

Features

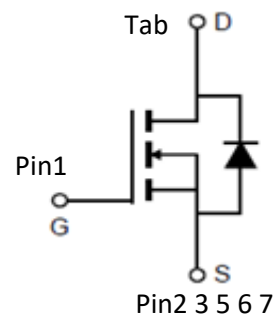
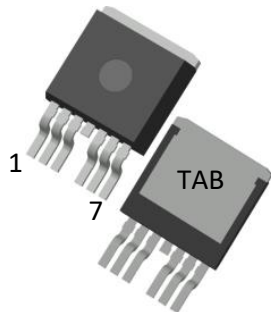
- Uses advanced SGT technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent gate charge x $R_{DS(on)}$ product(FOM)

Application

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

Product Summary

	TO263-7
V_{DS}	100V
$R_{DS(on)}@V_{GS}=10V$	1.78mΩ
I_D	320A



Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
LR020N10SM0	TO-263-7	LR020N10SM0	-	-	Reel&Tape	800

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	100	V
Continuous drain current $T_C = 25^\circ\text{C}$ (Silicon limit) $T_C = 100^\circ\text{C}$ (Silicon limit)	I_D	320 208	A
Pulsed drain current, $T_C = 25^\circ\text{C}$	$I_{D\text{ pulse}}$	1176	
Avalanche energy, single pulse ($L=0.5\text{mH}$, $R_g=25\Omega$)	E_{AS}	1936	mJ
Gate-Source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25^\circ\text{C}$	P_D	250	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}	0.5	°C/W
Thermal resistance, junction – ambient. Max	R_{thJA}	42	

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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$ $T_j=25^\circ\text{C}$	2	2.9	4	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$ $T_j=25^\circ\text{C}$	-	-	1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=100A$, $T_j=25^\circ\text{C}$	-	1.78	2	mΩ
Transconductance	g_{fs}	$V_{DS}=5V, I_D=100A$	-	238	-	S

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=50V$, $f=1\text{MHz}$	-	10120	-	pF
Output Capacitance	C_{oss}		-	1360	-	
Reverse Transfer Capacitance	C_{rss}		-	50	-	
Gate Total Charge	Q_G	$V_{GS}=10V, V_{DS}=50V$, $I_D=50A$	-	175	-	nC
Gate-Source charge	Q_{gs}		-	48	-	
Gate-Drain charge	Q_{gd}		-	53	-	
Turn-on delay time	$t_{d(on)}$	$T_j=25^\circ\text{C}, V_{GS}=10V$, $V_{DS}=50V, R_L=6\Omega$	-	85	-	ns
Rise time	t_r		-	138	-	
Turn-off delay time	$t_{d(off)}$		-	93	-	
Fall time	t_f		-	98	-	
Gate resistance	R_G	$V_{GS}=0V, V_{DS}=0V$, $f=1\text{MHz}$	-	1.2	-	Ω

Body Diode Characteristic

Body Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=100A$	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=50A,$ $dI/dt=100A/\mu s$	-	80	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=50A,$ $dI/dt=100A/\mu s$	-	180	-	nC

Typical Performance Characteristics

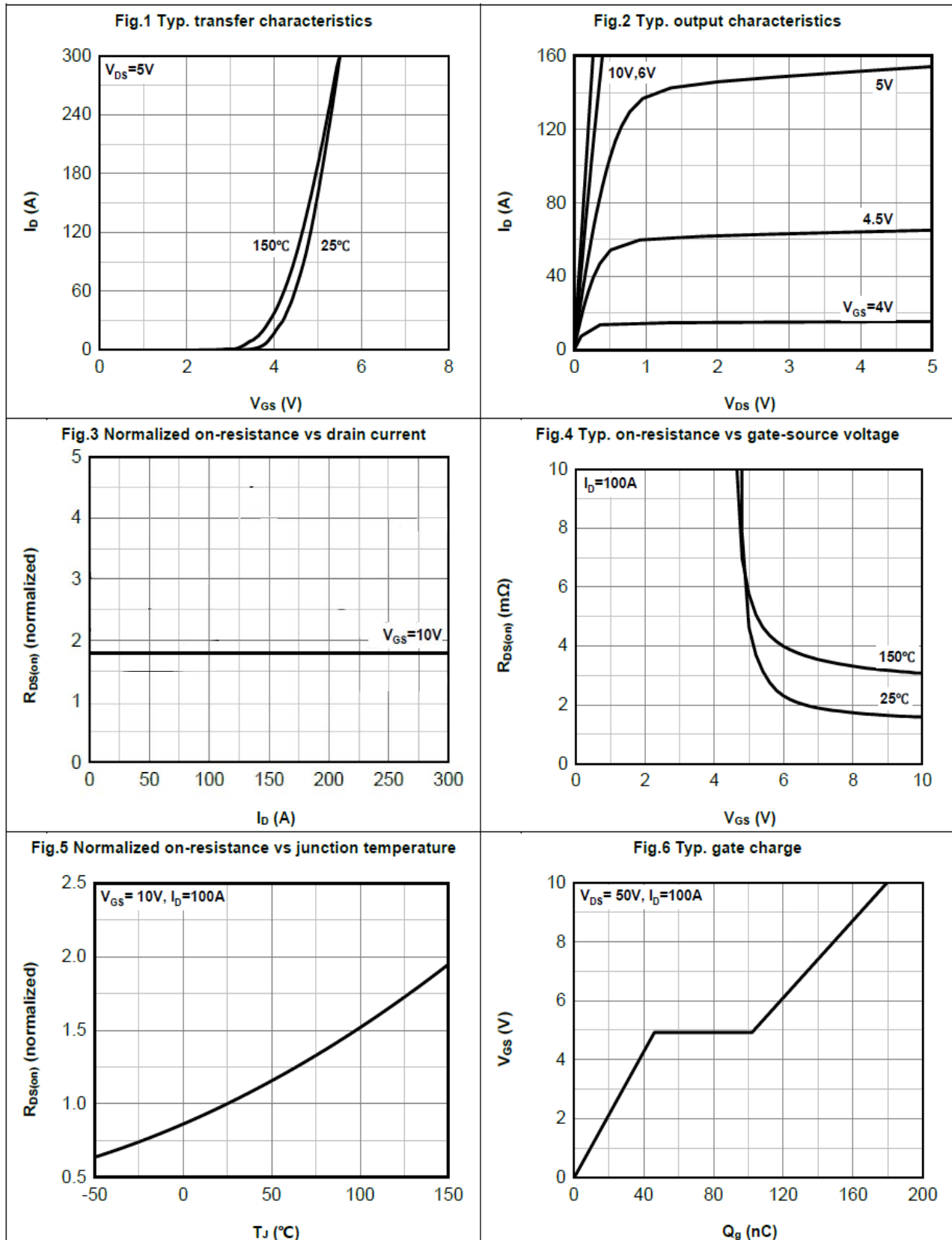


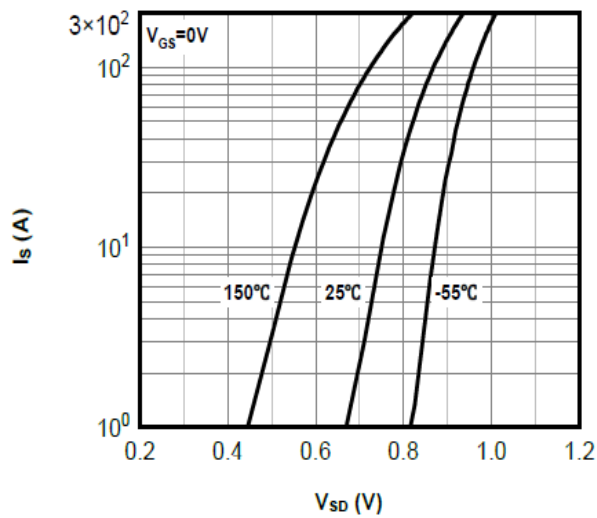
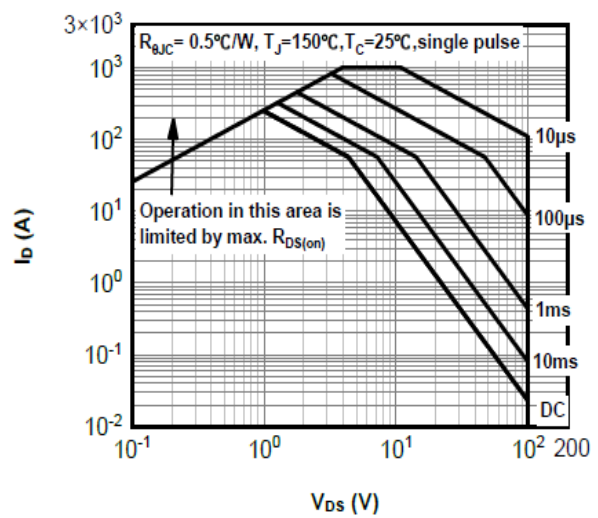
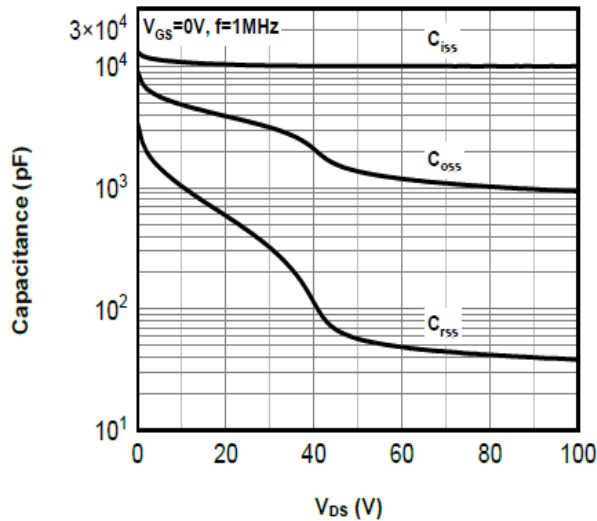
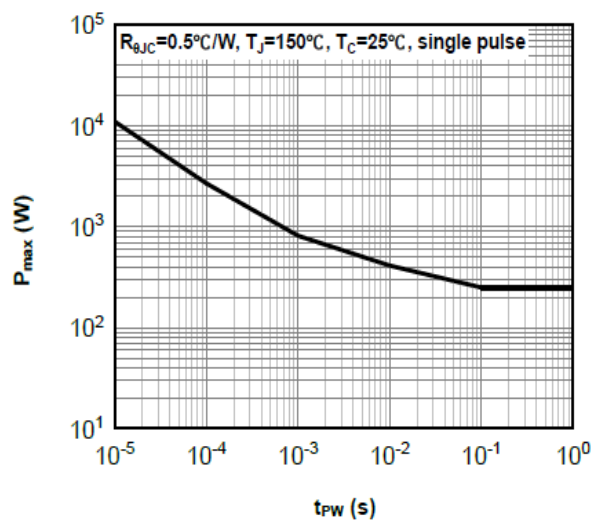
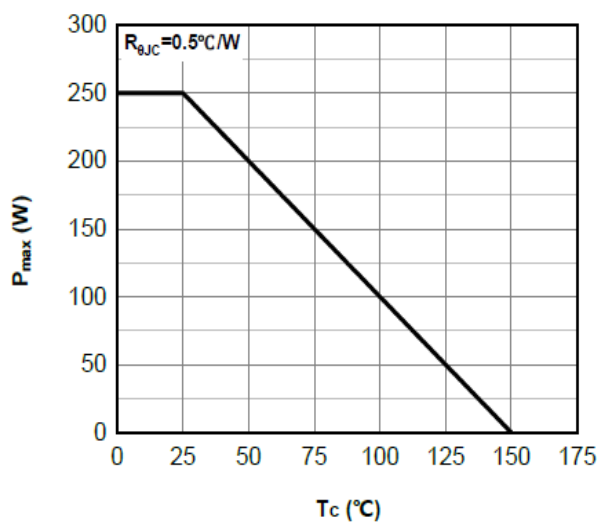
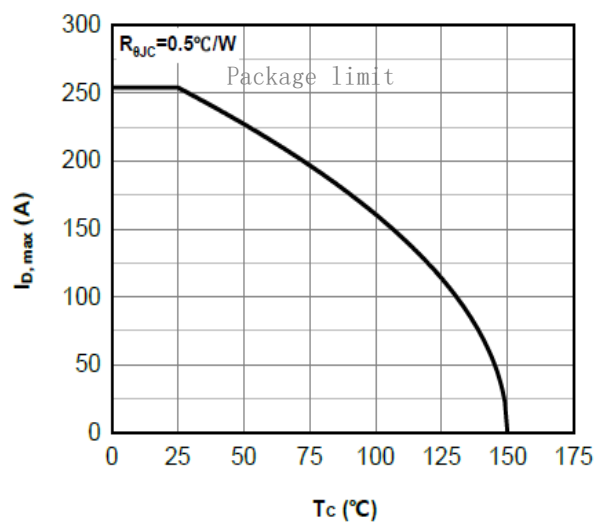
Fig.7 Typ. forward characteristics of body diode

Fig.8 Safe operating area

Fig.9 Typ. Capacitance

Fig.10 Single pulse maximum power dissipation

Fig.11 Max. power dissipation vs case temperature

Fig.12 Max. continuous drain current vs case temperature


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

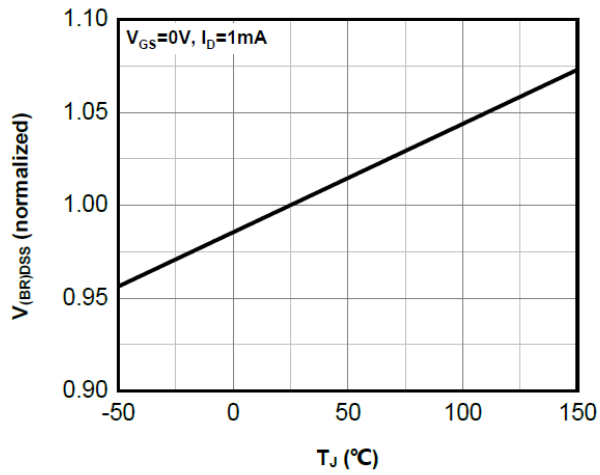


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

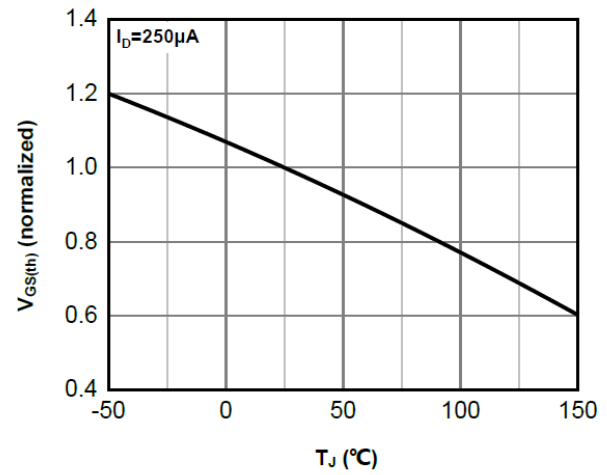
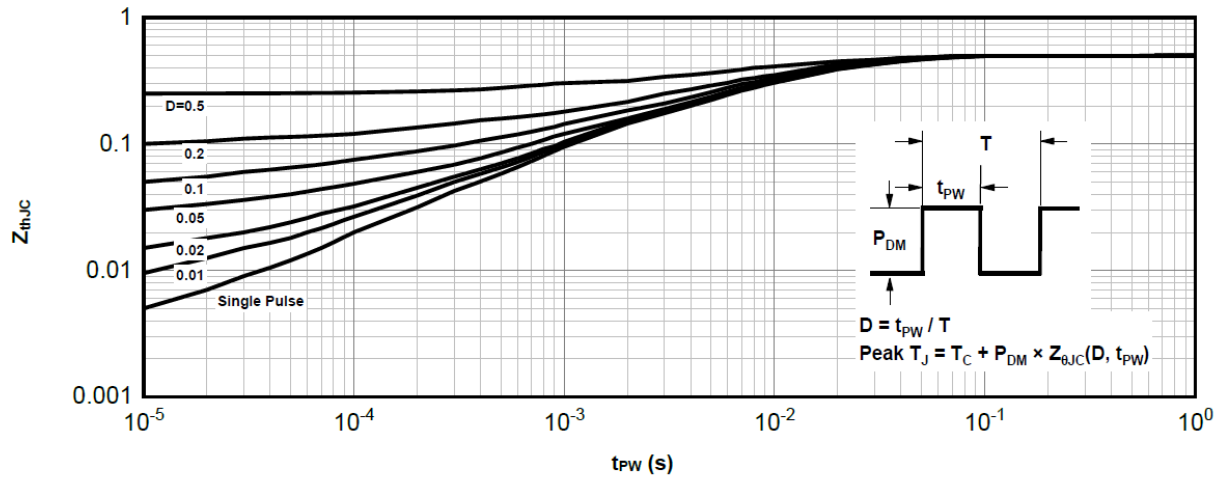
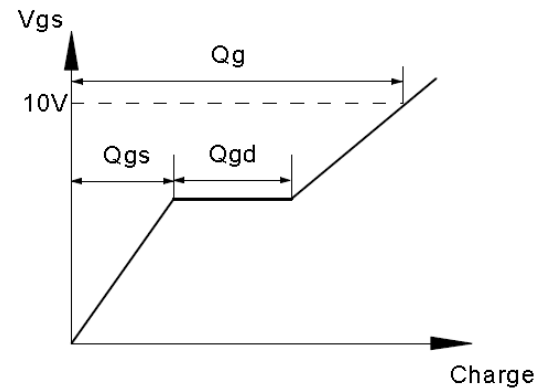
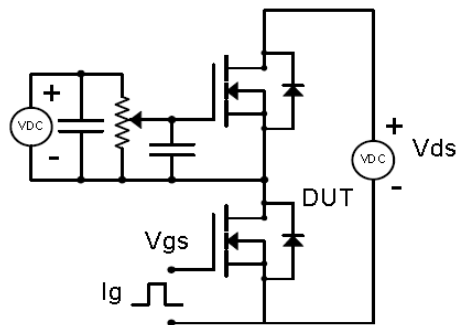


Fig.15 Transient thermal impedance from junction to case

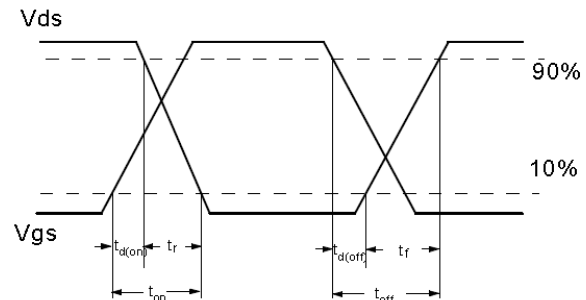
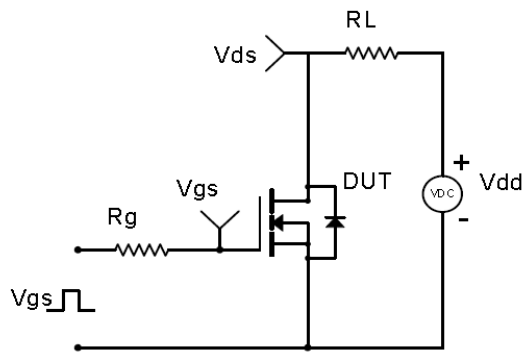


Test Circuit & Waveform

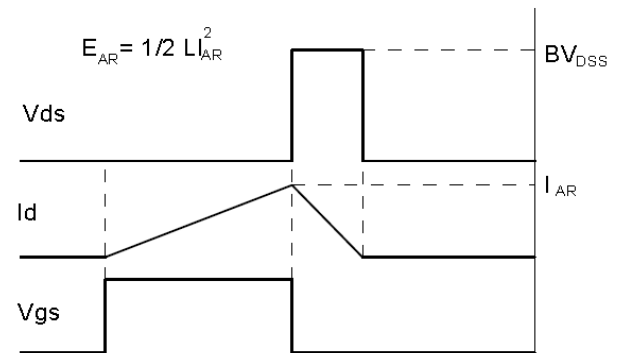
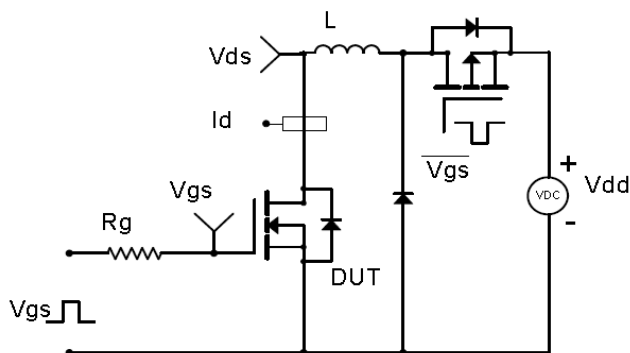
Gate Charge Test Circuit & Waveform



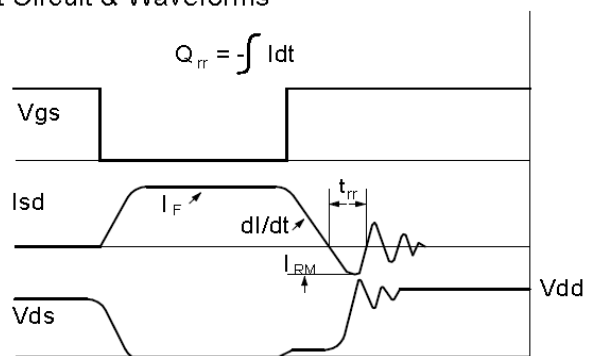
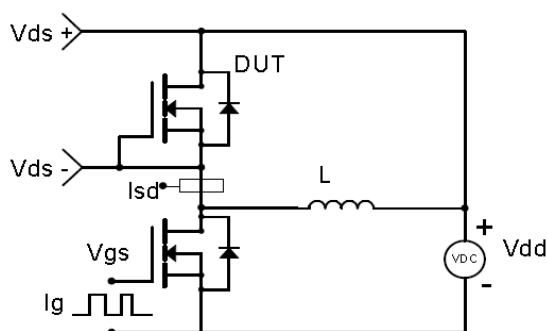
Resistive Switching Test Circuit & Waveforms

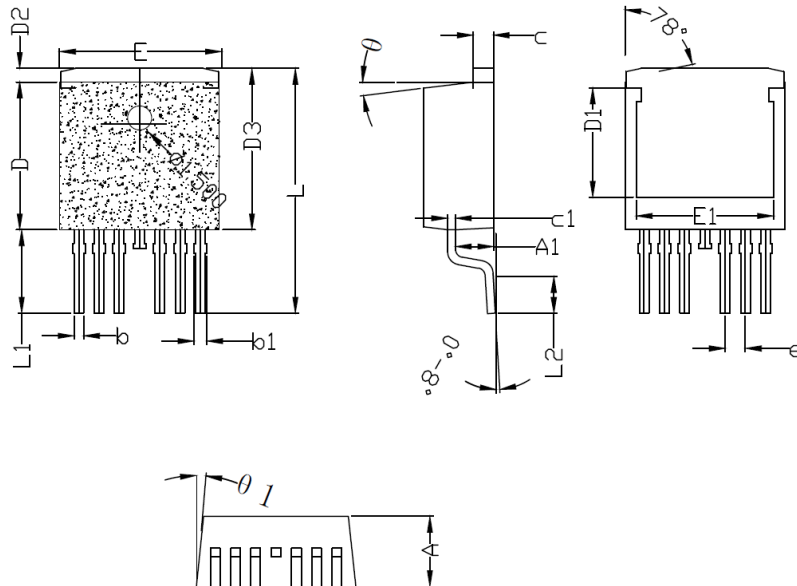


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-263-7


COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.20	4.40	4.60
A1	2.30	2.40	2.50
b	0.50	0.60	0.70
b1	0.60	0.70	0.80
c	1.25	1.30	1.35
c1	0.45	0.50	0.55
D	9.05	9.25	9.45
D1	6.65	6.85	7.05
D2	0.65	0.85	1.05
D3	9.90	10.10	10.30
E	9.80	10.00	10.20
E1	8.50	8.60	8.70
L	14.90	15.10	15.40
L1	4.80	5.00	5.20
L2	2.30	2.50	2.70
e	1.27 BSC		
θ	5°	7°	10°
θ1	3°	5°	8°