TO-252 Plastic-Encapsulate MOSFETS

Features

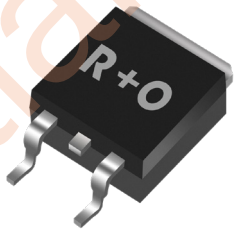
- V_{DS}=30V
- I_D=50A
- $R_{DS(on)}$@V_{GS}=10V ＜ 7mΩ
- $R_{DS(on)}$@V_{GS}=4.5V ＜ 11.5mΩ
- Avalanche energy tested
- Fast Switching Speedze
- Improved dv/dt capability, high ruggedness

Drain-source Voltage
30 V
Drain Current
50 Ampere

Applications

- DC-DC Converter
- Load switch
- Power management

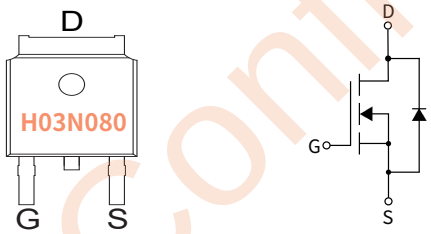
TO-252



Mechanical Data

- Case: TO-252
  Molding compound meets UL 94V-0 flammability rating, RoHS-compliant,halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750,Method 2026

Function Diagram



Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
TO-252	R3	0.305	2500	5000	30000	13''

Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	V_{DS}	V	30
Gate-source Voltage	V_{GS}	V	±20
Drain Current	I_D	A	50
Pulsed Drain Current [1]	I_{DM}	A	200
Total Power Dissipation	P_D	W	25
Single pulse avalanche energy[2]	EAS	mJ	36
Junction temperature	T_J	°C	-55 ~+150
Storage temperature	T_{stg}	°C	-55 ~+150
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	°C / W	5

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Static Parameter Characteristics (Tj=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=250μA	V	30	—	—
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V	μA	—	—	1.0
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	nA	—	—	±100
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	V	1.0	1.6	3.0
Static Drain-Source On-Resistance (3)	$R_{DS(ON)}$	V_{GS}= 10V, I_D=10A	mΩ	—	5.5	7
		V_{GS}= 4.5V, I_D=10A		—	7.5	11.5

Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHZ	pF	—	1665	—
Output Capacitance	C_{oss}			—	180	—
Reverse Transfer Capacitance	C_{rss}			—	130	—

Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=15V, I_D=10A ,R_{GEN}=3Ω	nS	—	6	—
Turn-on Rise Time	t_r		nS	—	10	—
Turn-off Delay Time	$t_{D(off)}$		nS	—	16	—
Turn-off fall Time	t_f		nS	—	4	—
Total Gate Charge	Q_g	V_{DS}=15V, I_D=10A V_{GS}=10V	nC	—	30.5	—
Gate-Source Charge	Q_{gs}		nC	—	4.3	—
Gate-Drain Charge	Q_{gd}		nC	—	6	—

Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V_{SD}	I_S=40A, V_{GS}=0V	V	—	—	1.2
Maximum Body-Diode Continuous Current	I_S	—	A	—	—	50

Note :
(1)Repetitive Rating: Pulse width limited by maximum junction temperature.
(2)EAS condition : Tj=25°C ,VDD=25V,VG=10V,L=0.5mH,IAS=12A,Rg=25Ω.
(3)Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

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Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

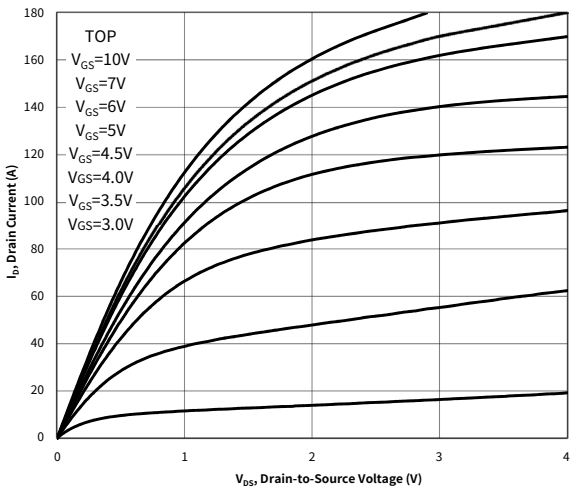


Fig.1 Output Characteristics

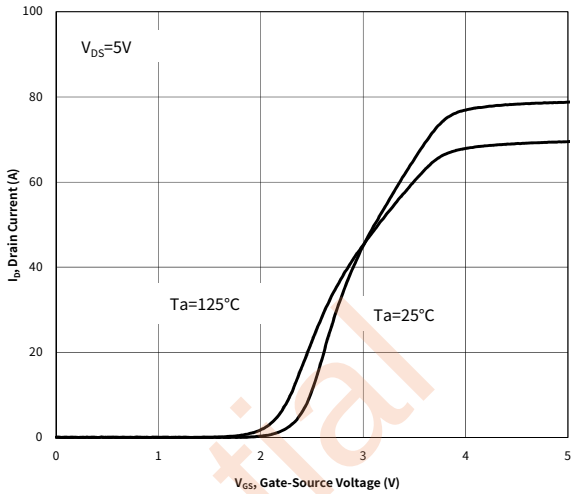


Fig.2 Transfer Characteristics

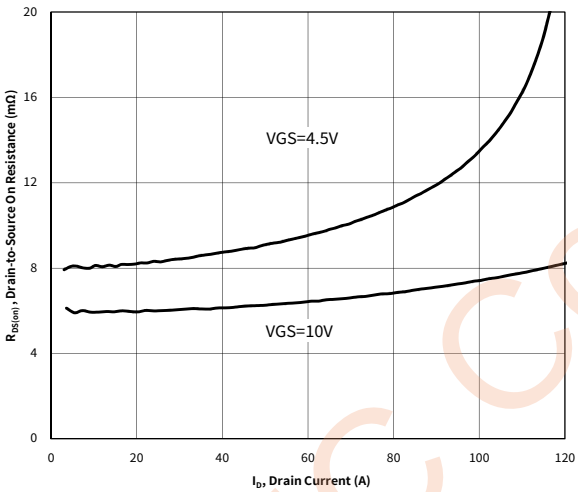


Fig.3 On-Resistance vs. Drain Current and Gate Voltage

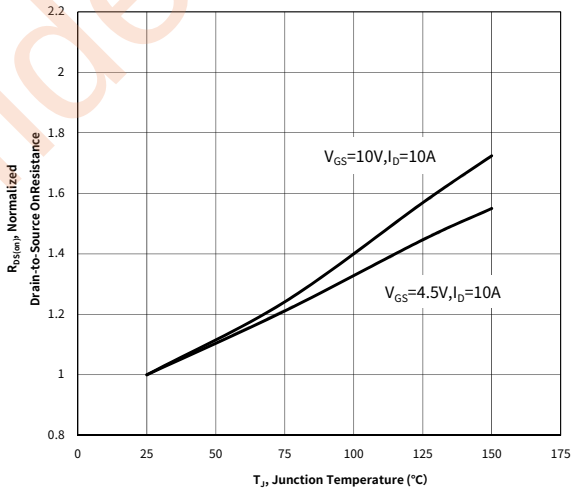


Fig.4 On-Resistance vs. Junction Temperature

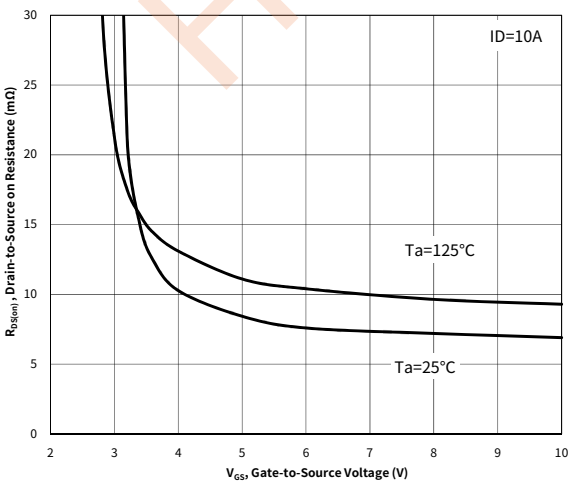


Fig.5 On-Resistance vs. Gate to Source Voltage

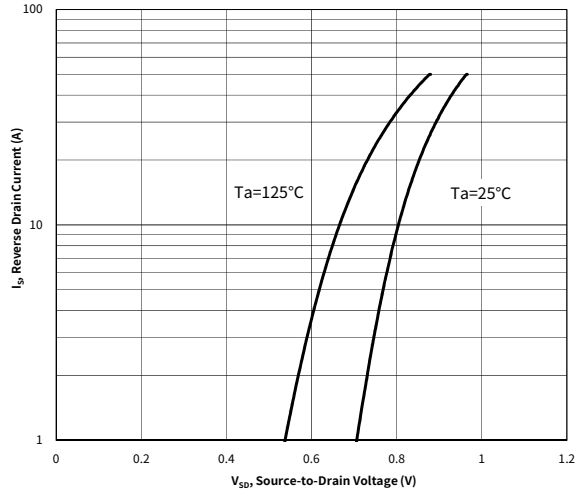


Fig.6 Typical Body-Diode Forward Characteristics

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Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

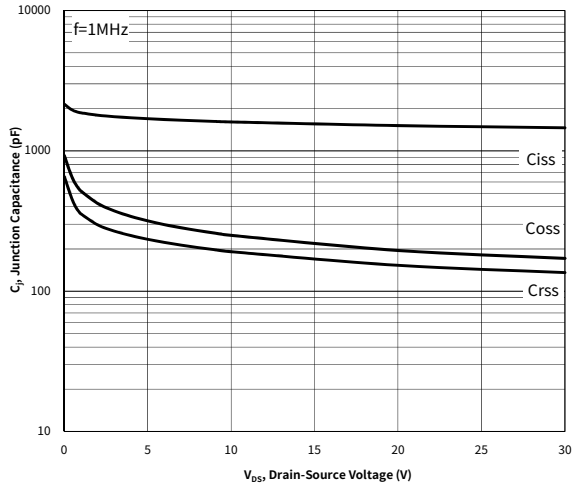


Fig.7 Capacitance Characteristics

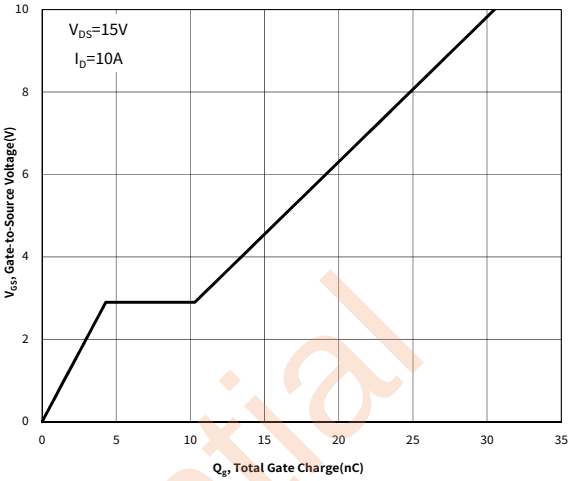


Fig.8 Gate Charge

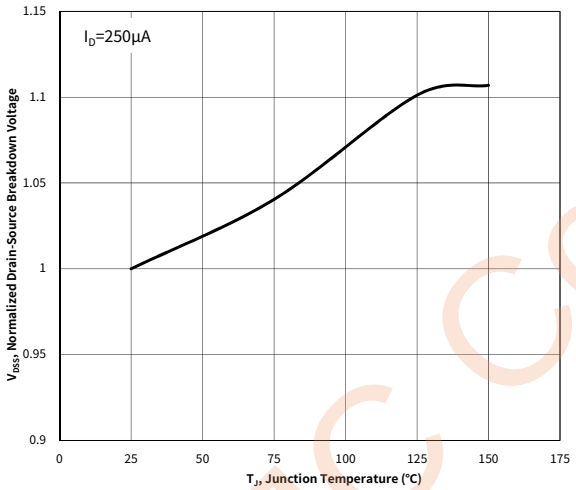


Fig.9 V(BR)DSS vs.Junction Temperature

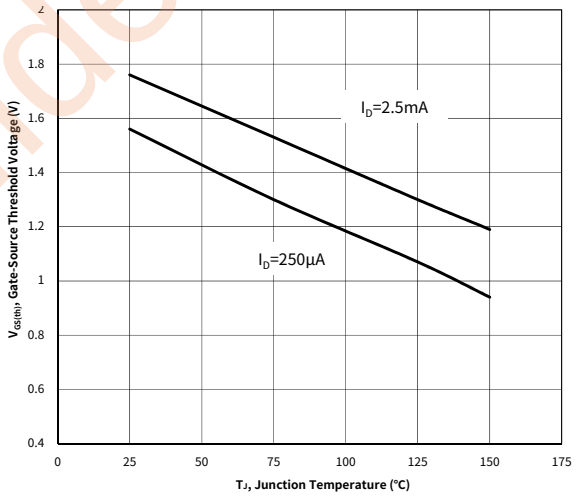


Fig.10 Gate Thresold Variation vs. Tj

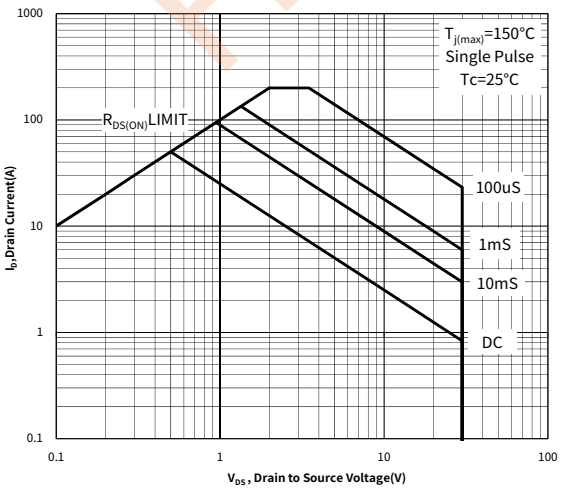


Fig.11 Safe Operation Area

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Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

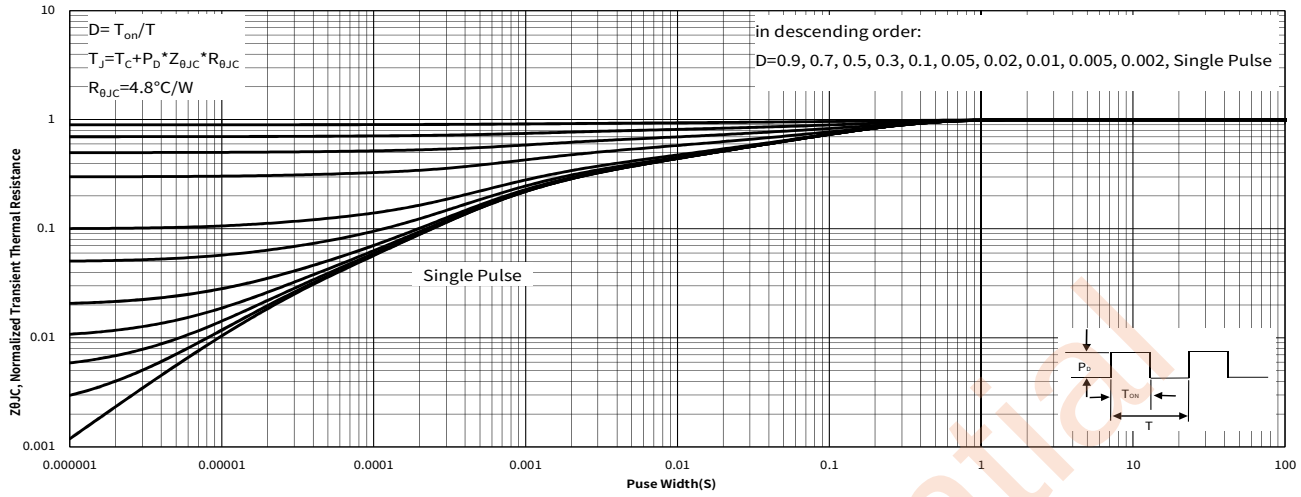
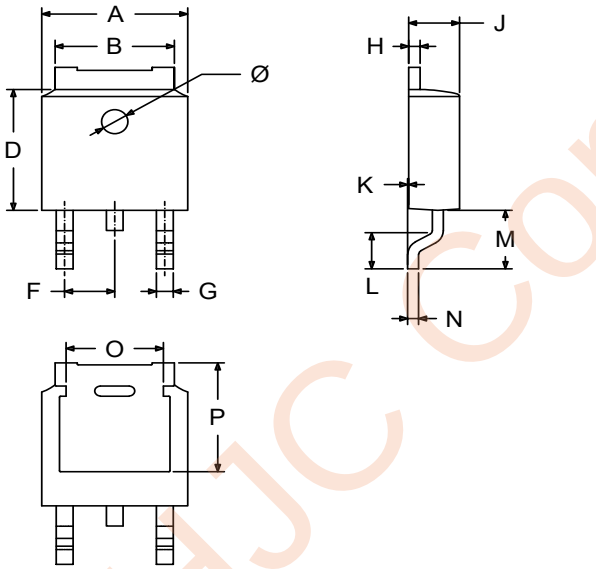


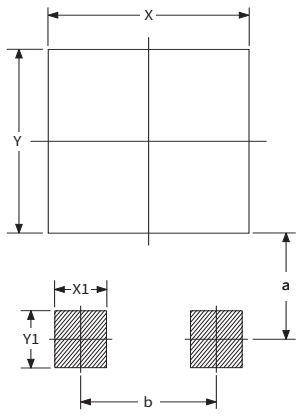
Fig.12 Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions (TO-252)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	6.50	6.70	0.253	0.262
B	5.10	5.46	0.199	0.213
C	1.40	1.80	0.054	0.070
D	6.00	6.20	0.234	0.242
E	10.00	10.40	0.390	0.406
F	2.16	2.36	0.084	0.092
G	0.66	0.86	0.025	0.033
ϕ	1.05	1.35	0.041	0.052
H	0.46	0.58	0.017	0.022
J	2.20	2.40	0.086	0.094
K	-	0.30	-	0.012
L	0.89	2.29	0.035	0.089
M	2.73	3.08	0.106	0.120
N	0.43	0.58	0.016	0.022

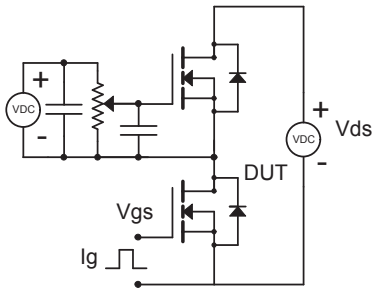
Suggested Pad Layout

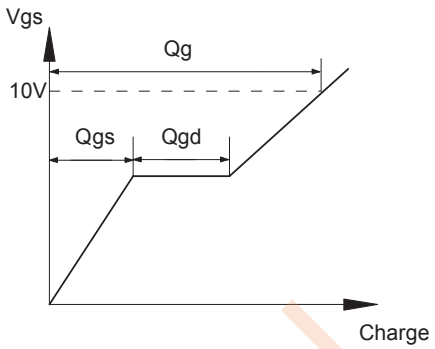


Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
a	3.70	-	0.145	-
b	4.37	-	0.171	-
X	-	5.80	-	0.227
X1	-	1.20	-	0.047
Y	-	5.85	-	0.229
Y1	-	2.00	-	0.078

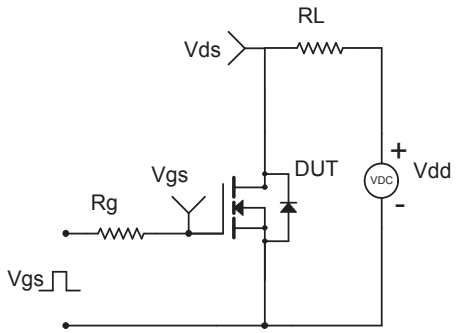
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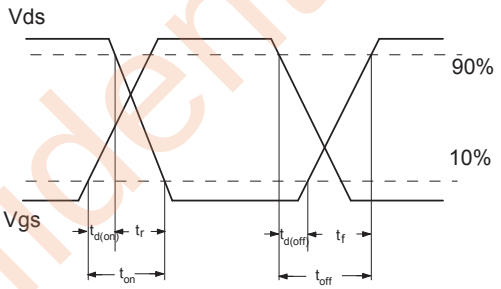
1.Gate Charge Test Circuit & Waveforms



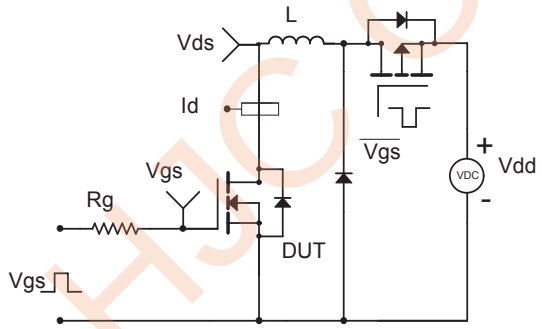


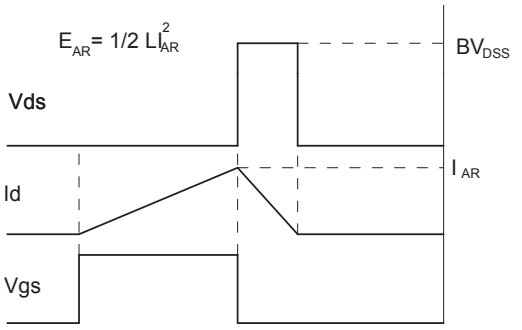
2. Resistive Switching Test Circuit & Waveforms



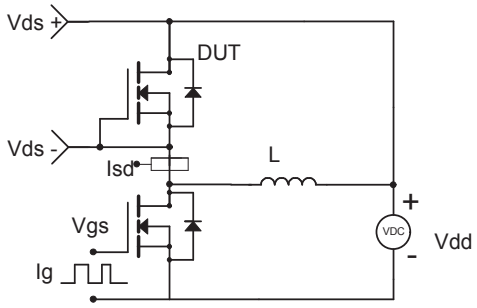


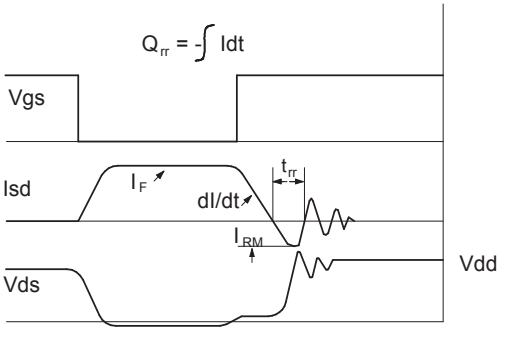
3.Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





4.Diode Recovery Test Circuit & Waveforms





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