

Features

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- $R_{DS(on).typ}=3.1m\Omega@V_{GS}=10V$
- High Reliability Capability

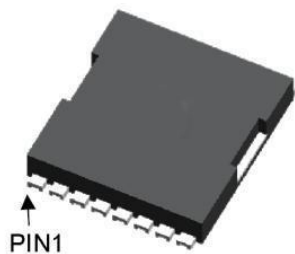
Application

- Charger
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

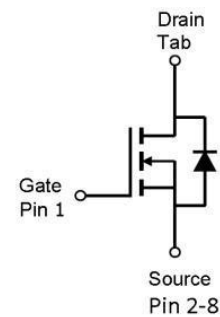
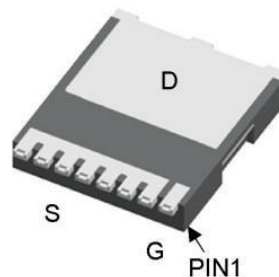
Product Summary

V_{DS}	150V
$R_{DS(on).typ}@V_{GS}=10V$	3.1mΩ
I_D	210A

TOLL Top View



TOLL Bottom View



Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Qty
LR038N15S10	TOLL	LR038N15S10	330*28.5mm	5000

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	150	V
Continuous Drain Current $T_C = 25^\circ C$ $T_C = 100^\circ C$	I_D	210 178	A
Pulsed Drain Current	$I_{D \text{ pulse}}$	800	A
Avalanche Energy, Single Pulse	E_{AS}	2025	mJ
Gate-emitter Voltage	V_{GS}	±20	V
Power Dissipation, $T_C = 25^\circ C$	P_D	265	W
Operating Junction And Storage Temperature	T_j, T_{stg}	-55~150	°C

Thermal Resistance

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance, Junction to Case	R_{thJC}	-	0.47	°C/W
Thermal Resistance, Junction to Ambient	R_{thJA}	-	40	°C/W

Electrical Characteristic, at Tj = 25 °C, unless otherwise specified

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	
Static Characteristic						
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	150	-	-	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}	$V_{DS}=150V, V_{GS}=0V$	-	-	1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Drain-source on-state Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=40A$	-	3.1	3.8	m Ω

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{GS}=0V,$ $V_{DS}=40V,$ $f=1MHz$	-	10704	-	pF
Output Capacitance	C_{oss}		-	2223	-	
Reverse Transfer Capacitance	C_{rss}		-	30	-	
Gate Total Charge	Q_g	$V_{GS}=10V,$ $V_{DS}=75V,$ $I_D=40A$	-	150	-	nC
Gate-Source charge	Q_{gs}		-	58	-	
Gate-Drain charge	Q_{gd}		-	30	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=10V,$ $V_{DD}=75V,$ $I_D=40A,$ $R_G=3\Omega$	-	40	-	ns
Turn-on Rise Time	t_r		-	69	-	
Turn-off Delay Time	$t_{d(off)}$		-	88	-	
Turn-off Fall Time	t_f		-	33	-	

Body Diode Characteristic

Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=40A$	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$I_F=40A,$ $dI_F/dt=100A/\mu s$	-	99	-	ns
Reverse Recovery Charge	Q_{rr}		-	333	-	nC

Typical Performance Characteristics

Fig 1: Output Characteristics

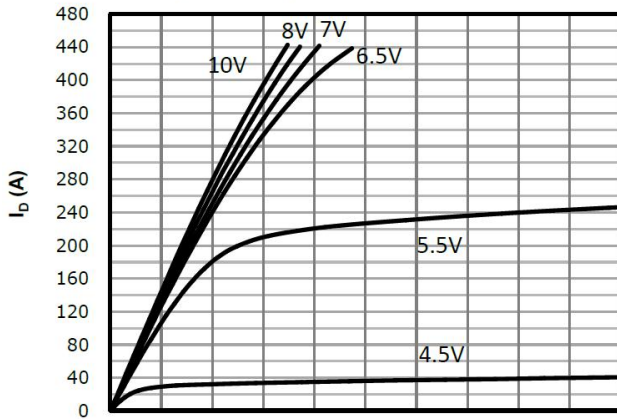


Fig 2: Transfer Characteristics

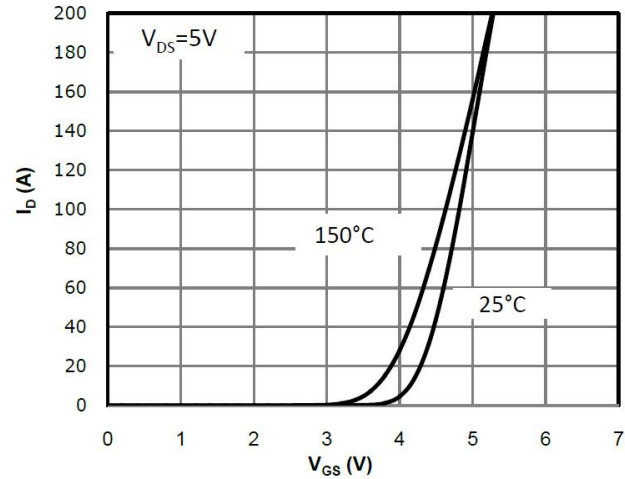


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

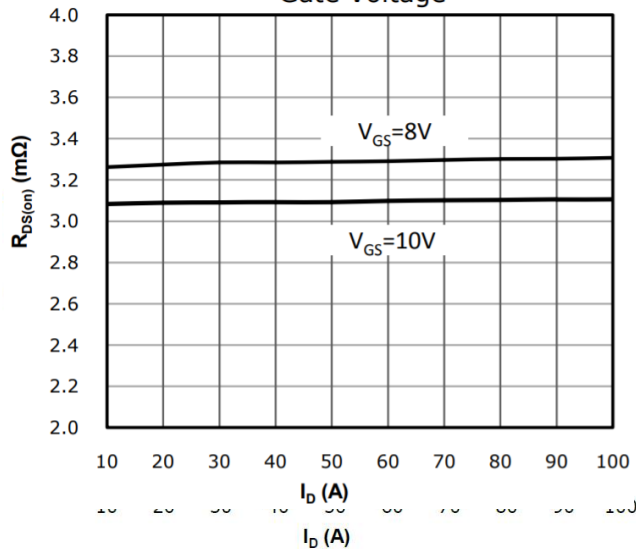


Fig 4: $R_{DS(on)}$ vs Gate Voltage

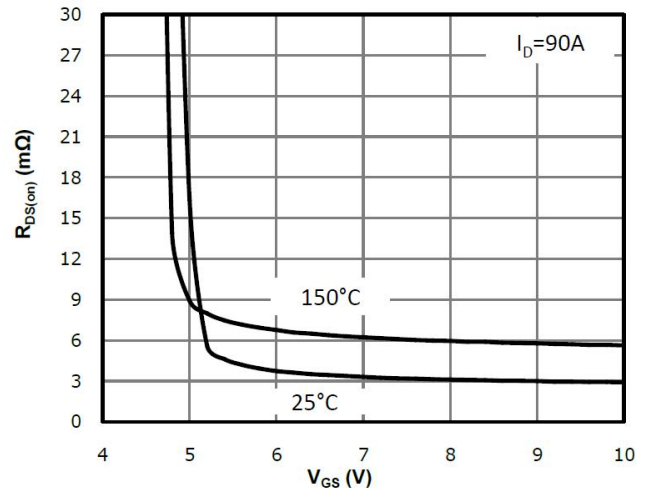


Fig 5: $R_{DS(on)}$ vs. Temperature

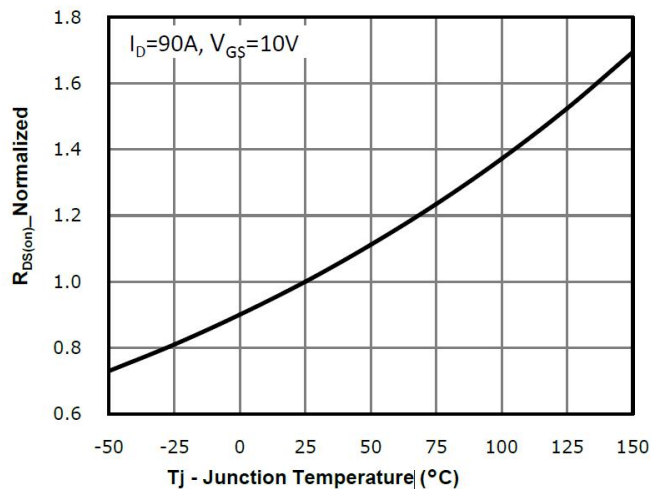


Fig 6: $V_{GS(th)}$ vs. Temperature

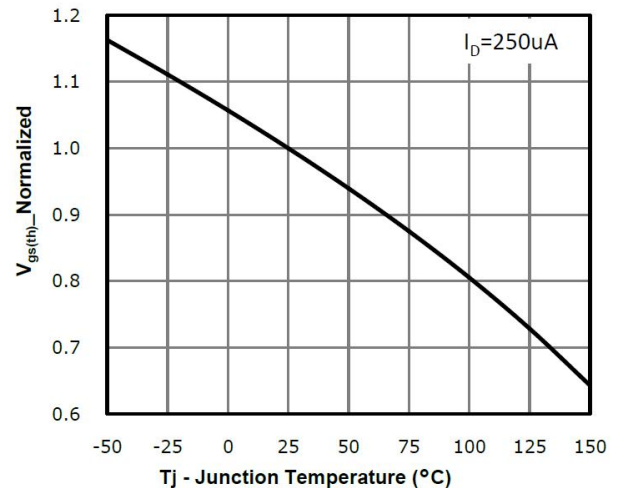


Fig 7: BVdss vs. Temperature

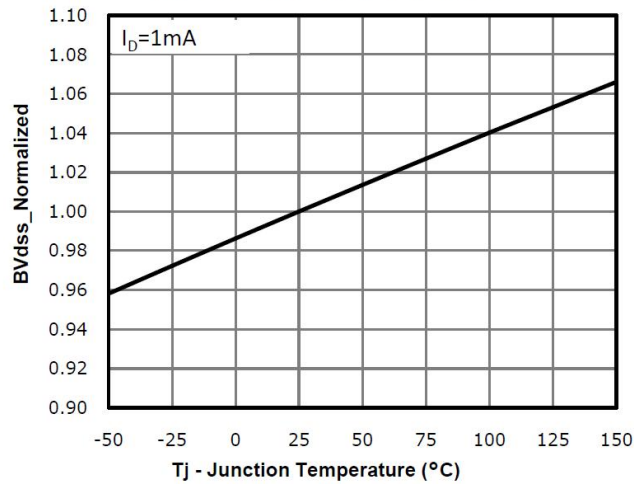


Fig 8: Capacitance Characteristics

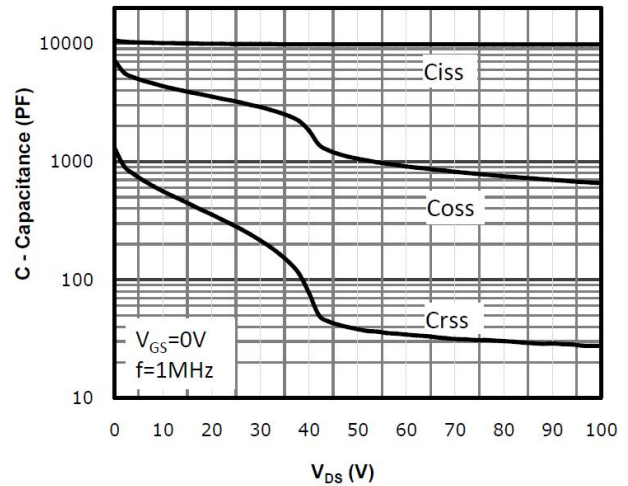


Fig 9: Gate Charge Characteristics

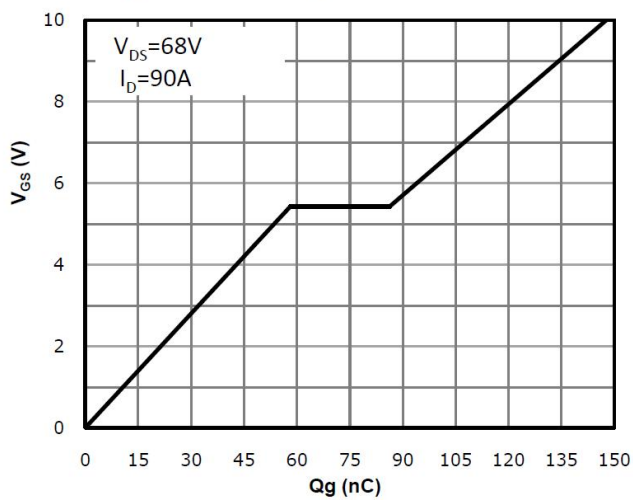


Fig 10: Body-diode Forward Characteristics

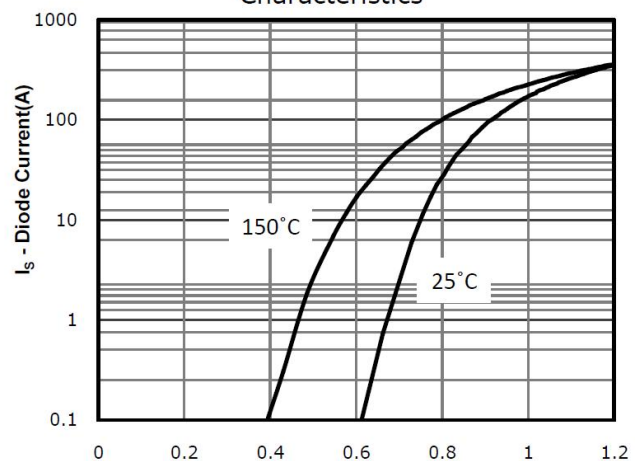


Fig 11: Power Dissipation

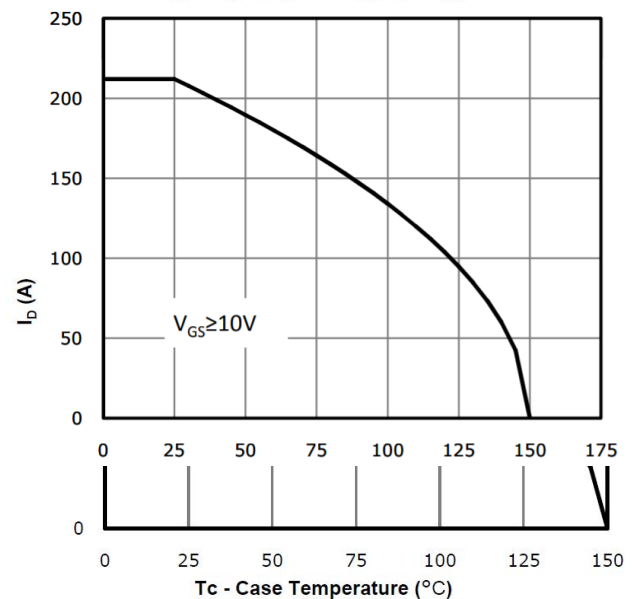
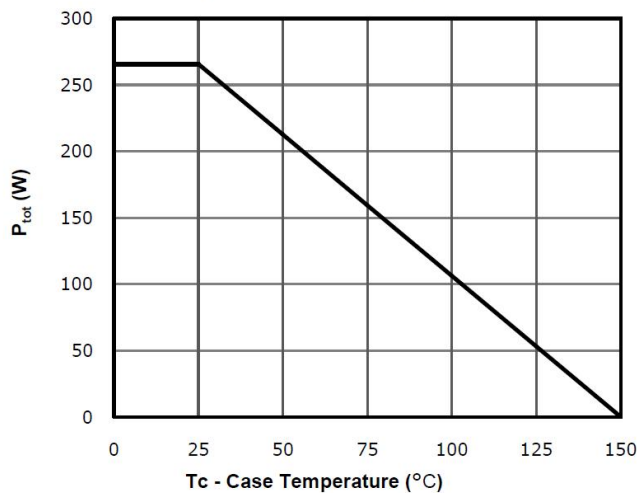


Fig 13: Safe Operating Area

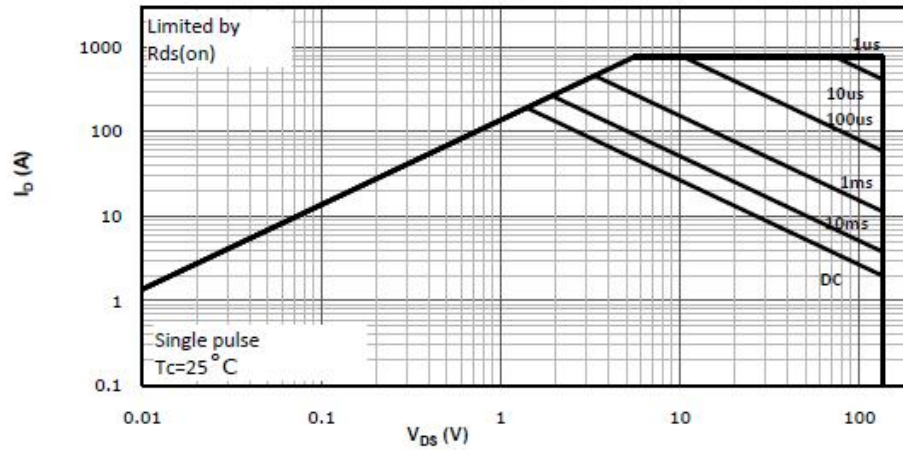
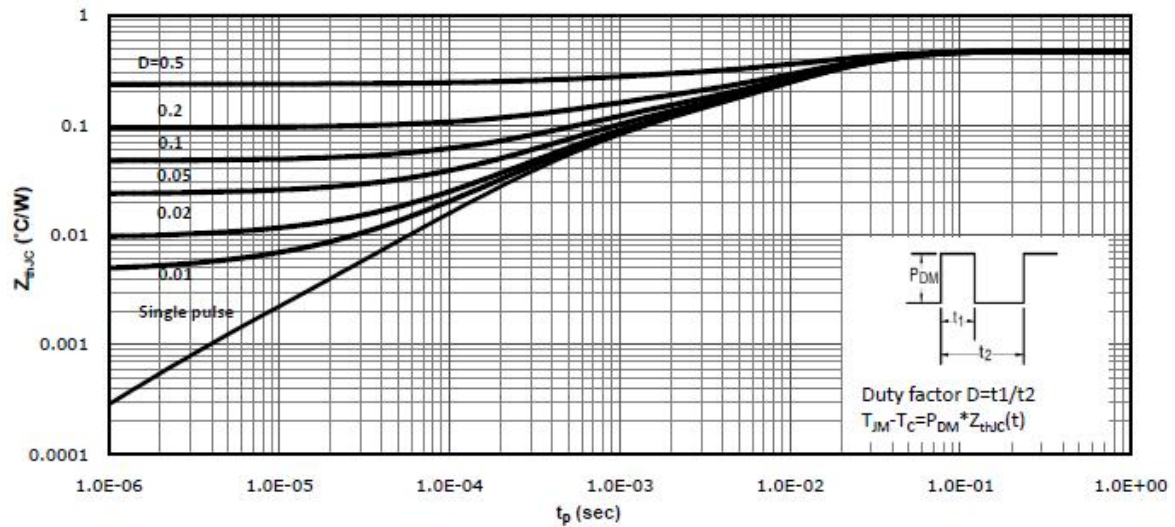
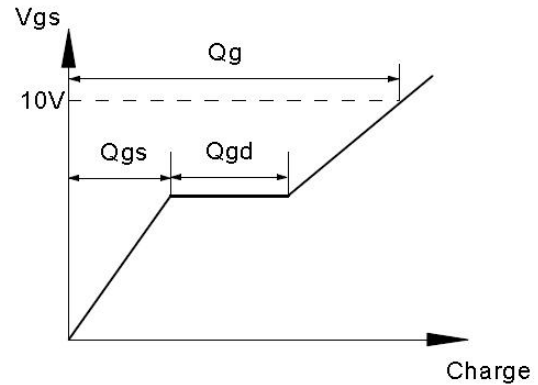
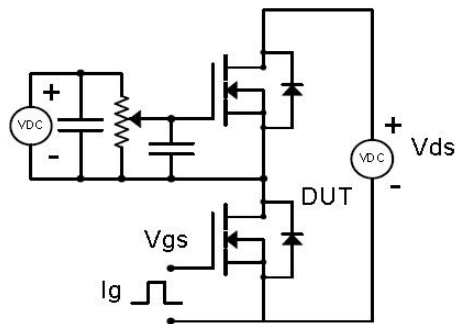


Fig 14: Max. Transient Thermal Impedance

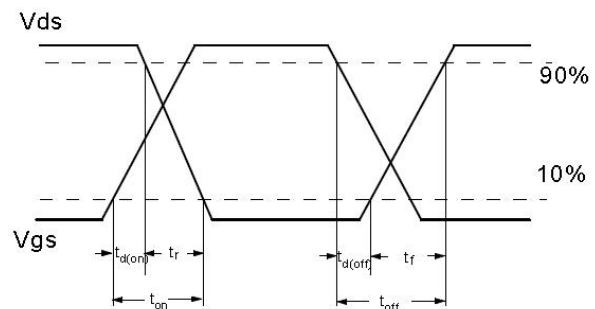
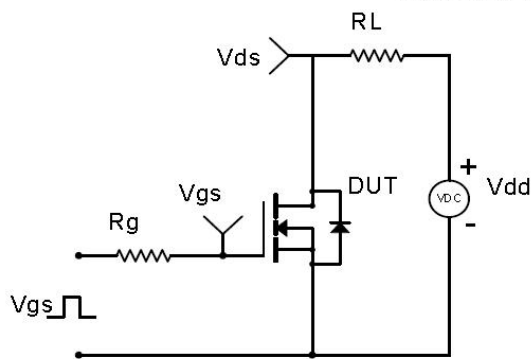


Test Circuit & Waveform

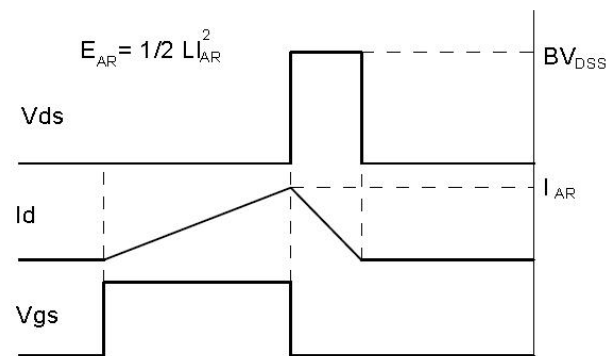
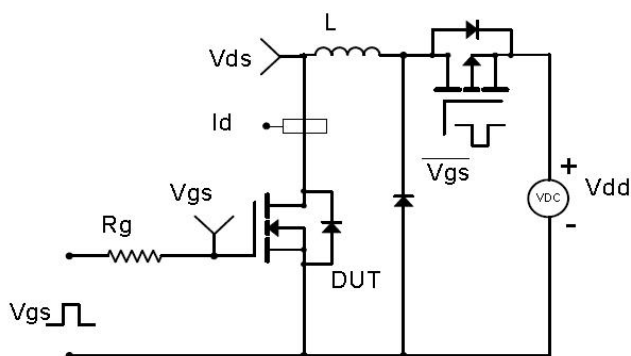
Gate Charge Test Circuit & Waveform



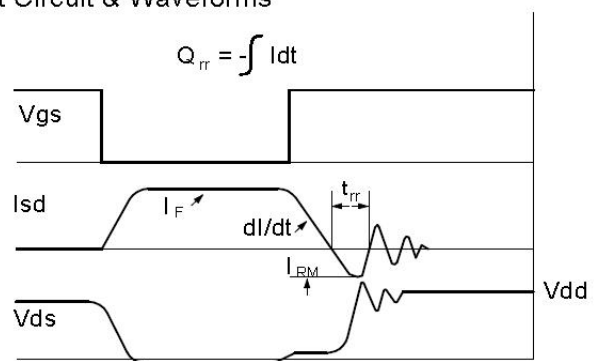
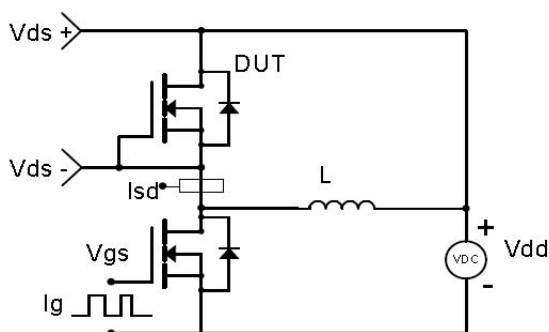
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TOLL

