



SC175N25S10

N-MOSFET TOLL 250V, 120A, 15.3mΩ

Features

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

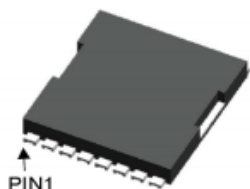
Application

- Motor control and drives
- Battery management
- DC/DC converter
- General purpose applications

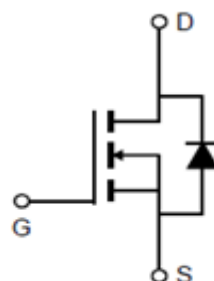
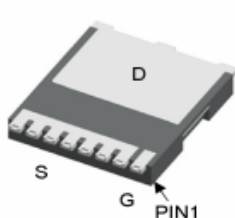
Product Summary

	TOLL
V_{DS}	250V
$R_{DS(on)@VGS=10V}$	15.3mΩ
I_D	120A

TOLL Top View



TOLL Bottom View



Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
SC175N25S10	TOLL	SC175N25S10	330*28.5mm	24mm	Reel&Tape	2000

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	250	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Package limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	120 80	A
Pulsed drain current $T_C = 25^\circ\text{C}$, t_p limited by T_{jmax}	$I_{D \text{ pulse}}$	480	
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	690	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25^\circ\text{C}$	P_D	291	W
Operating junction and storage temperature	T_j, T_{stg}	-55~150	$^\circ\text{C}$

Thermal Resistance

	Symbol	Value	Unit
Thermal resistance, junction – case. Max	R_{thJC}	0.4	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	60	

Electrical Characteristic, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Test Condition	Value			Unit
			min.	typ.	max.	

Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	250	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$ $T_j=25^\circ\text{C}$	2	3	4	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=250V, V_{GS}=0V$ $T_j=25^\circ\text{C}$	-	-	1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A$ $T_j=25^\circ\text{C}$	-	15.3	17.5	$m\Omega$
Transconductance	g_{fs}	$V_{DS}=5V, I_D=40A$	-	145	-	S

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=125V$ $f=1\text{MHz}$	-	4850	-	pF
Output Capacitance	C_{oss}		-	310	-	
Reverse Transfer Capacitance	C_{rss}		-	8	-	
Gate Total Charge	Q_G	$V_{GS}=10V$ $V_{DS}=125V$ $I_D=50A$	-	72	-	nC
Gate-Source charge	Q_{gs}		-	28.6	-	
Gate-Drain charge	Q_{gd}		-	12	-	
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ\text{C}, V_{GS}=10V$ $V_{DS}=40V, R_L=3\Omega$	-	15	-	ns
Rise time	t_r		-	55	-	
Turn-off delay time	$t_{d(off)}$		-	56	-	
Fall time	t_f		-	51	-	
Gate resistance	R_G	$V_{GS}=0V, V_{DS}=0V$ $f=1\text{MHz}$	-	3	-	Ω

Body Diode Characteristic

Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=50A$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=30A,$ $dI/dt=500A/\mu s$	-	155	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=30A,$ $dI/dt=500A/\mu s$	-	117	-	nC

Typical Performance Characteristics

Fig 1: Output Characteristics

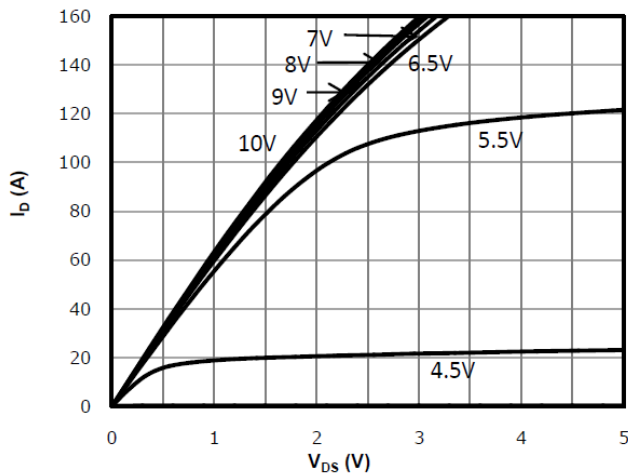


Fig 2: Transfer Characteristics

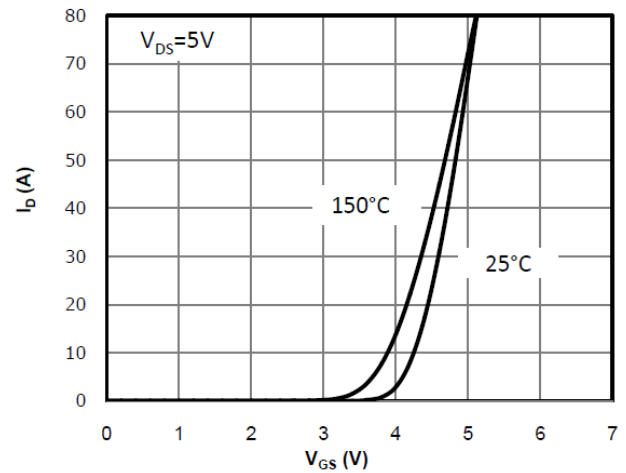


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

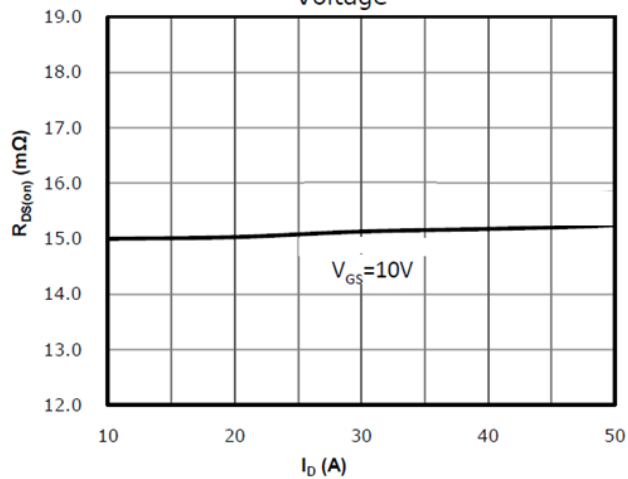


Fig 4: $R_{DS(on)}$ vs Gate Voltage

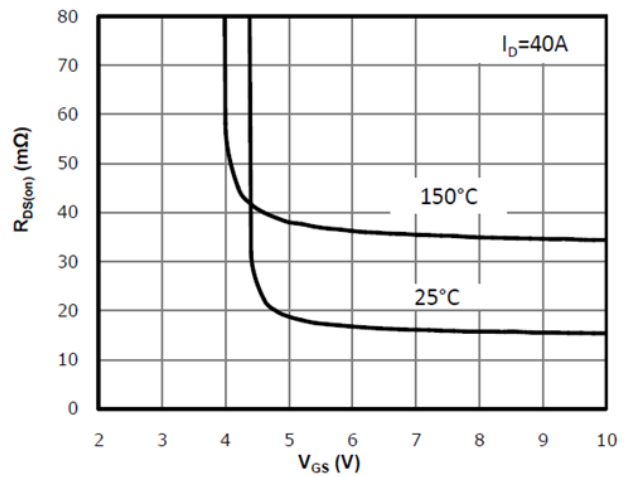


Fig 5: $R_{DS(on)}$ vs. Temperature

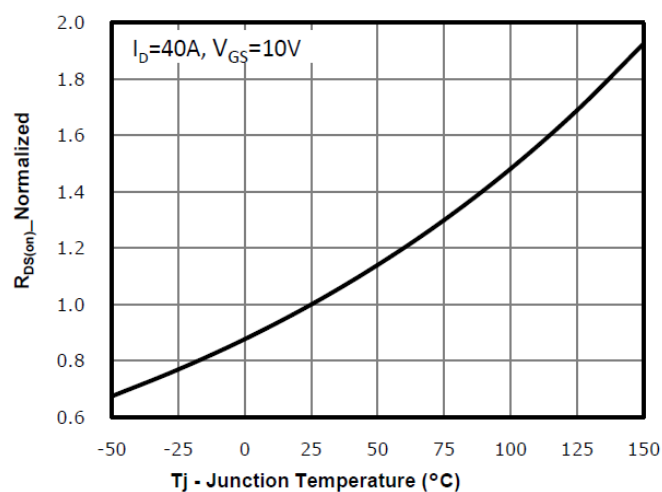


Fig 6: $V_{GS(th)}$ vs. Temperature

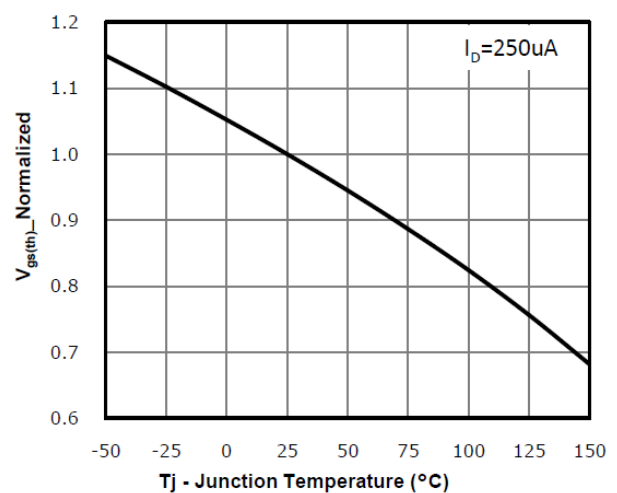


Fig 7: BVdss vs. Temperature

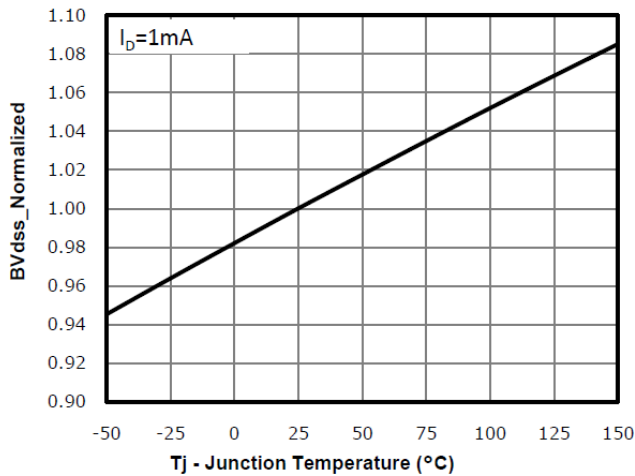


Fig 8: Capacitance Characteristics

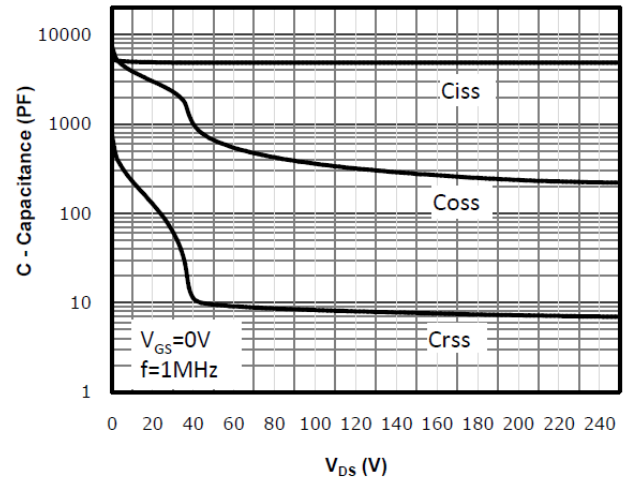


Fig 9: Gate Charge Characteristics

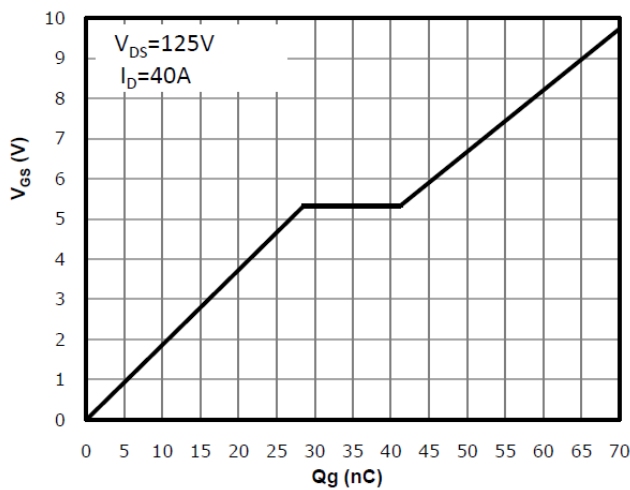


Fig 10: Body-diode Forward Characteristics

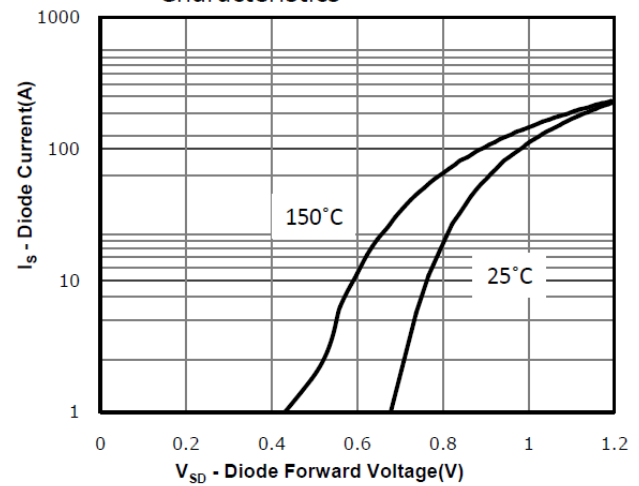


Fig 11: Power Dissipation

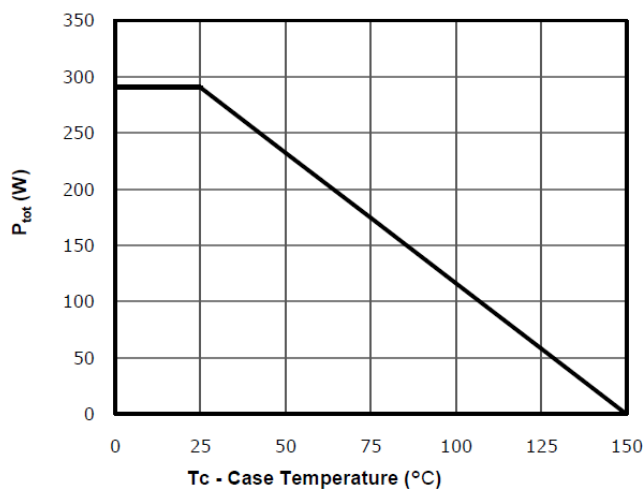


Fig 12: Drain Current Derating

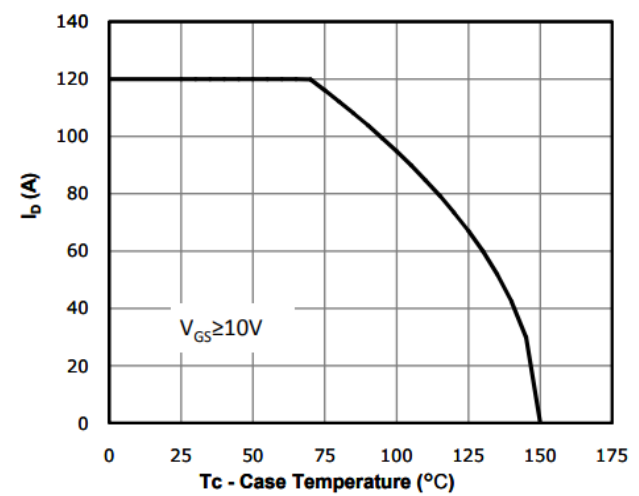


Fig 13: Safe Operating Area

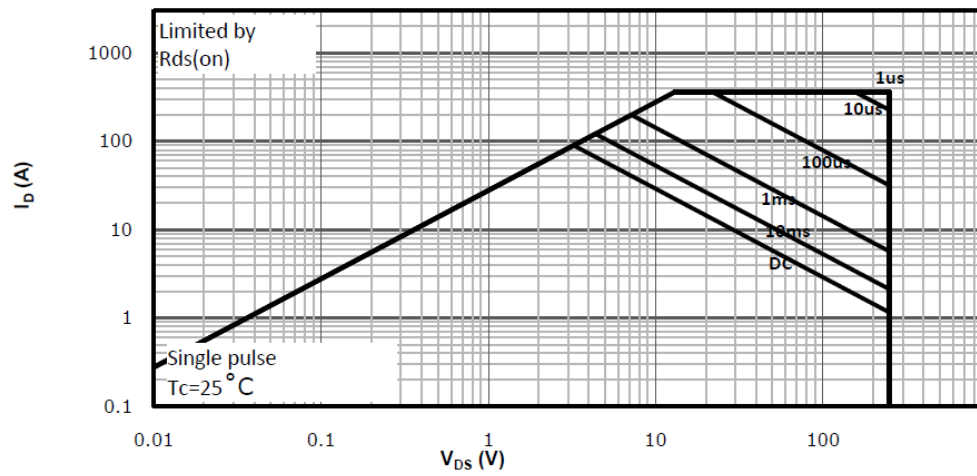
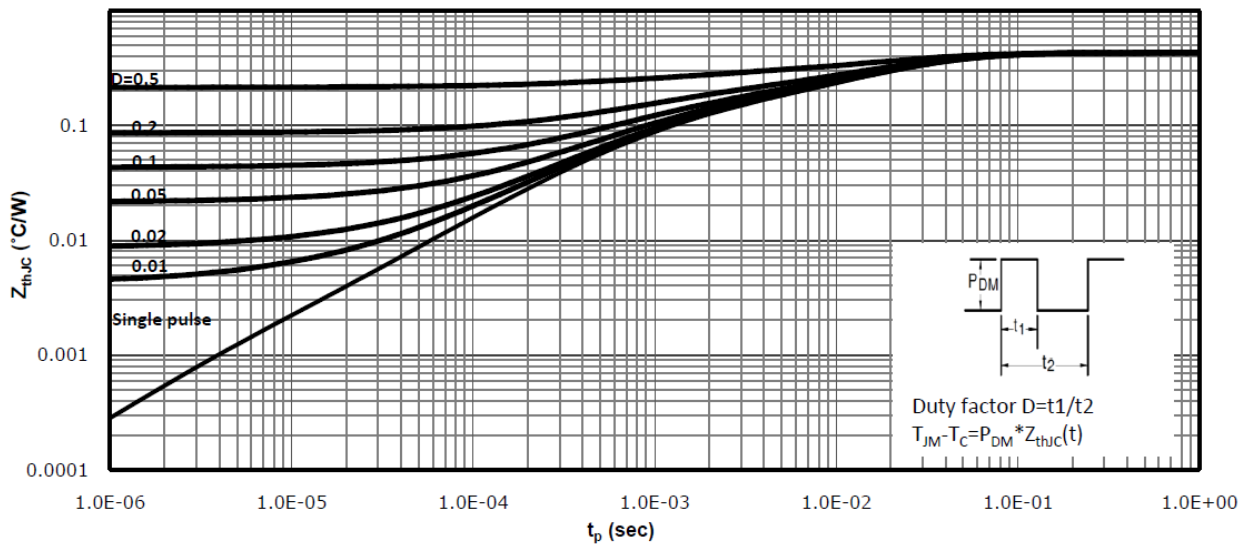
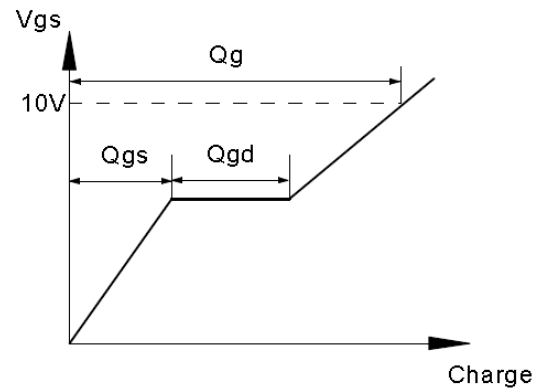
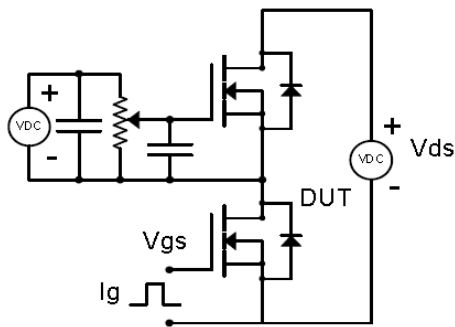


Fig 14: Max. Transient Thermal Impedance

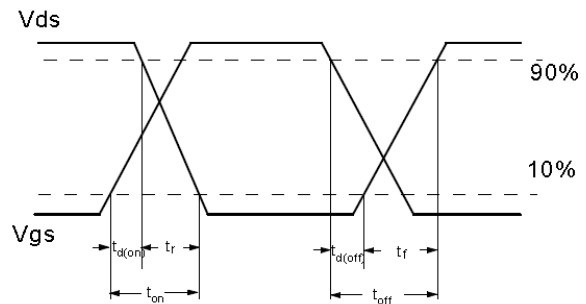
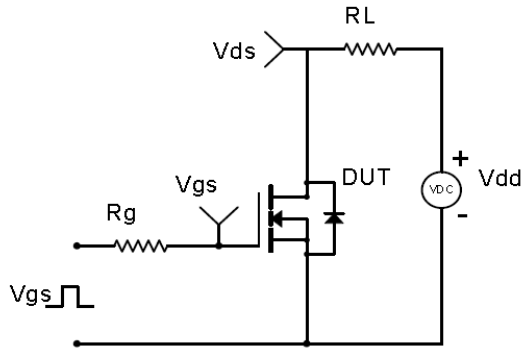


Test Circuit & Waveform

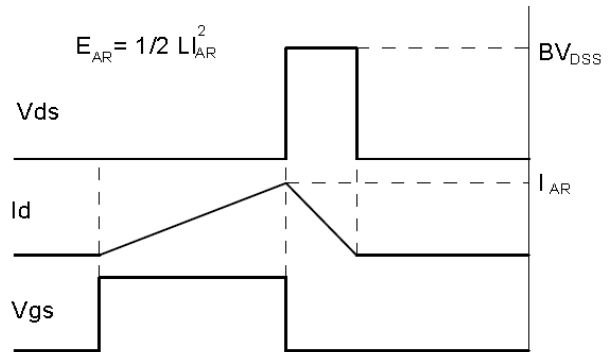
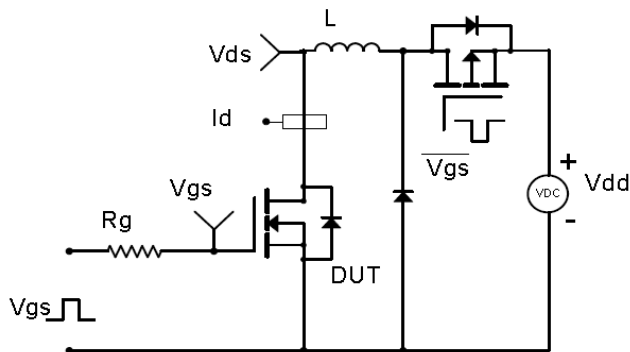
Gate Charge Test Circuit & Waveform



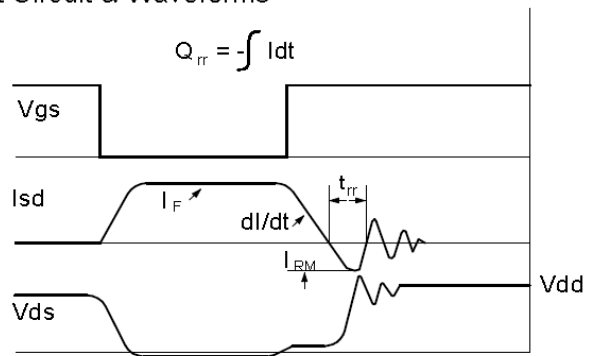
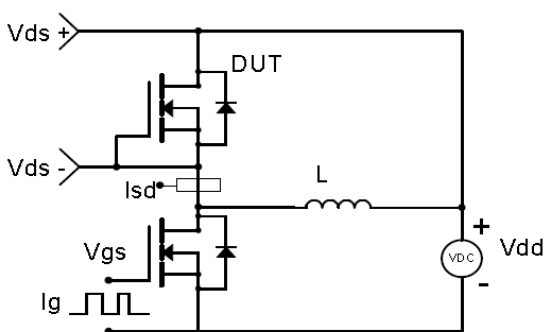
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TOLL

