

Features

- Uses advanced SGT technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)

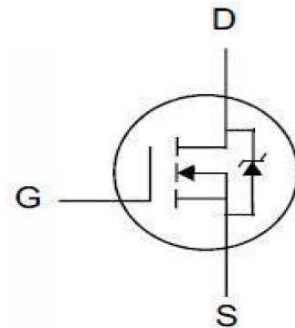
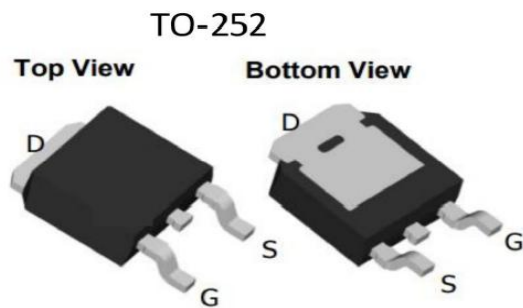
Application

- Motor control and drive
- Battery management
- DC/DC

Product Summary

Package	TO-252
V_{DS}	90V
$R_{DS(on)}@V_{GS}=10V$	3.5mΩ
I_D	132A

Package Marking



Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
LR040N09XD4	TO-252	LR040N09XD4	330*20.5mm	16mm	Reel&Tape	2500

Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	90	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous drain current $T_c=25^{\circ}C$ (Silicon limit) $T_c=100^{\circ}C$ (Silicon limit)	I_D	132 84	A
Pulsed Drain Current	I_{DM}	320	A
Maximum Power Dissipation	P_d	125	W
Single pulse avalanche energy	E_{AS}	506	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance,Junction-to-Case	R_{thJC}	1.0	°C/W
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Electrical Characteristics (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition	min	typ	max	Unit
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Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	90	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.0	4.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=85V, V_{GS}=0V$	-	-	1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=30A, V_{GS}=10V$	-	3.5	4.0	mΩ

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{DS}=40V, V_{GS}=0V,$ $f=1MHz$	-	3440	-	pF
Output Capacitance	C_{oss}		-	1642	-	
Reverse Transfer Capacitance	C_{rss}		-	51	-	
Gate resistance	R_g	$f=1MHz$	-	1	-	Ω
Gate Total Charge	Q_G	$V_{DS}=50V, I_D=100A,$ $V_{GS}=10V$	-	47	-	nC
Gate-Source charge	Q_{gs}		-	17	-	
Gate-Drain charge	Q_{gd}		-	7	-	
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=50V,$ $R_G=1.8\Omega$	-	18	-	ns
Rise time	t_r		-	11	-	
Turn-off delay time	$t_{d(off)}$		-	43	-	
Fall time	t_f		-	9	-	

Body Diode Characteristic

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=30A$	-	-	1.2	v
Reverse Recovery Time	t_{rr}	$I_F = 30A$ $di/dt = 100A/\mu s$	-	80	-	ns
Reverse Recovery Charge	Q_{rr}		-	147	-	nC

Typical Performance Characteristics

Fig 1: Output Characteristics

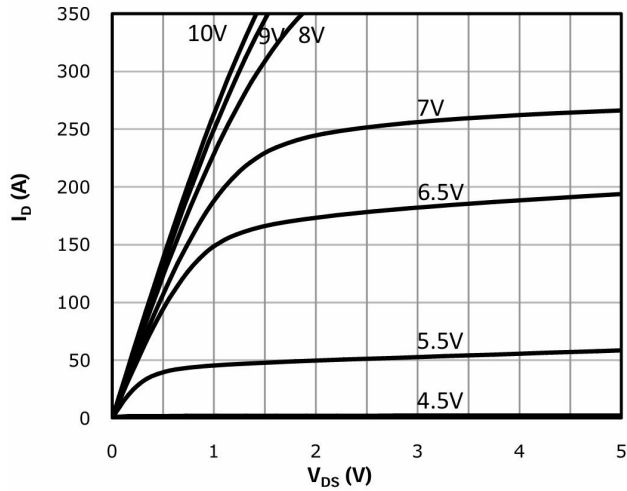


Fig 2: Transfer Characteristics

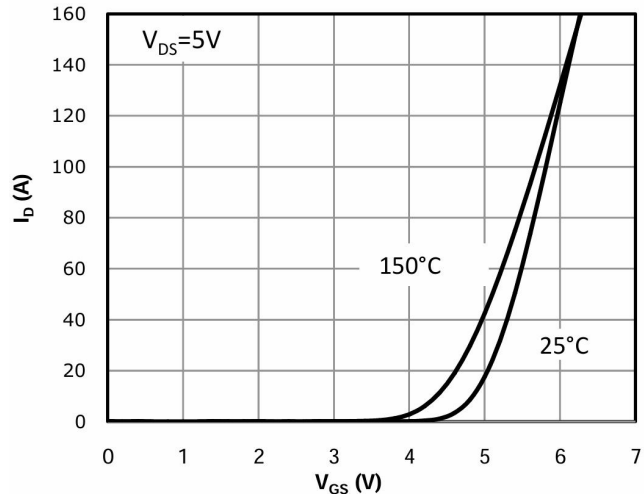


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

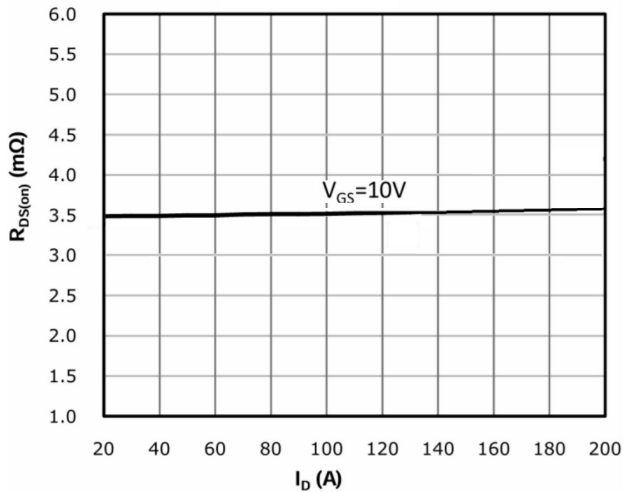


Fig 4: $R_{DS(on)}$ vs Gate Voltage

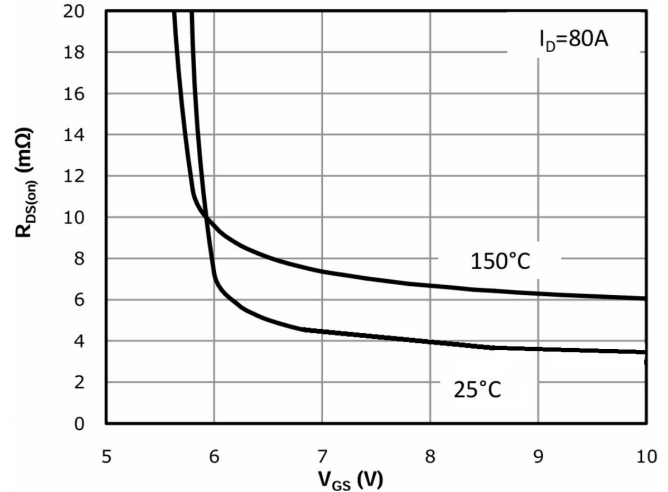


Fig 5: $R_{DS(on)}$ vs. Temperature

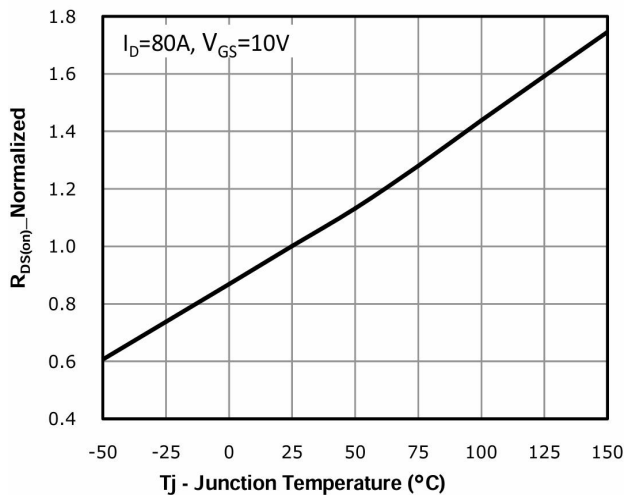


Fig 6: $V_{GS(th)}$ vs. Temperature

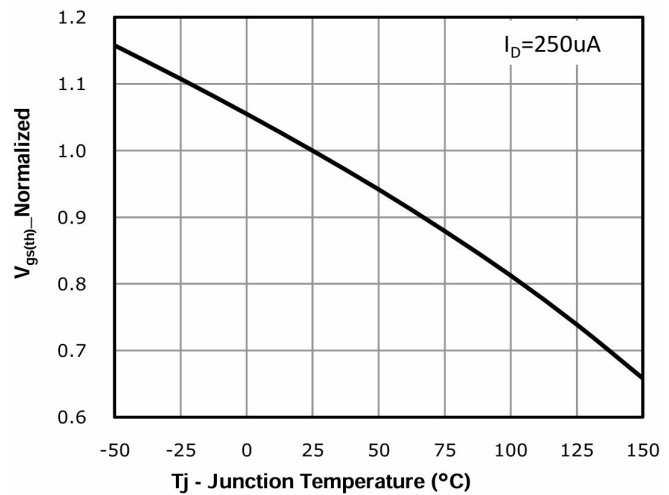


Fig 7: BVdss vs. Temperature

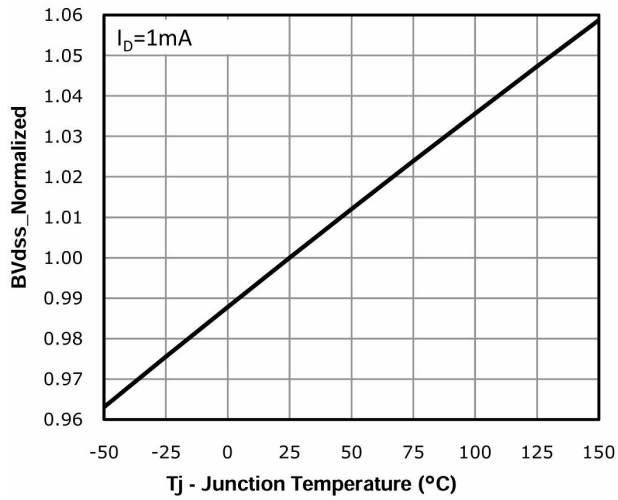


Fig 8: Capacitance Characteristics

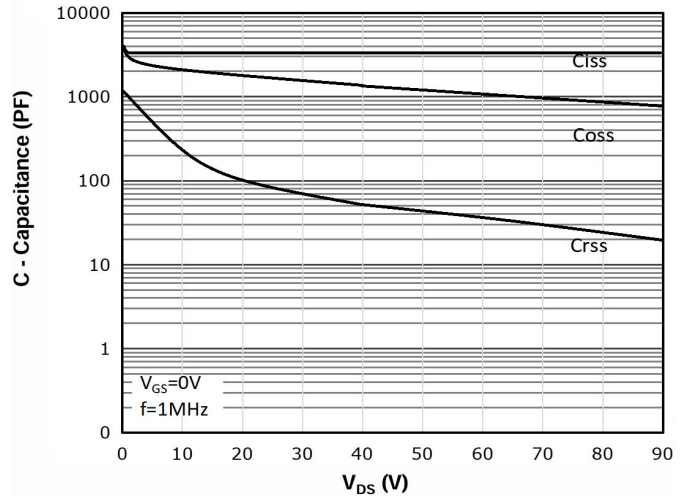


Fig 9: Gate Charge Characteristics

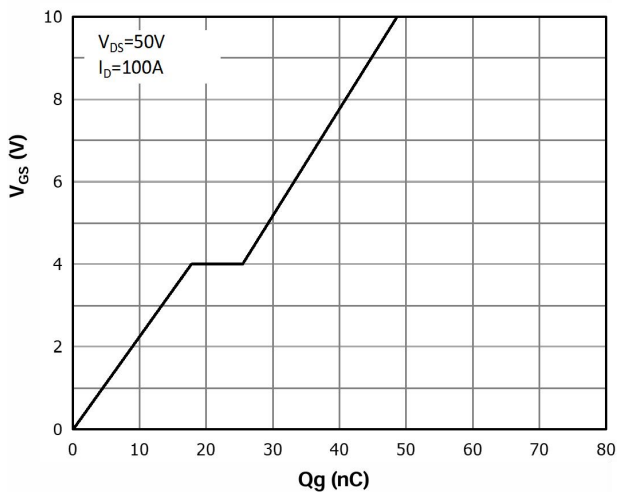


Fig 10: Body-diode Forward Characteristics

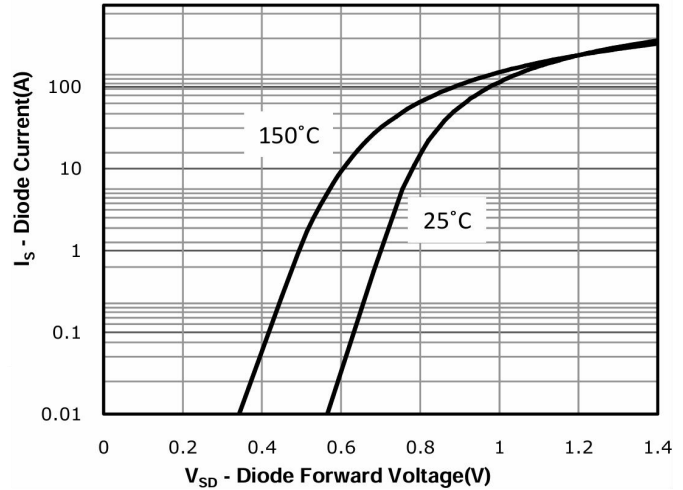


Fig 11: Power Dissipation

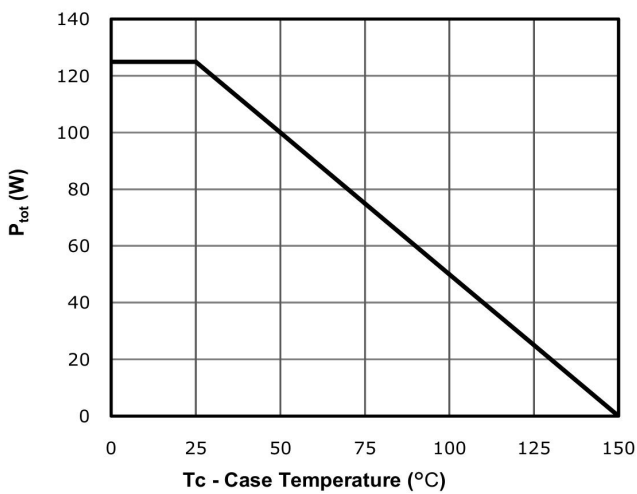


Fig 12: Drain Current Derating

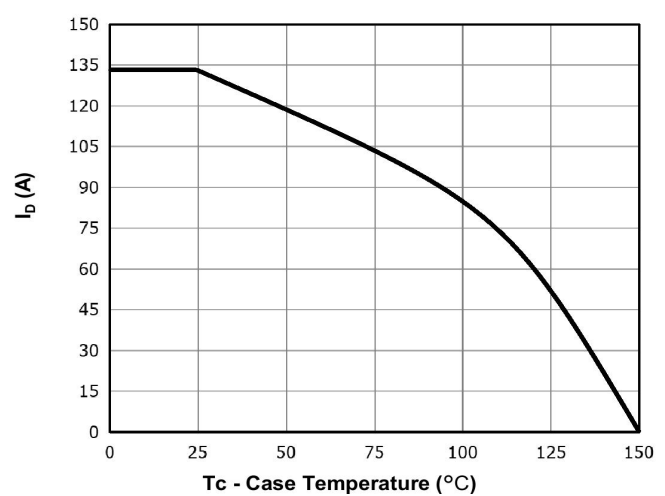


Fig 13: Safe Operating Area

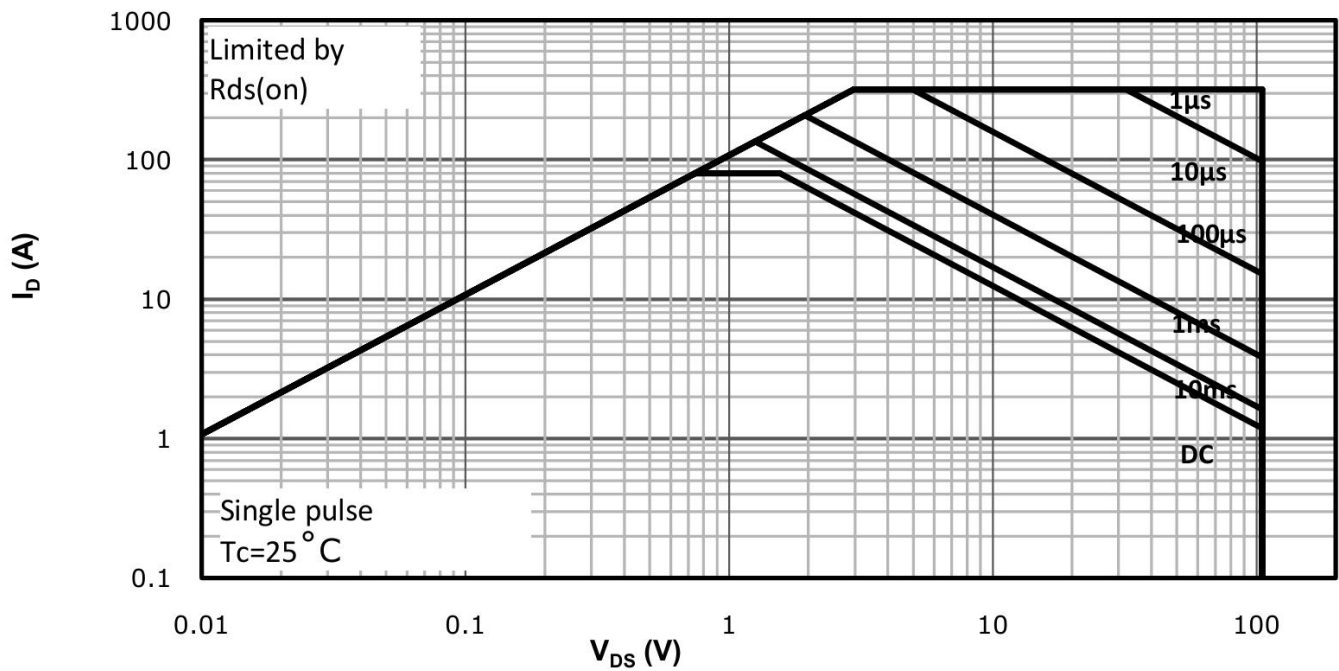
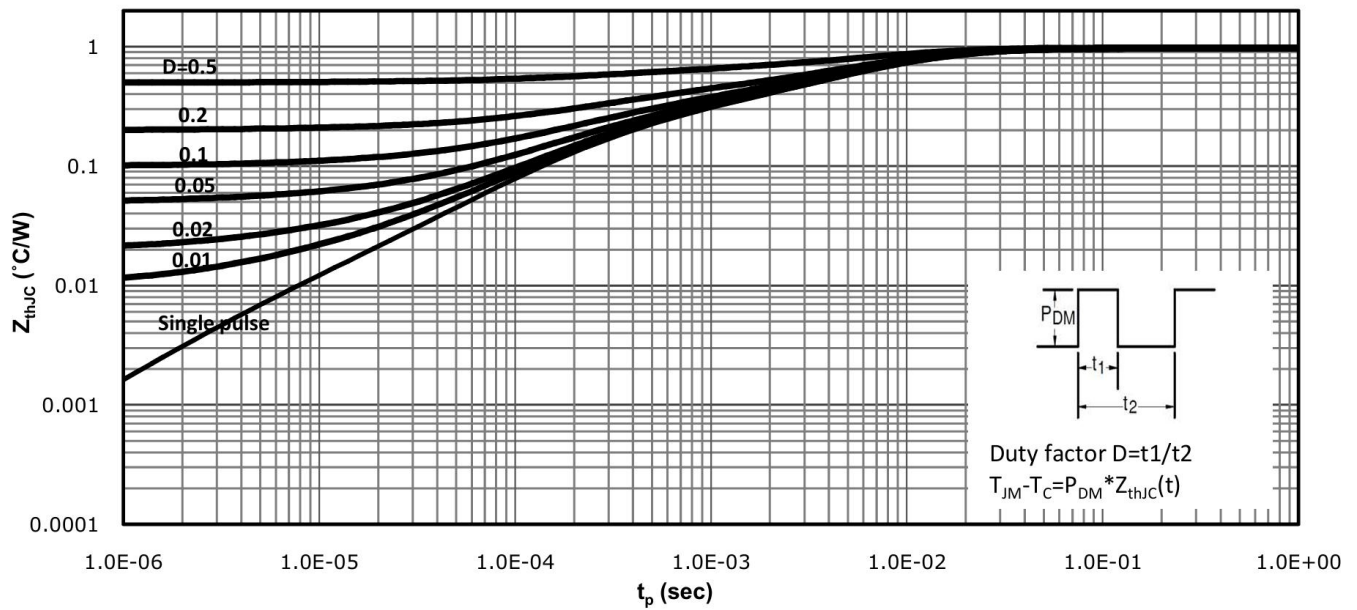
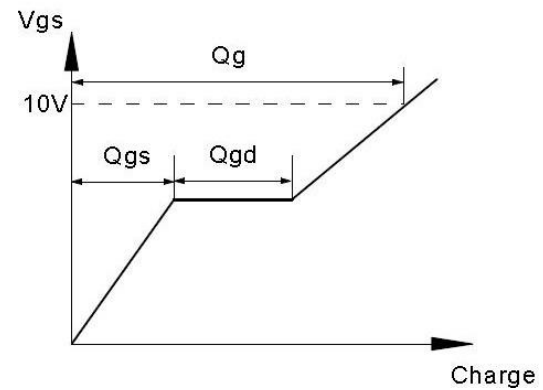
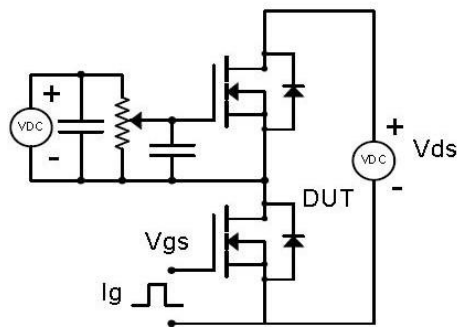


Fig 14: Max. Transient Thermal Impedance

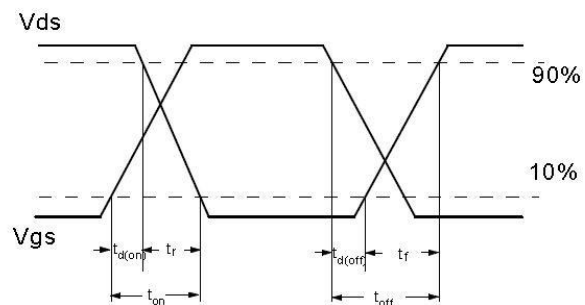
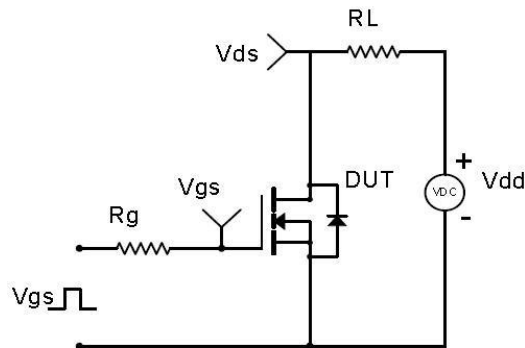


Test Circuit & Waveform

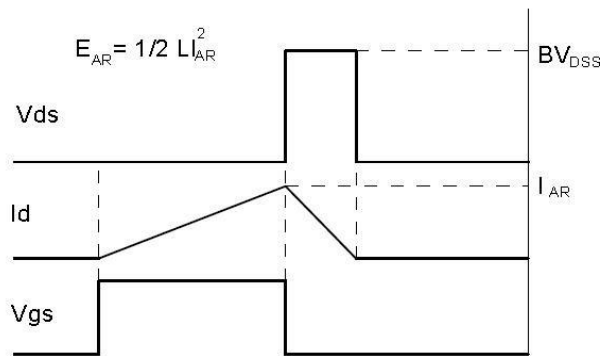
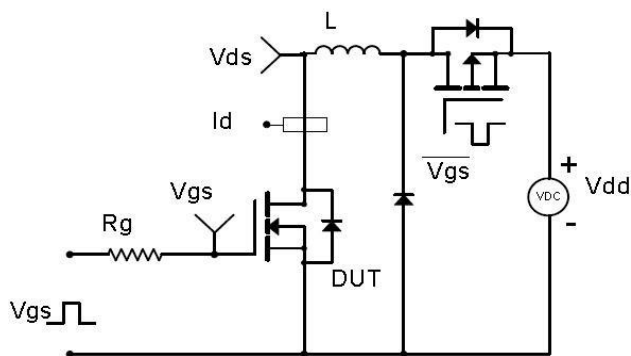
Gate Charge Test Circuit & Waveform



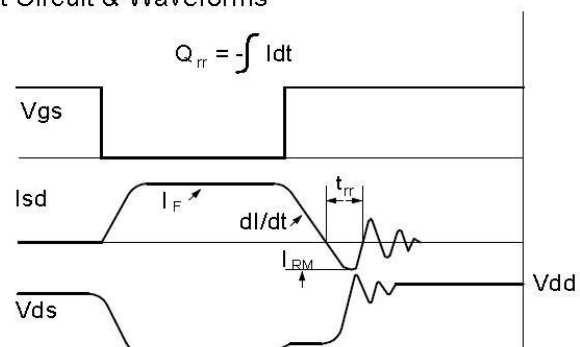
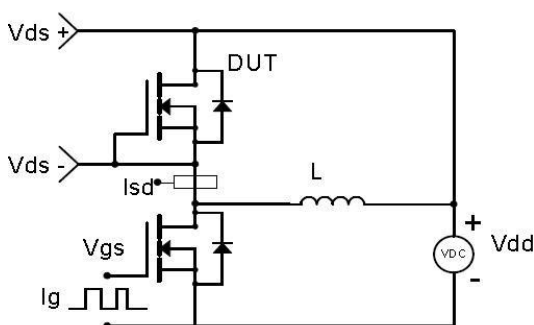
Resistive Switching Test Circuit & Waveforms



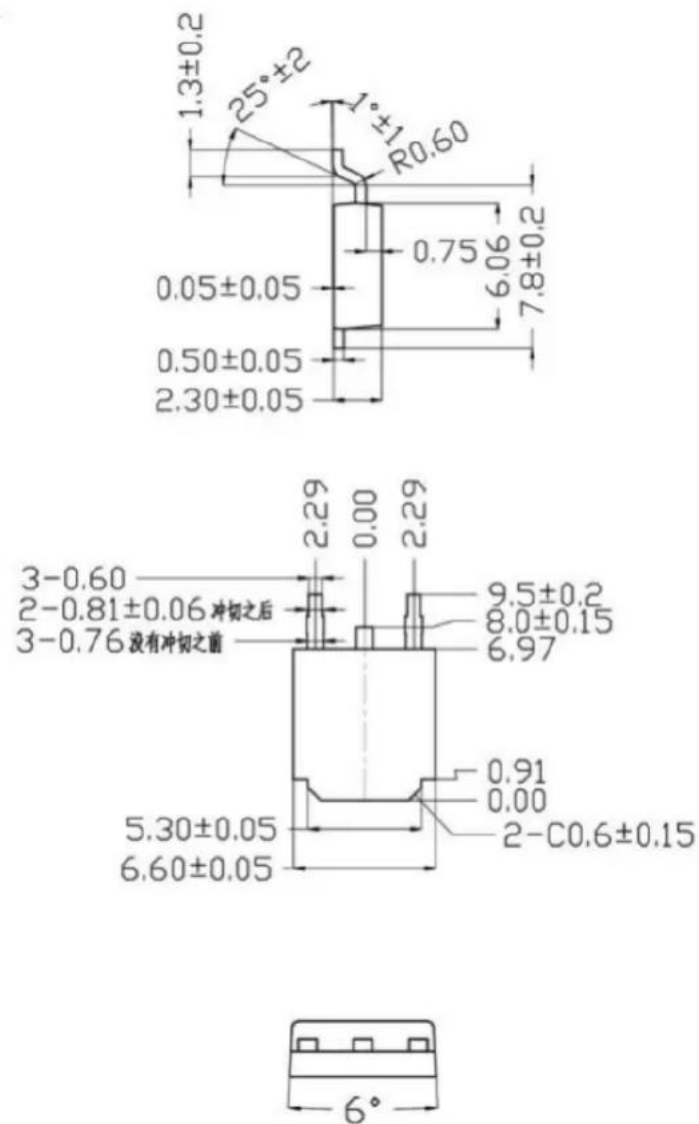
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline:TO-252



Revision History:

Revision	Date	Major changes
1.0	2026/3/18	Release of Preliminary version.
2.0	2026/5/26	Update Typical Performance Characteristics and product name.