

Features

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

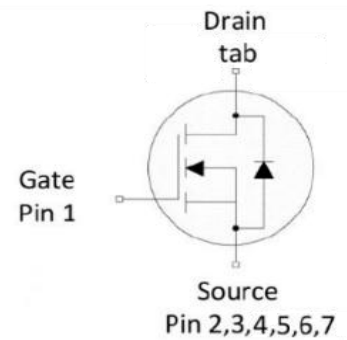
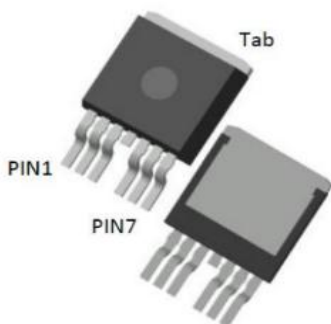
Application

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

Product Summary

Package	TO-263-7
V_{DS}	110V
$R_{DS(on)}@V_{GS}=10V$	1.13mΩ
I_D	330A

Package Marking



Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
LR013N11SM0	TO-263-7	LR013N11SM0	330*28.5mm	24mm	Reel&Tape	800

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

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	110	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous drain current $T_c=25^\circ\text{C}$ (Silicon limit) $T_A=25^\circ\text{C}$ (Package limit) $T_c=100^\circ\text{C}$ (Silicon limit)	I_D	412 330 260	A
Pulsed Drain Current	I_{DM}	1648	
Maximum Power Dissipation	P_d	431	W
Single pulse avalanche energy	E_{AS}	2809	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance,Junction-to-Case	R_{thJC}	0.29	°C/W
Thermal Resistance,Junction-to-Ambient	R_{thJA}	40	

Electrical Characteristics (T_c=25°C unless otherwise noted)

Parameter	Symbol	Condition	min	typ	max	Unit
-----------	--------	-----------	-----	-----	-----	------

Static Characteristic

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	110	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.2	3.0	4.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=110V, V_{GS}=0V$	-	-	1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=40A, V_{GS}=10V$	-	1.13	1.3	mΩ
Forward transconductance	g_{fs}	$V_{DS}=5V, I_D=100A$	-	380	-	S

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{DS}=55V, V_{GS}=0V,$ $f=1MHz$	-	13264	-	pF
Output Capacitance	C_{oss}		-	3316	-	
Reverse Transfer Capacitance	C_{rss}		-	476	-	
Gate resistance	R_g	$f=1MHz$	-	0.89	-	Ω
Gate Total Charge	Q_G	$V_{DS}=50V, I_D=100A,$ $V_{GS}=10V$	-	189	-	nC
Gate-Source charge	Q_{gs}		-	70	-	
Gate-Drain charge	Q_{gd}		-	20	-	
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=50V,$ $R_G=1.6\Omega$	-	131	-	ns
Rise time	t_r		-	143	-	
Turn-off delay time	$t_{d(off)}$		-	71	-	
Fall time	t_f		-	70	-	

Body Diode Characteristic

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_F=40A$	-	0.85	1.1	v
Reverse Recovery Time	t_{rr}	$I_F = 100A$ $di/dt = 100A/\mu s$	-	100	-	ns
Reverse Recovery Charge	Q_{rr}		-	280	-	nC

Typical Performance Characteristics

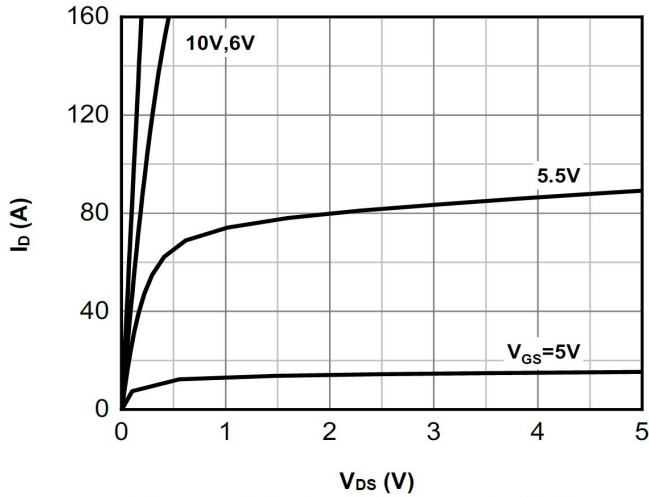


Figure 1 Output Characteristics

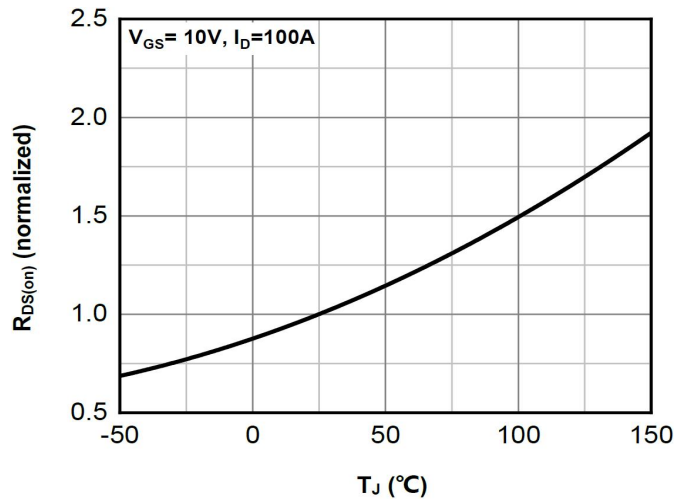


Figure 4 Rds(on)-Junction Temperature

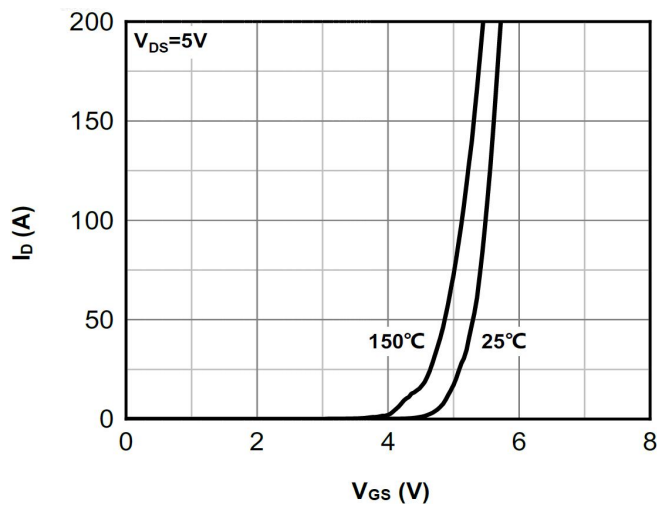


Figure 2 Transfer Characteristics

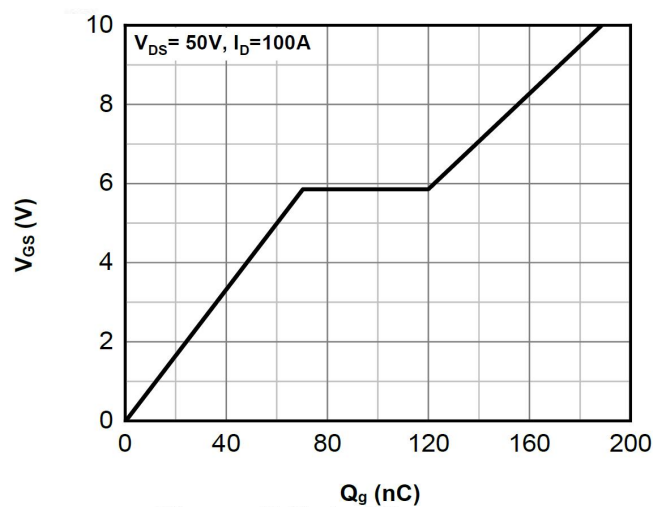


Figure 5 Gate Charge

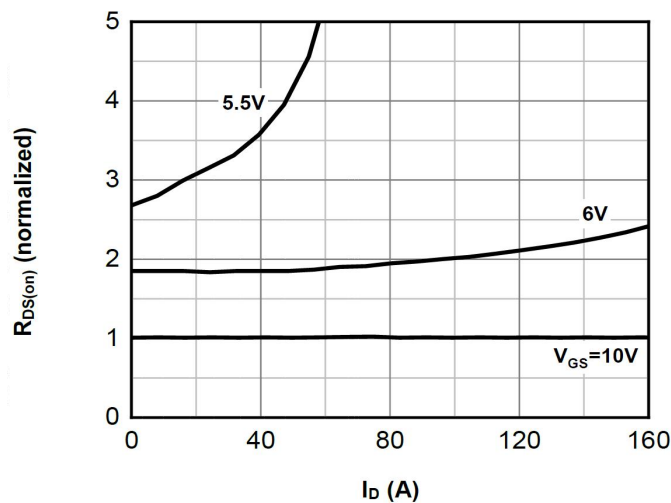


Figure 3 Rds(on)- Drain Current

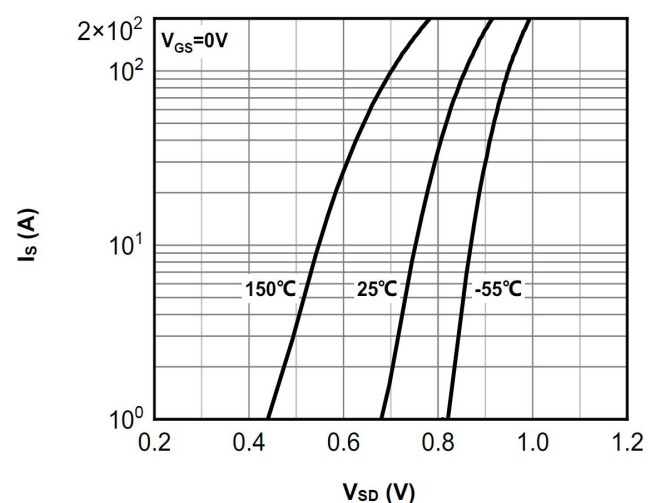
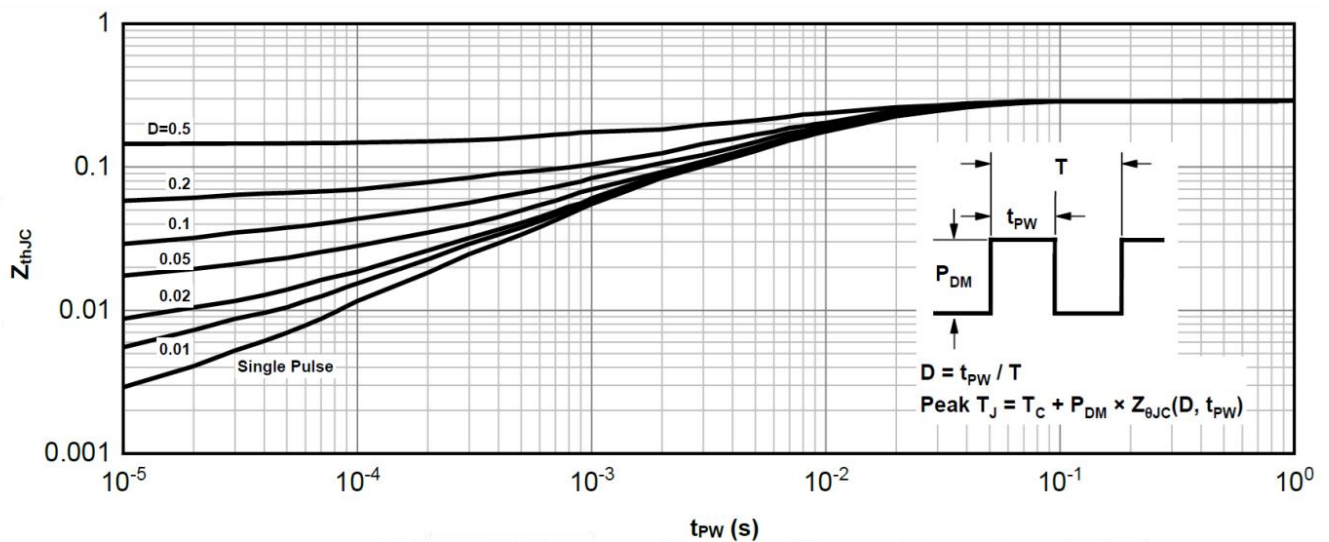
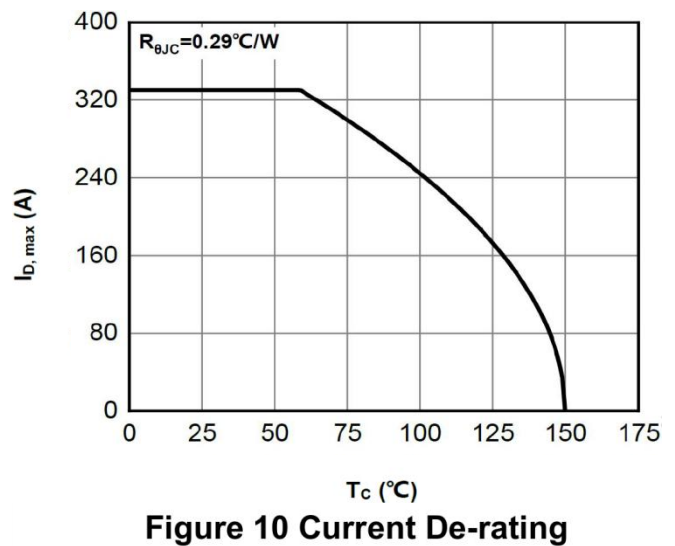
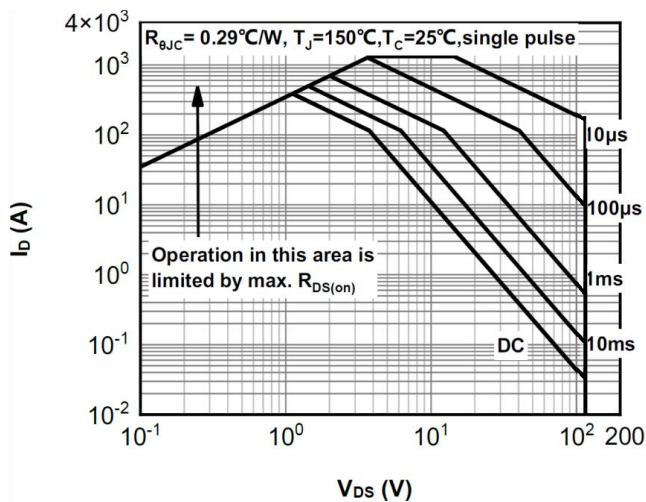
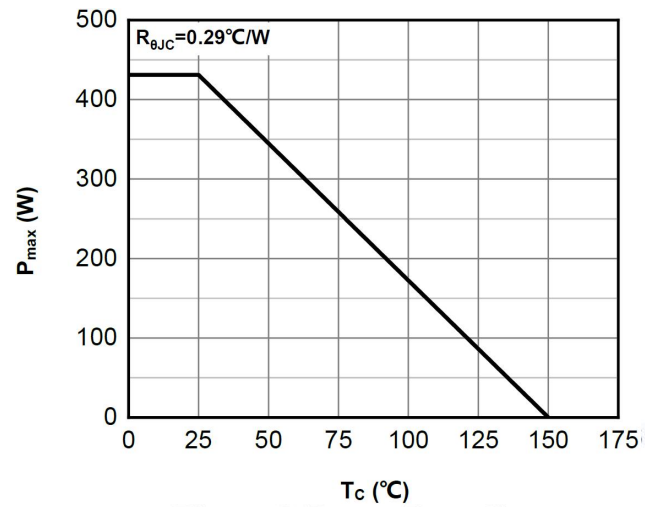
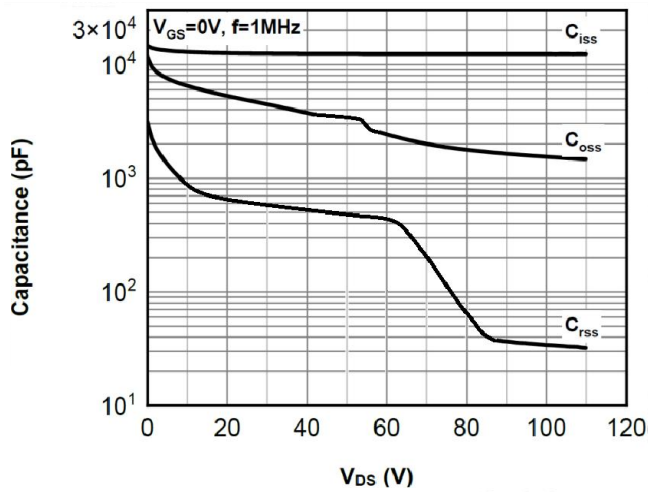
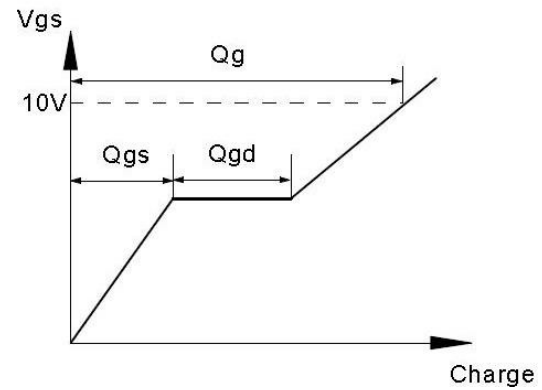
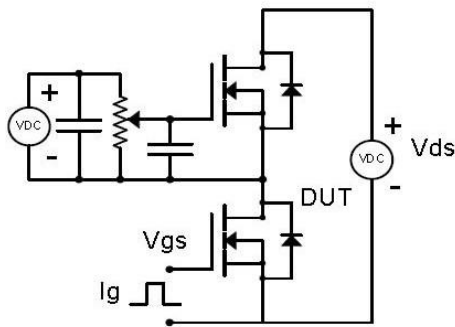


Figure 6 Source- Drain Diode Forward

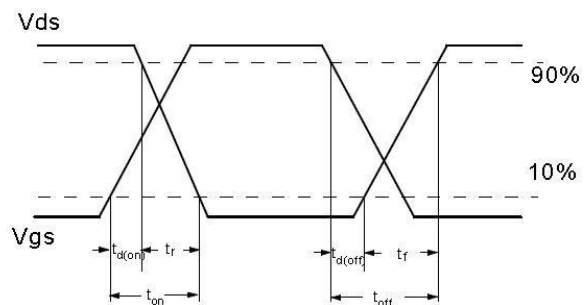
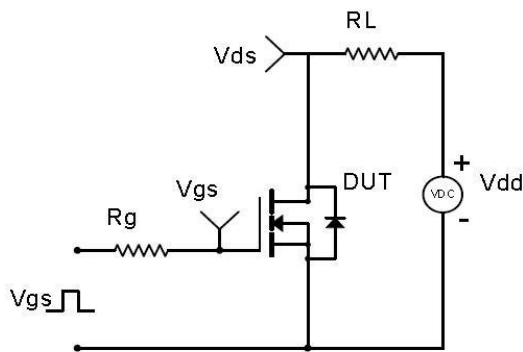


Test Circuit & Waveform

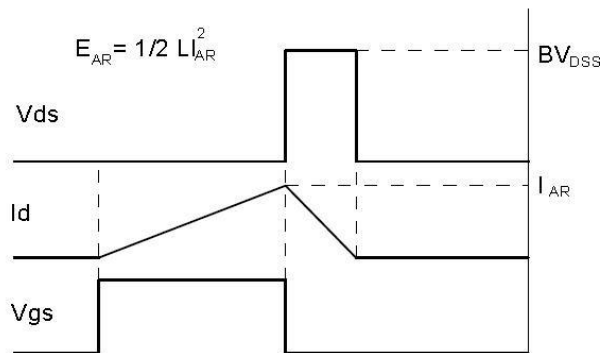
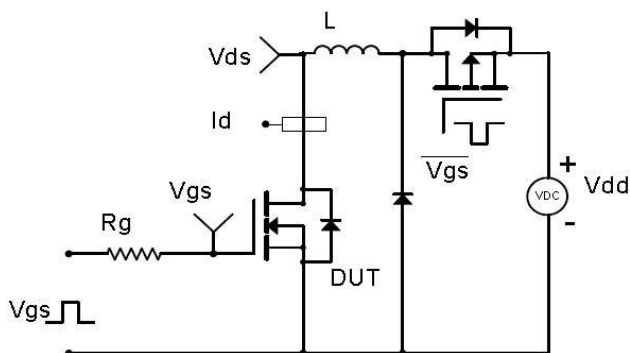
Gate Charge Test Circuit & Waveform



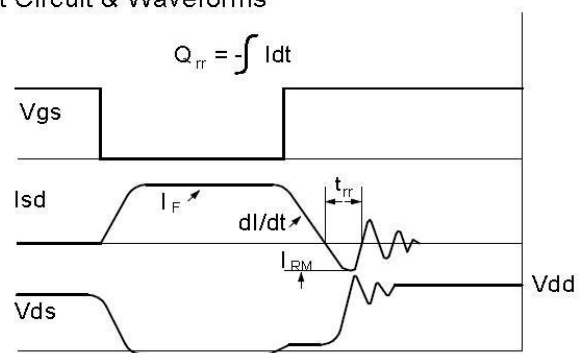
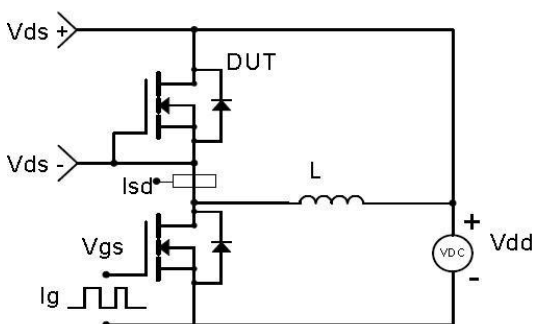
Resistive Switching Test Circuit & Waveforms



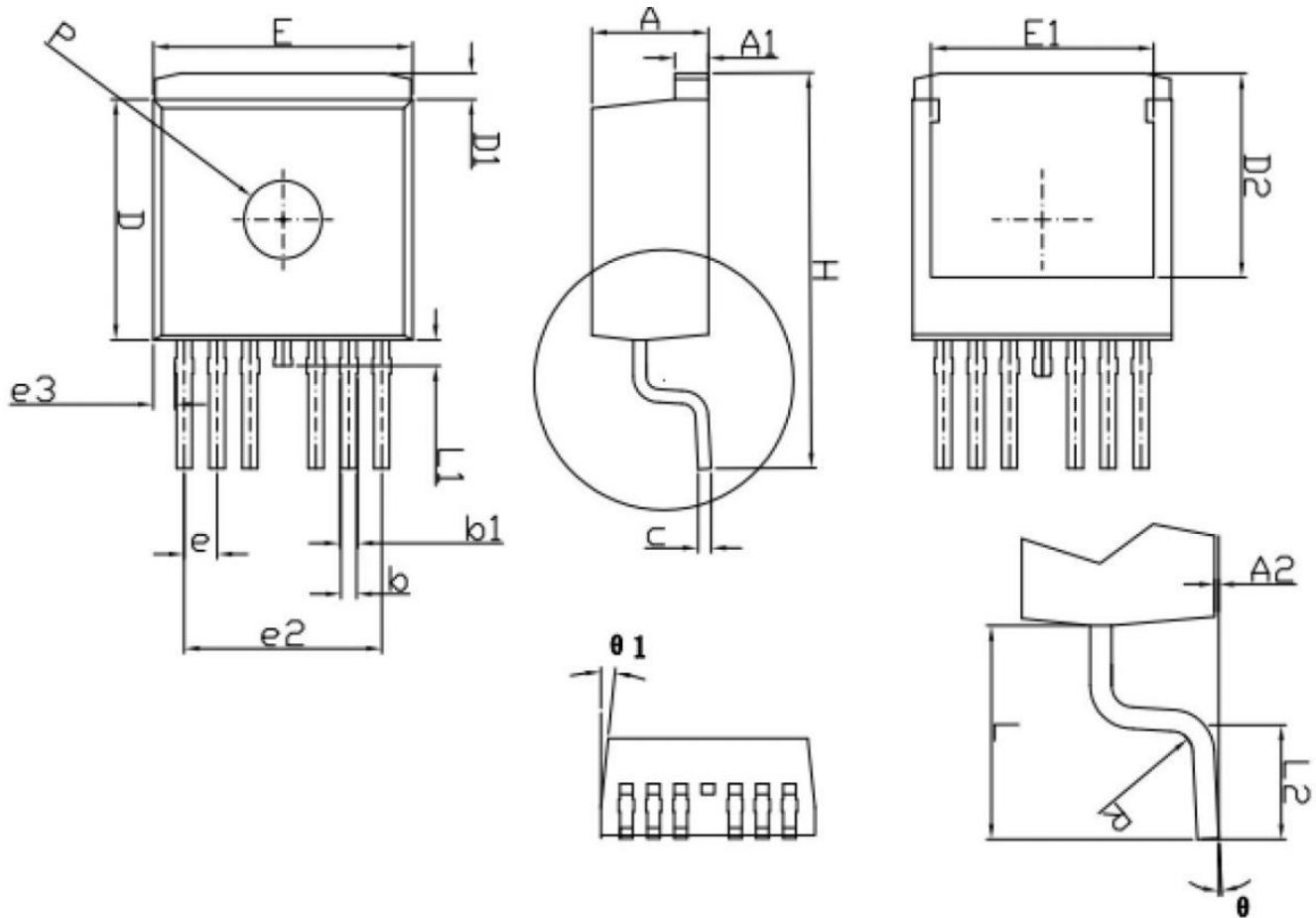
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



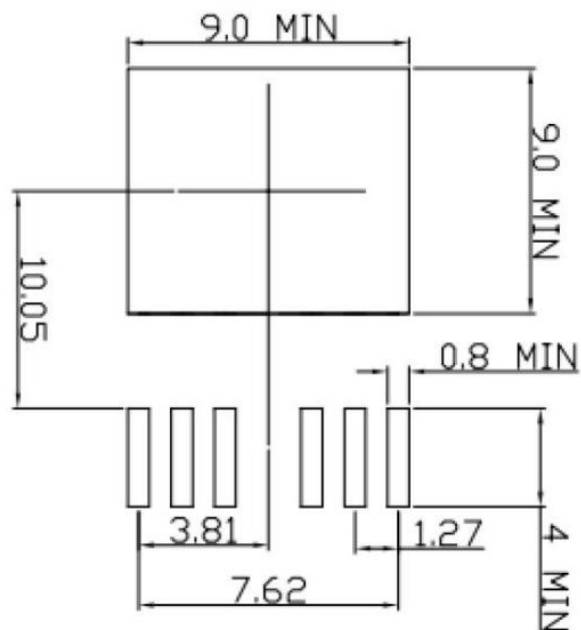
Diode Recovery Test Circuit & Waveforms



Package Outline:TO-263-7



RECOMMENDED LAND PATTERN



UNIT: mm

	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.20	1.30	1.40
A2	0.05	0.15	0.30
b	0.50	0.60	0.70
b1	0.50	0.70	0.90
c	0.40	0.50	0.60
D	9.05	9.25	9.45
D1	0.70	1.00	1.30
D2	7.35	7.85	8.35
E	9.80	10.00	10.20
E1	8.10	8.60	9.10
e	1.07	1.27	1.47
e2	7.32	7.62	7.92
e3	0.64	0.84	1.04
H	14.65	15.15	15.65
L	4.47	4.97	5.47
L1	0.90	1.20	1.50
L2	2.20	2.50	2.80
θ	0°	3°	8°
θ1	0°	6°	10°
ΦP	2.70	3.00	3.30

Revision History:

Revision	Date	Major changes
1.0	2025/10/15	Release of Preliminary version.