TO-252 Plastic-Encapsulate MOSFETS

Features

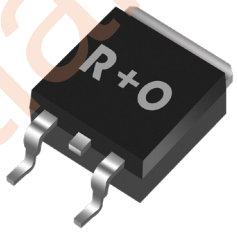
- V_{DS}=-30V
- I_D=-42A
- $R_{DS(on)}$@V_{GS}=-10V < 11mΩ
- $R_{DS(on)}$@V_{GS}=-4.5V < 16mΩ
- Low Gate Charge and Rdson
- Fast Switching Speedze
- Advanced Trench Technology

Drain-source Voltage
-30 V
Drain Current
-42 Ampere

Applications

- PWM Application
- 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	25000	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	-42
Pulsed Drain Current (1)	I_{DM}	A	-180
Total Power Dissipation	P_D	W	38
Single pulse avalanche energy(2)	EAS	mJ	72
Junction temperature	T_J	°C	-55 ~+150
Storage temperature	T_{stg}	°C	-55 ~+150
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	°C / W	3.29

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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}=-30V, 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	-1.5	-2.5
Static Drain-Source On-Resistance (3)	$R_{DS(ON)}$	V_{GS}= -10V, I_D=-10A	mΩ	—	8	11
		V_{GS}= -4.5V, I_D=-5A		—	12	16

Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C_{iss}	V_{DS}=-30V, V_{GS}=0V, f=1MHZ	pF	—	1470	—
Output Capacitance	C_{oss}			—	245	—
Reverse Transfer Capacitance	C_{rss}			—	210	—

Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=-10V, V_{DD}=-15V, I_D=-20A ,R_{GEN}=3Ω	nS	—	11	—
Turn-on Rise Time	t_r		nS	—	17	—
Turn-off Delay Time	$t_{D(off)}$		nS	—	60	—
Turn-off fall Time	t_f		nS	—	45	—
Total Gate Charge	Q_g	V_{DS}=-15V, I_D=-20A V_{GS}=-10V	nC	—	25	—
Gate-Source Charge	Q_{gs}		nC	—	4	—
Gate-Drain Charge	Q_{gd}		nC	—	5.5	—

Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V_{SD}	I_S=-42A, V_{GS}=0V	V	—	—	-1.2
Maximum Body-Diode Continuous Current	I_S	—	A	—	—	-42
Reverse Recovery Time	t_{rr}	I_F=-42A di/dt=100A/μs	nS	—	15	—
Reverse Recovery Charge	Q_{rr}		nC	—	6	—

Note :
(1)Repetitive Rating: Pulse width limited by maximum junction temperature.
(2)EAS condition : Tj=25°C ,VDD=-15V,VG=-10V,L=0.5mH,IAS=-17A,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)

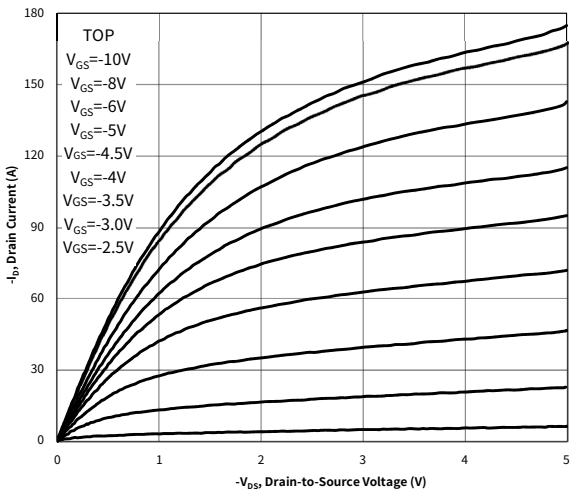


Fig.1 Output Characteristics

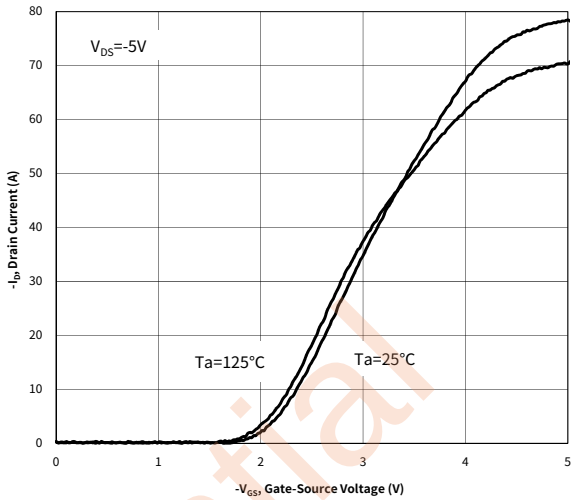


Fig.2 Transfer Characteristics

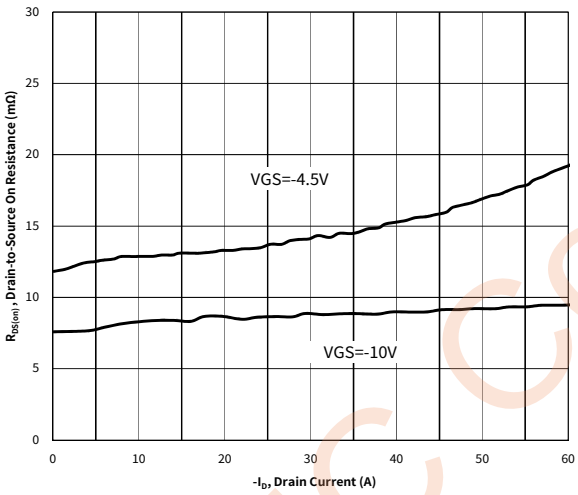


Fig.3 On-Resistance vs. Drain Current and Gate Voltage

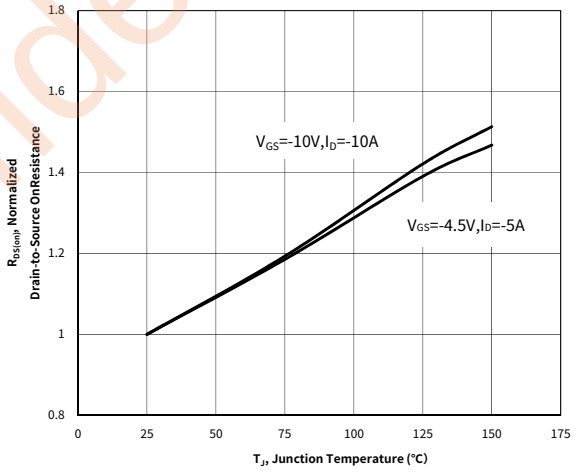


Fig.4 On-Resistance vs. Junction Temperature

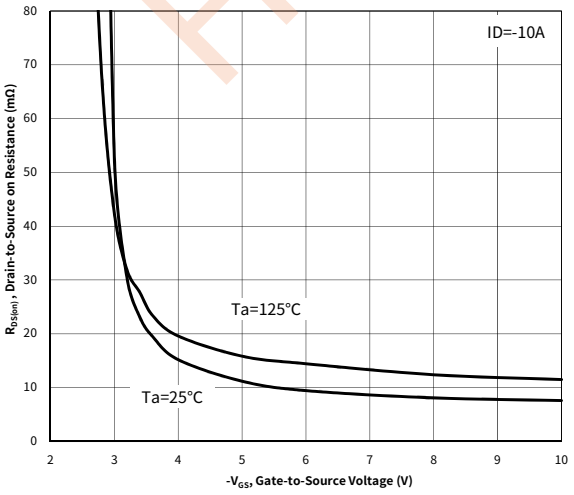


Fig.5 On-Resistance vs. Gate to Source Voltage

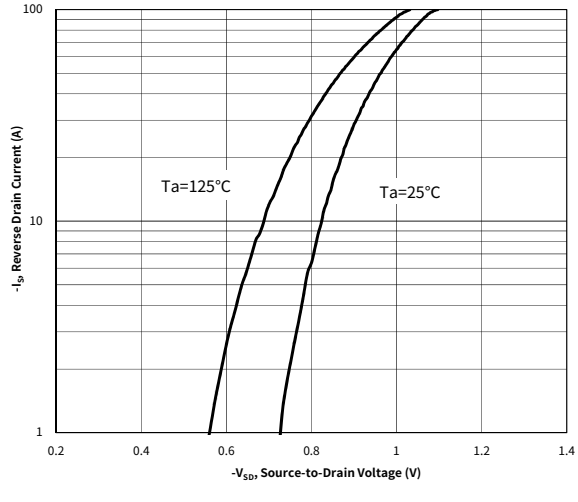


Fig.6 Typical Body-Diode Forward Characteristics

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

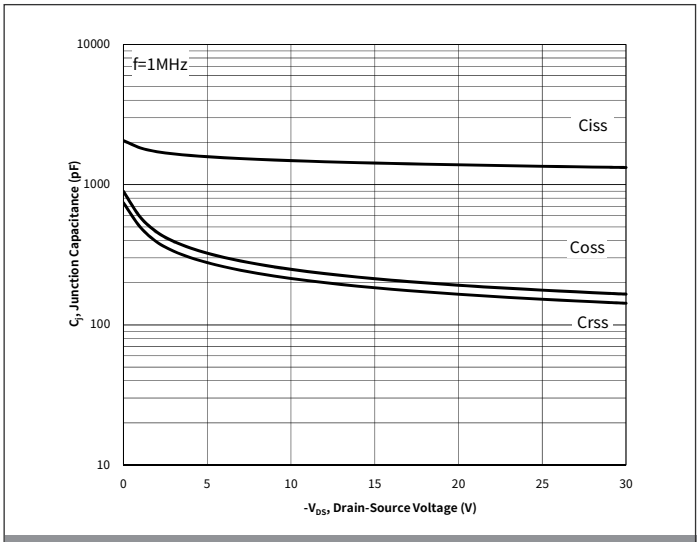


Fig.7 Capacitance Characteristics

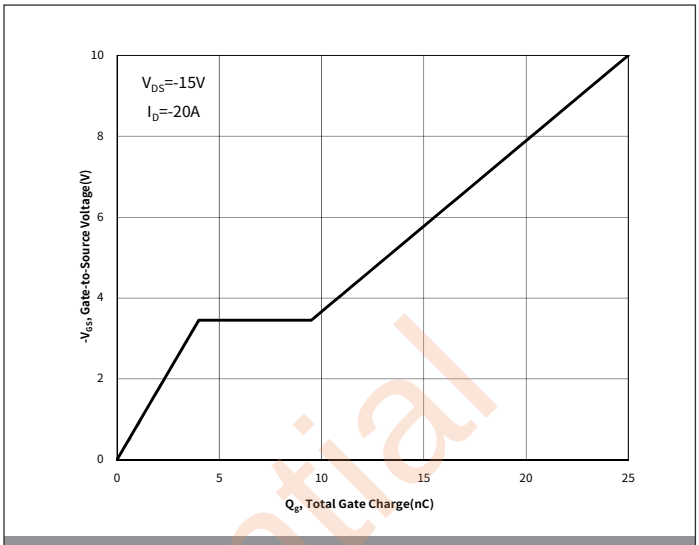


Fig.8 Gate Charge

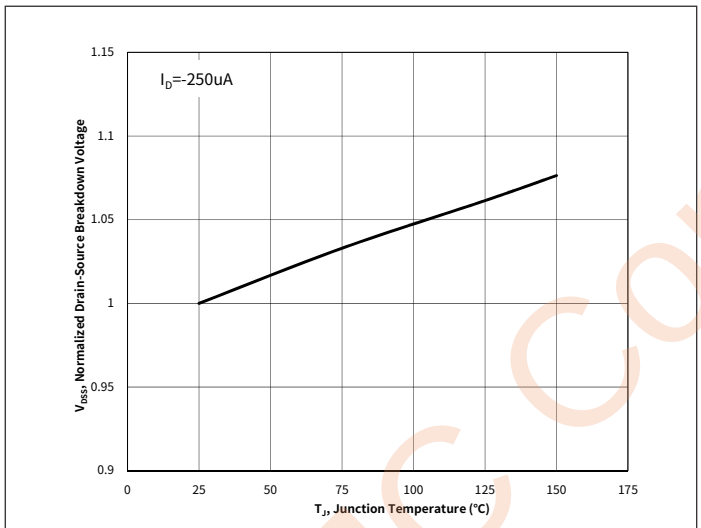


Fig.9 V(BR)DSS vs.Junction Temperature

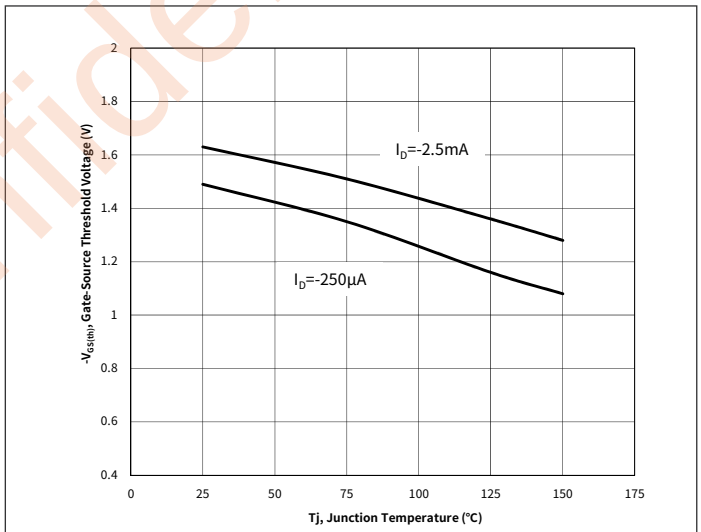


Fig.10 Gate Thresold Variation vs. Tj

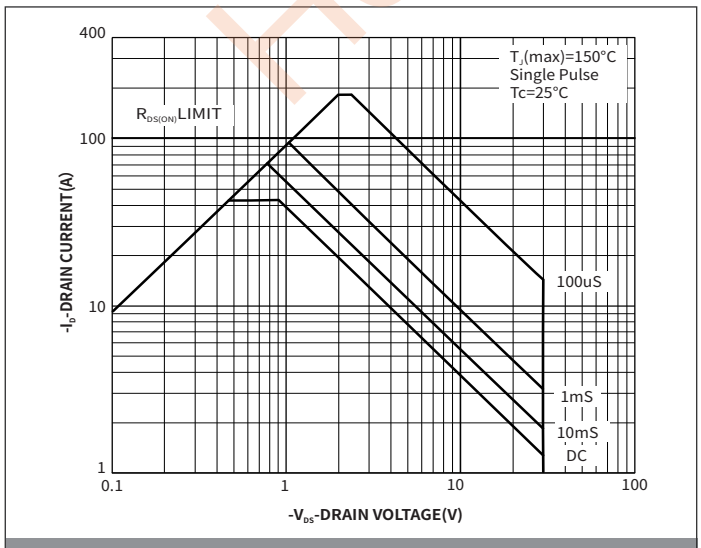


Fig.11 Safe Operation Area

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

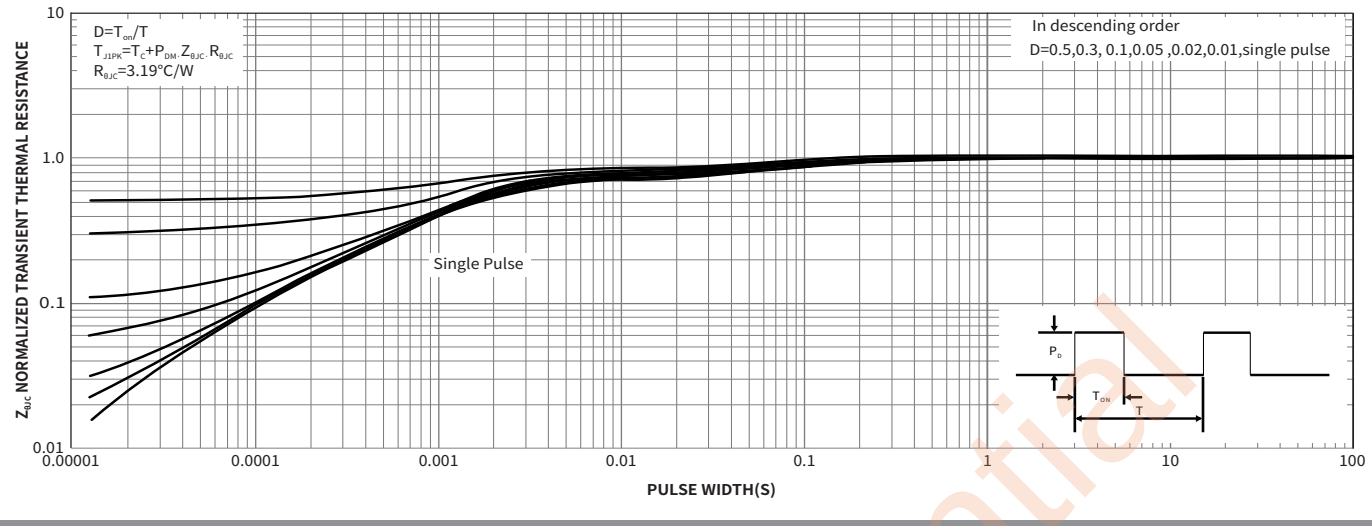
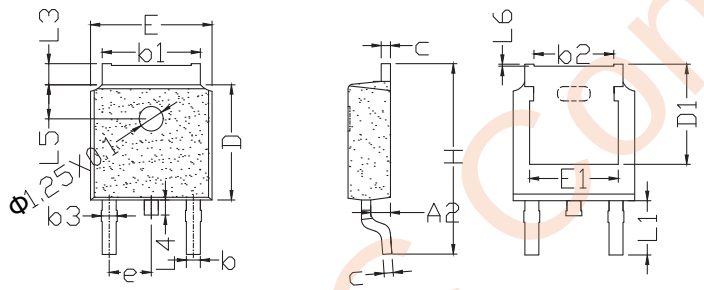


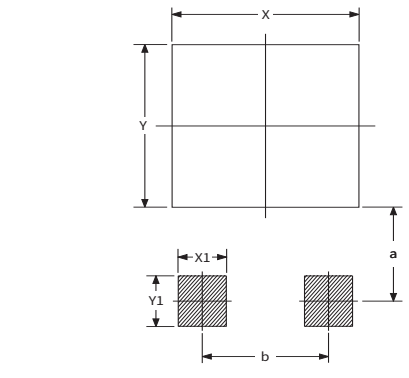
Fig.12 Normalized Maximum Transient Thermal Impedance

Package Outline Dimensions (TO-252)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A2	0.90	1.10	0.035	0.043
b	0.66	0.86	0.026	0.034
b1	5.10	5.46	0.201	0.215
b2	4.27	4.37	0.168	0.172
b3	0.78	0.90	0.031	0.035
c	0.46	0.58	0.018	0.023
D	6.00	6.20	0.236	0.244
D1	5.35 REF.		0.211REF.	
E	6.50	6.70	0.256	0.264
E1	4.83 REF.		0.190 REF.	
e	2.18	2.38	0.086	0.094
H	9.80	10.4	0.386	0.409
L1	2.90 REF.		0.114 REF.	
L3	0.90	1.20	0.035	0.047
L4	0.60	1.00	0.024	0.039
L5	1.6 REF.		0.063 REF.	
L6	-	0.12	-	0.005

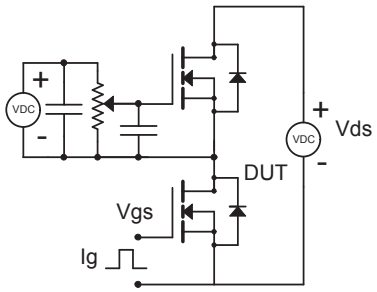
Suggested Pad Layout

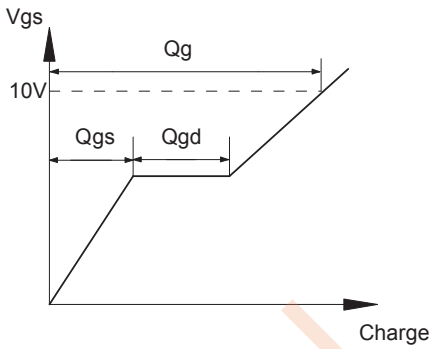


Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
a	3.70	-	0.146	-
b	4.37	-	0.172	-
X	-	5.80	-	0.228
X1	-	1.20	-	0.047
Y	-	5.85	-	0.230
Y1	-	2.00	-	0.079

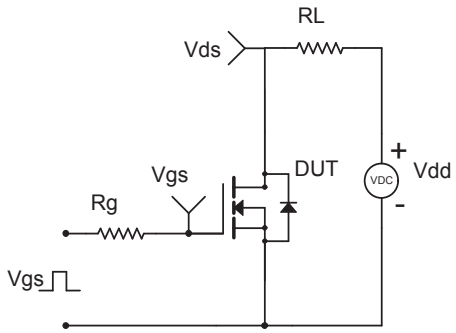
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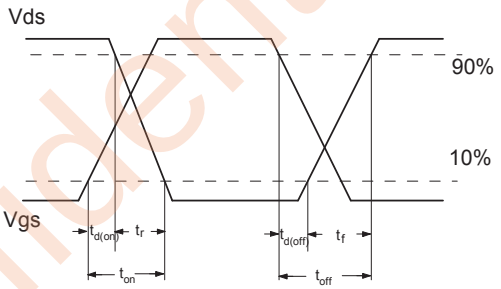
1.Gate Charge Test Circuit & Waveforms



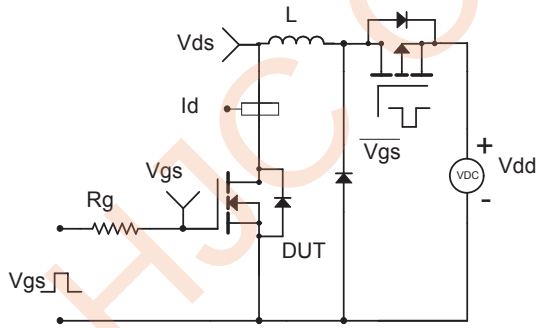


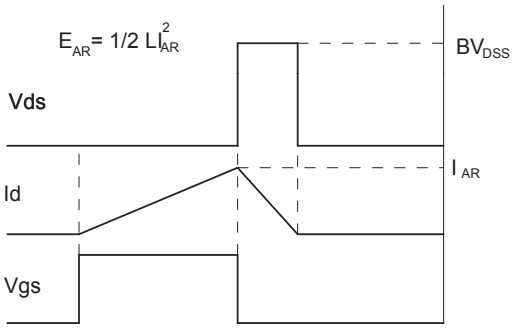
2. Resistive Switching Test Circuit & Waveforms



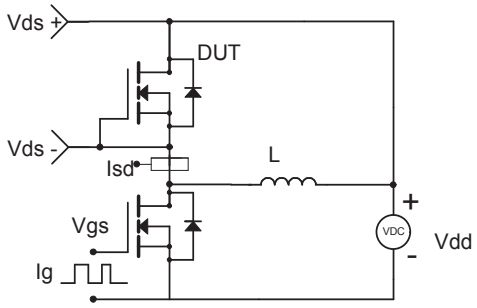


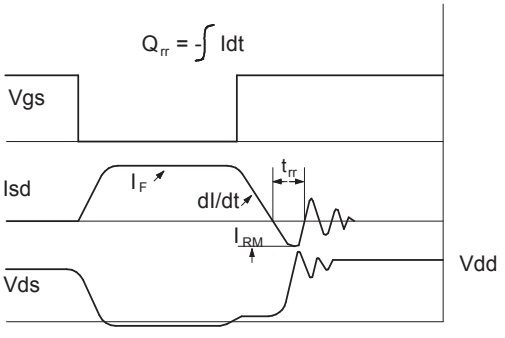
3.Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





4.Diode Recovery Test Circuit & Waveforms





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