typical.		
J	3.16 ref.		
K	1.80 ref.		
T	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	20A	26mΩ @ VGS=10V 35mΩ @ VGS=4.5V	18nC

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	20	A
Pulsed Drain Current (Note 1)	I DM	80	A
Avalanche Energy Single Pulsed (Note 2)	E AS	49	mJ
Power Dissipation	P D	40	W
Thermal Resistance Junction-to-Ambient (Note 3)	R θJA	100	°C/W
Thermal Resistance Junction-to-Case (Note 3)	R θJC	3.12	°C/W
Storage Temperature Range	T STG	-55 ~ +150	°C

Note:

- 1) $P_W \leq 10\mu s$, Duty cycle $\leq 1\%$.
- 2) EAS condition: $V_{DD}=30V$, $V_{GS}=10V$, $L=0.5mH$, $R_g=25\Omega$ Starting $T_J = 25^\circ C$
- 3) $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

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=48V, VGS=0V	-	-	1	uA
Gates-Source Leakage Crurent	IGSS	VGS=±20V, VDS=0V	-	-	± 100	nA
Gate Threshold Voltage	VGS(TH)	VDS=VGS, ID=250μA	1.0	1.7	2.5	V
Drain-Source On-State Resistance	RDS(ON)	VGS=10V, ID=10A	-	26	35	mΩ
		VGS=4.5V, ID=10A	-	35	50	mΩ

DYNAMIC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Input Capacitance	Ciss	VDS=25V, VGS=0V f=1MHz	-	850	1700	pF
Output Capacitance	Coss		-	60	120	pF
Reverse Transfer Capacitance	Crss		-	55	110	pF
Total Gate Charge	Qg	VDS=30V, VGS=10V, ID=10A (Note1, 2)	-	18	36	nC
Gate Source Charge	Qgs		-	2.0	4.0	nC
Gate Drain Charge	Qgd		-	4.4	8.8	nC

SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Turn on Delay Time	$t_{d(on)}$	$V_{DS}=30V$, $V_{GS}=10V$, $R_L=2.5\Omega$ $R_G=3\Omega$ (Note1,2)	-	4.2	-	ns
Turn on Rise Time	t_r		-	3.4	-	ns
Turn Off Delay Time	$t_{d(off)}$		-	16	-	ns
Turn Off Fall Time	t_f		-	2	-	ns

SOURCE DRAIN DIODE CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	VALUE			UNIT
			Min.	Typ.	Max.	
Source drain current(Body Diode)	I_{SD}		-	-	20	A
Pulsed Current	I_{SM}		-	-	80	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=10A$, $V_{GS}=0V$	-	-	1.2	V

Note:

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

TYPICAL PERFORMANCE - For Reference Only

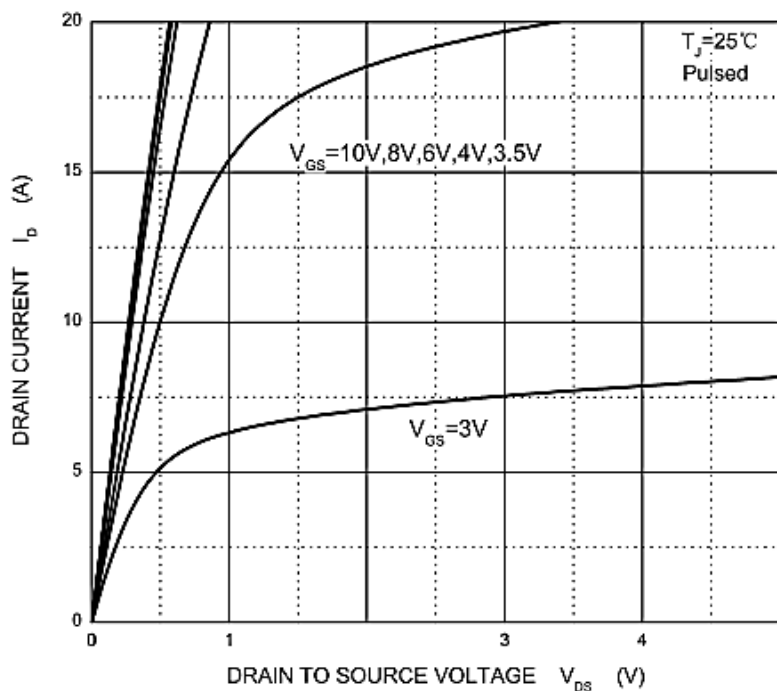


Figure 1. Typical Output Characteristics

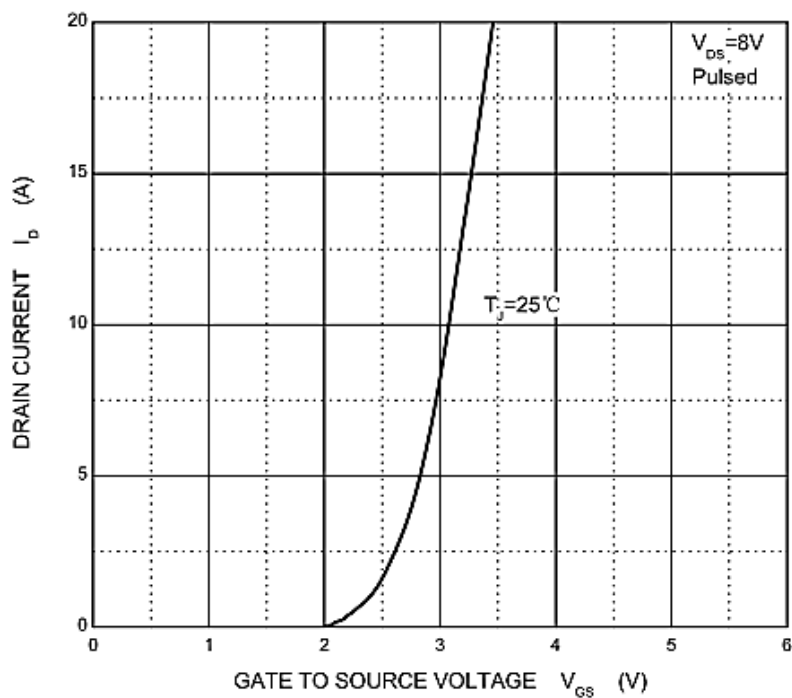


Figure 2. Transfer Characteristics

TYPICAL PERFORMANCE - For Reference Only

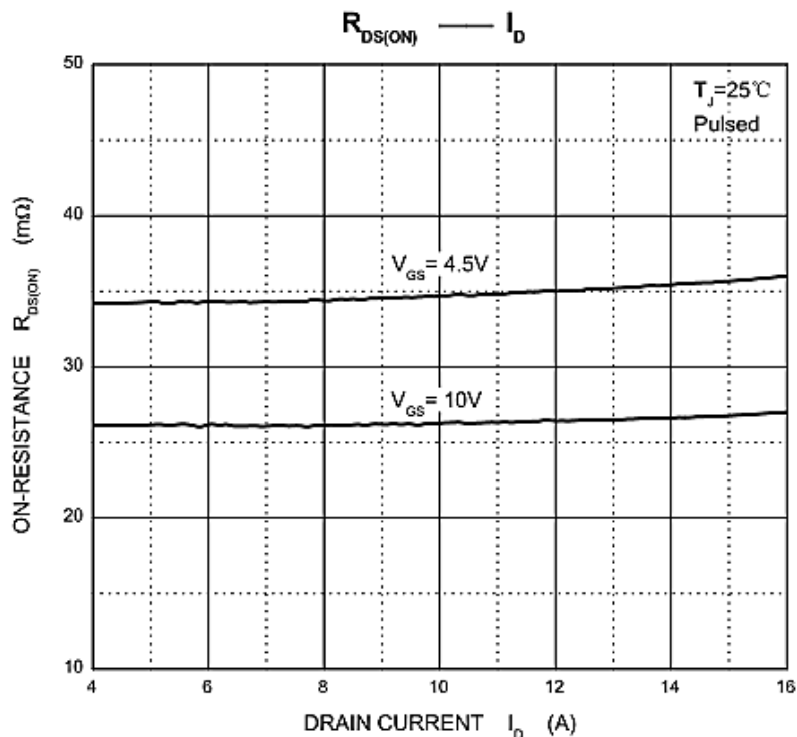


Figure 3. $R_{DS(ON)}$ vs. I_D

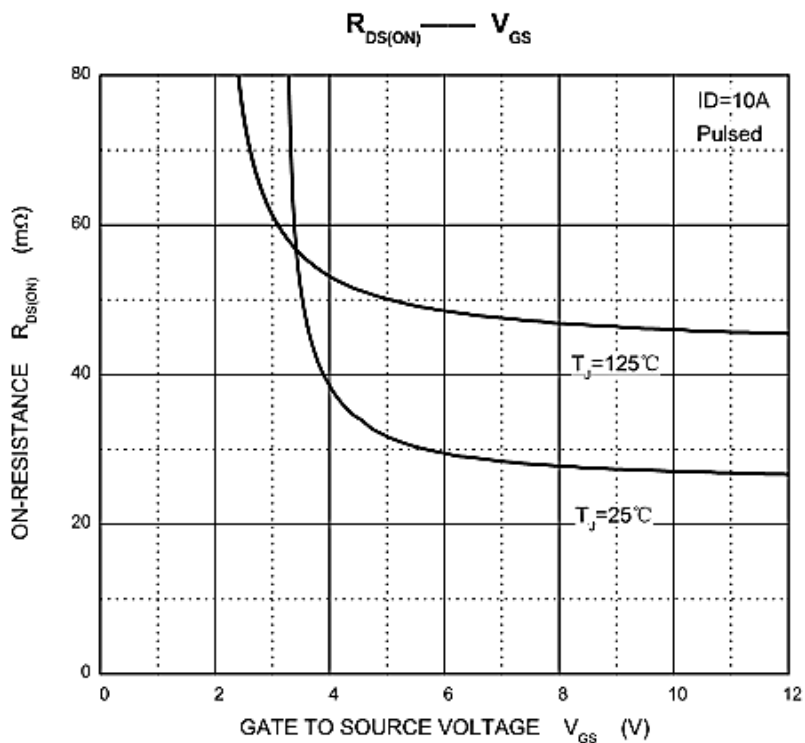


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

TYPICAL PERFORMANCE - For Reference Only

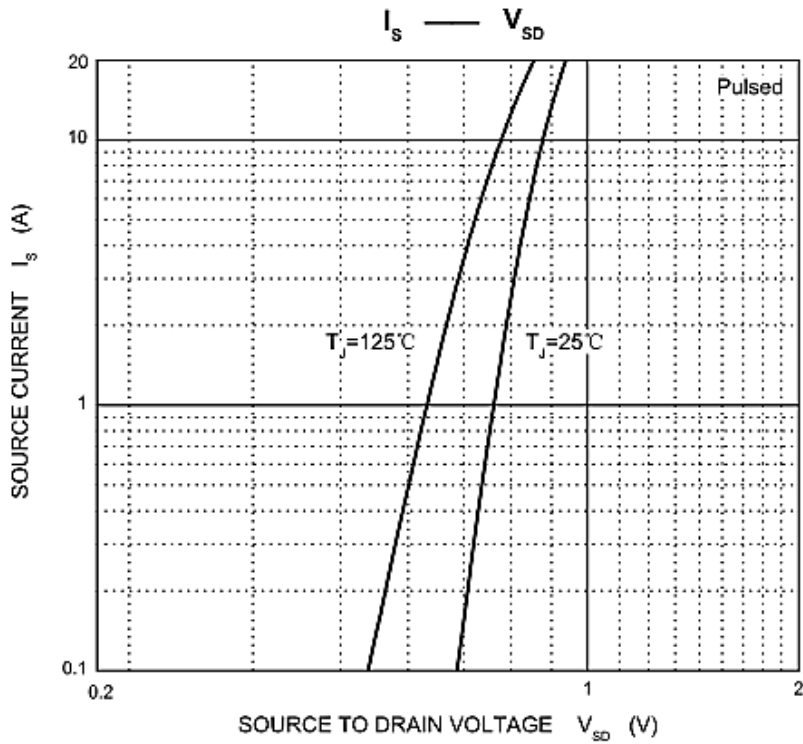


Figure 5. I_s vs. V_{sd}

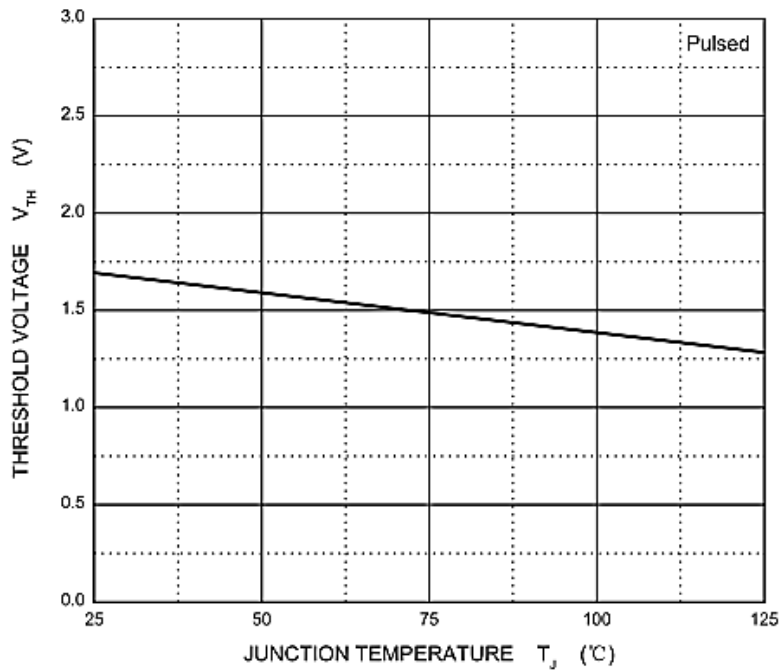


Figure 6. Threshold Voltage vs. Temperature

TYPICAL PERFORMANCE - For Reference Only

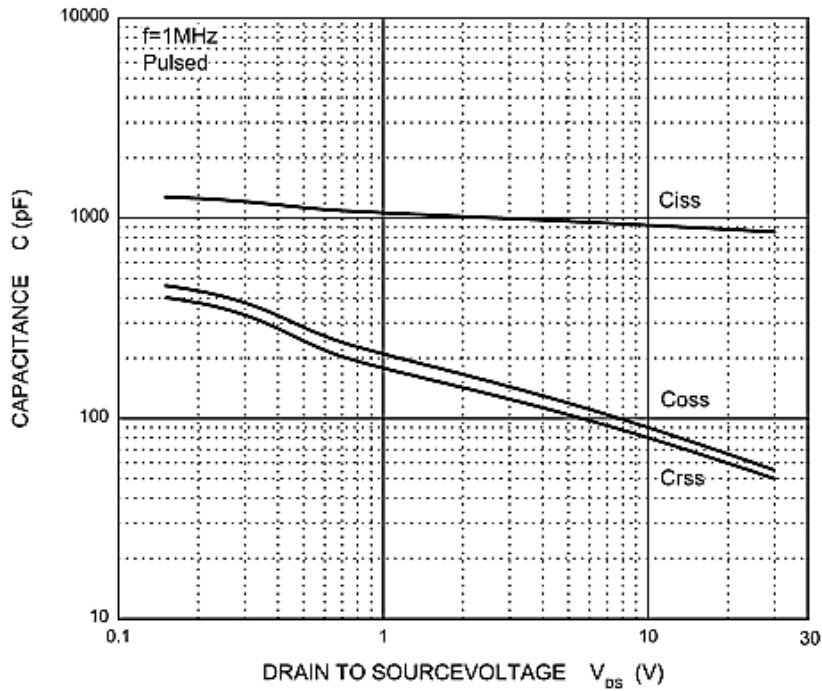


Figure 7. Capacitance Characteristics

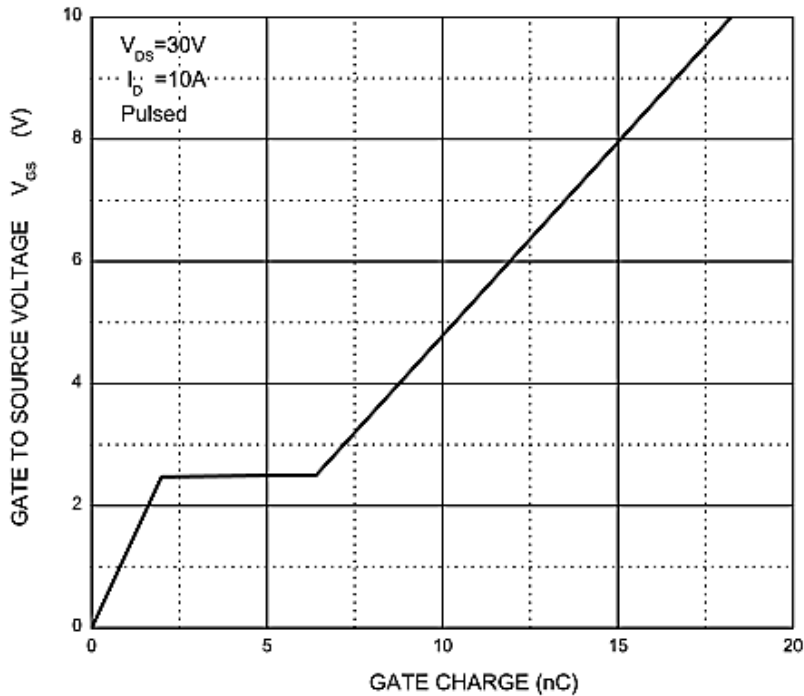
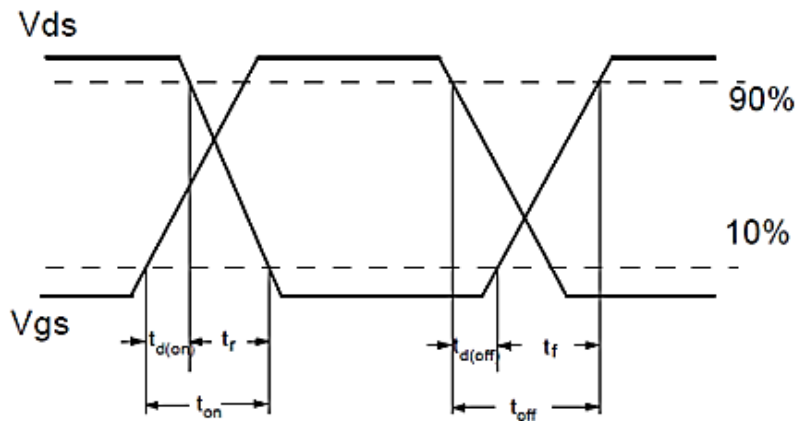
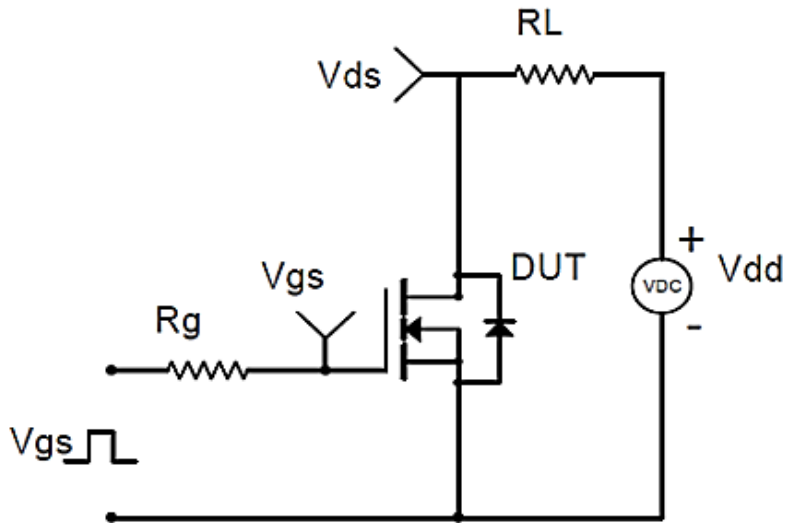
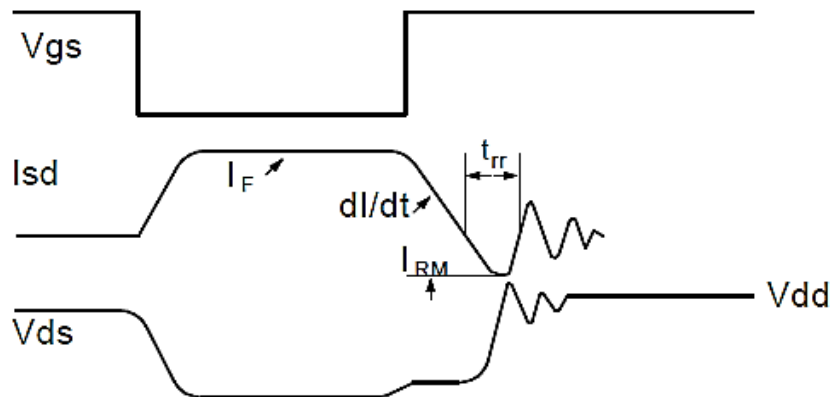
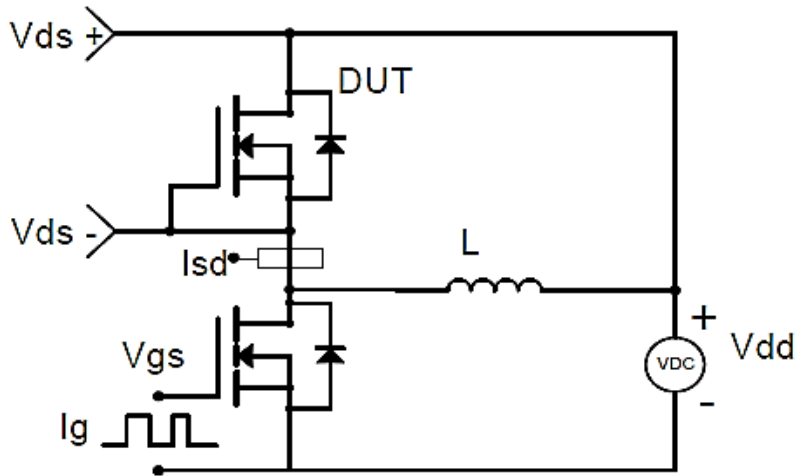


Figure 8. Gate Charge Characterist

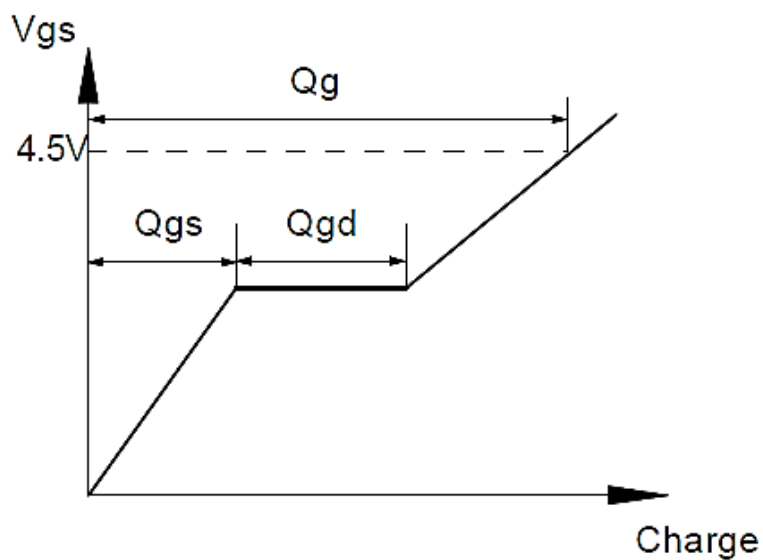
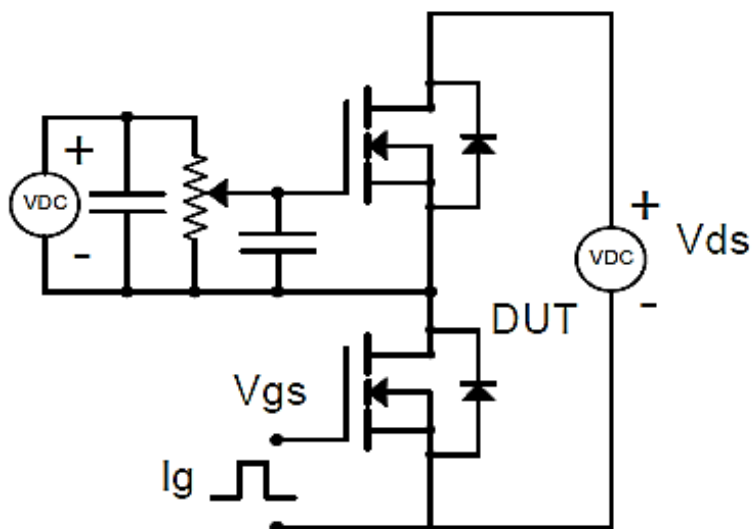
RESISTIVE SWITCHING TEST CIRCUIT & WAVEFORMS



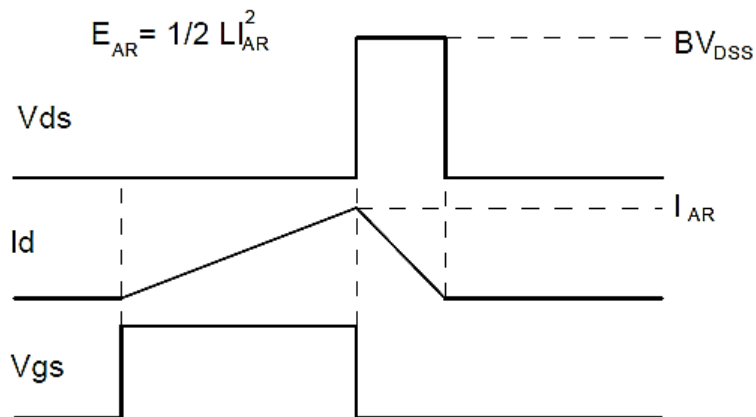
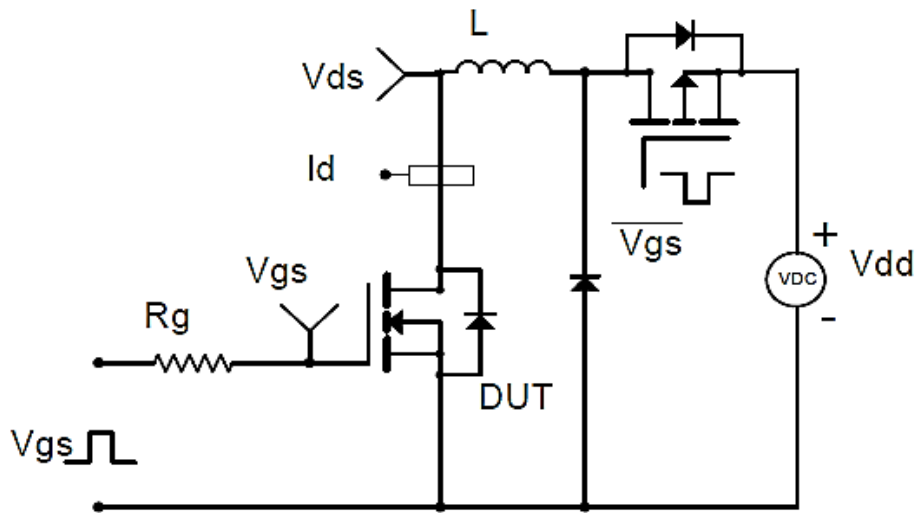
DIODE RECOVERY TEST CIRCUIT & WAVEFORMS



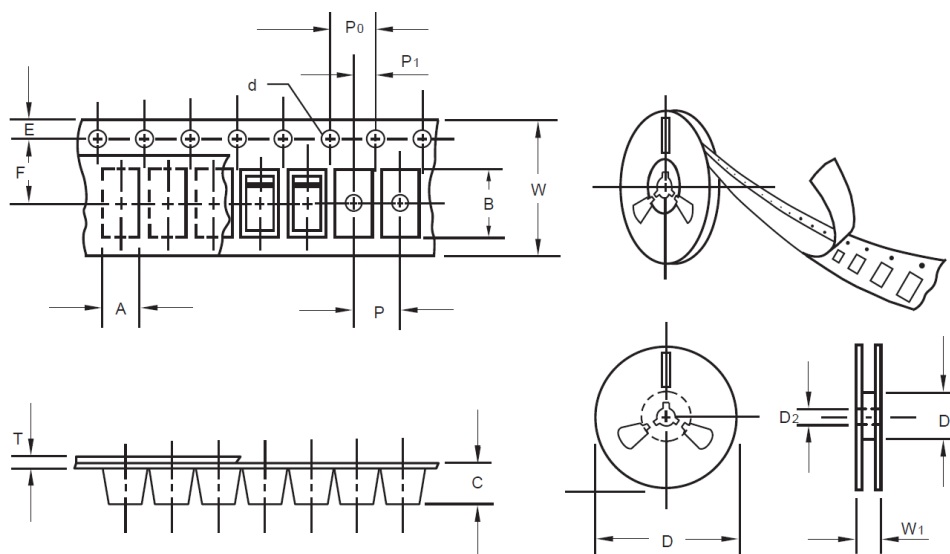
GATE CHARGE TEST CIRCUIT & WAVEFORM



UNCLAMPED INDUCTIVE SWITCHING (UIS) 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.
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