

Features

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

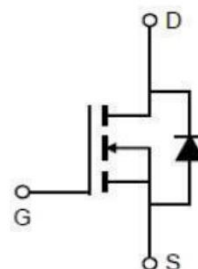
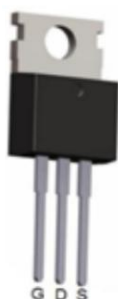
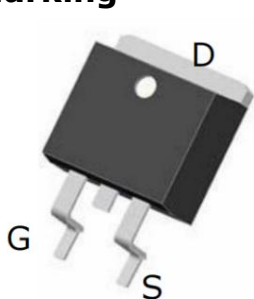
Application

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

Product Summary

Package	TO-263	TO-220
V_{DS}	150V	150V
$R_{DS(on)}@V_{GS}=10V$	4.2mΩ	4.6mΩ
I_D	173A	173A

Package Marking



Type	Package	Marking	Reel Size	Tape Width	Packing	Qty
LR049N15SW2	TO-263	LR049N15SW2	330*28.5mm	24mm	Reel&Tape	800 or 1000
LR052N15SW3	TO-220	LR052N15SW3	-	-	Tube	50

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

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous drain current $T_c=25^\circ\text{C}$ (Silicon limit) $T_c=100^\circ\text{C}$ (Silicon limit)	I_D	173 110	A
Pulsed Drain Current	I_{DM}	620	A
Maximum Power Dissipation	P_d	284	W
Single pulse avalanche energy	E_{AS}	1638	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance,Junction-to-Case	R_{thJC}	0.44	°C/W
Thermal Resistance,Junction-to-ambient	R_{thJA}	62	

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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	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}	$V_{DS}=100V, V_{GS}=0V$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			±100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$I_D=20A, V_{GS}=10V$ TO-263 TO-220		4.2 4.6	4.9 5.2	mΩ
Transconductance	g_{fs}	$V_{DS}=5V, I_D=80A$		124		S

Dynamic Characteristic

Input Capacitance	C_{iss}	$V_{DS}=75V, V_{GS}=0V,$ $f=1MHz$	-	5007	-	pF
Output Capacitance	C_{oss}		-	809	-	
Reverse Transfer Capacitance	C_{rss}		-	23	-	
Gate resistance	R_g	$f=1MHz$	-	3.5	-	Ω
Gate Total Charge	Q_G	$V_{DS}=75V, I_D=80A,$ $V_{GS}=10V$	-	74	-	nC
Gate-Source charge	Q_{gs}		-	29	-	
Gate-Drain charge	Q_{gd}		-	16	-	
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10V, V_{DS}=75V,$ $R_G=2.7\Omega$	-	20	-	ns
Rise time	t_r		-	99	-	
Turn-off delay time	$t_{d(off)}$		-	60	-	
Fall time	t_f		-	102	-	

Body Diode Characteristic

Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=80A$	-	-	1.4	v
Reverse Recovery Time	t_{rr}	$I_F=80A$ $di/dt = 100A/\mu s$	-	96	-	ns
Reverse Recovery Charge	Q_{rr}		-	313	-	nC

Typical Performance Characteristics

Fig 1: Output Characteristics

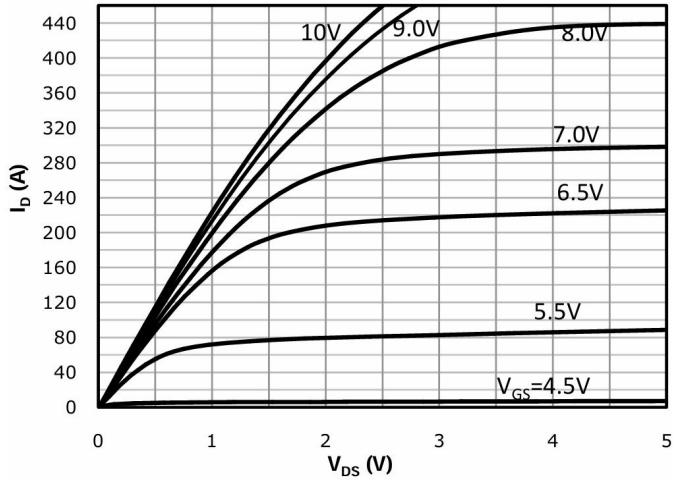


Fig 2: Transfer Characteristics

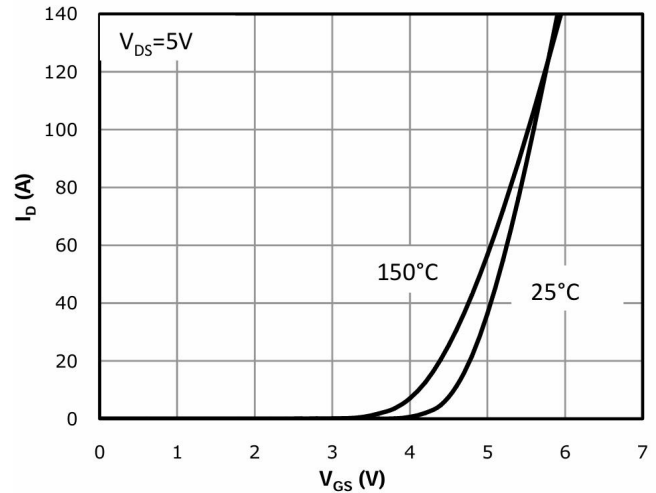


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

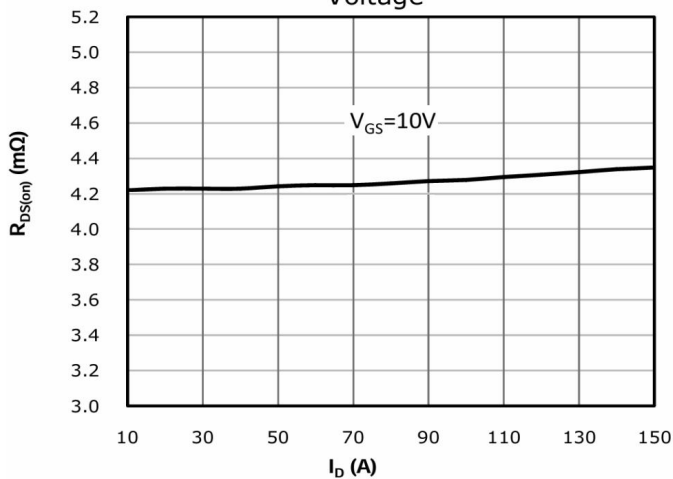


Fig 4: $R_{DS(on)}$ vs Gate Voltage

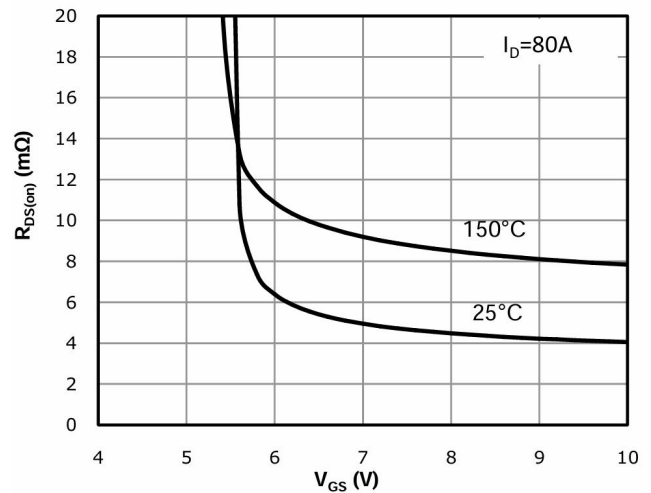


Fig 5: $R_{DS(on)}$ vs. Temperature

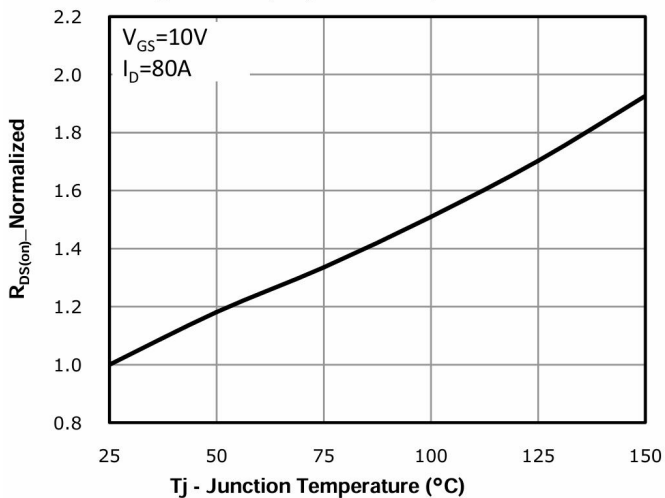
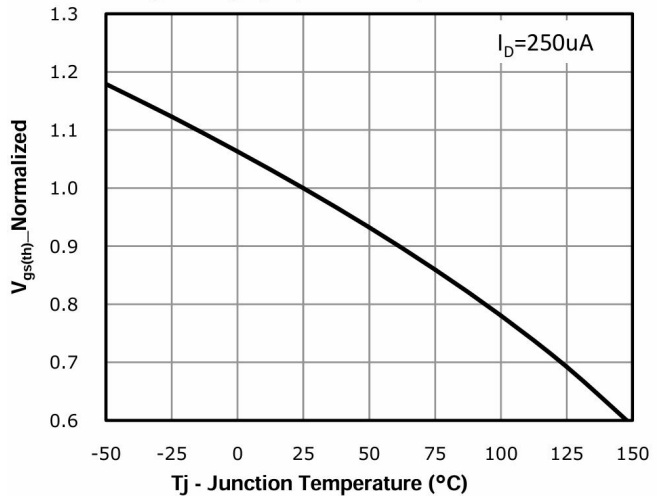


Fig 6: $V_{GS(th)}$ vs. Temperature



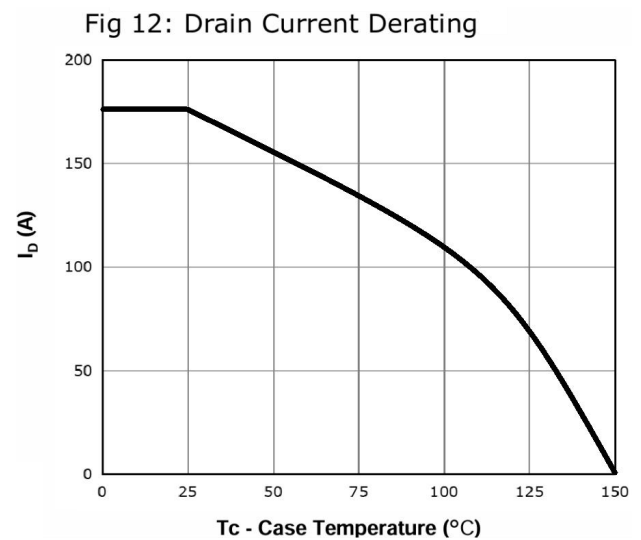
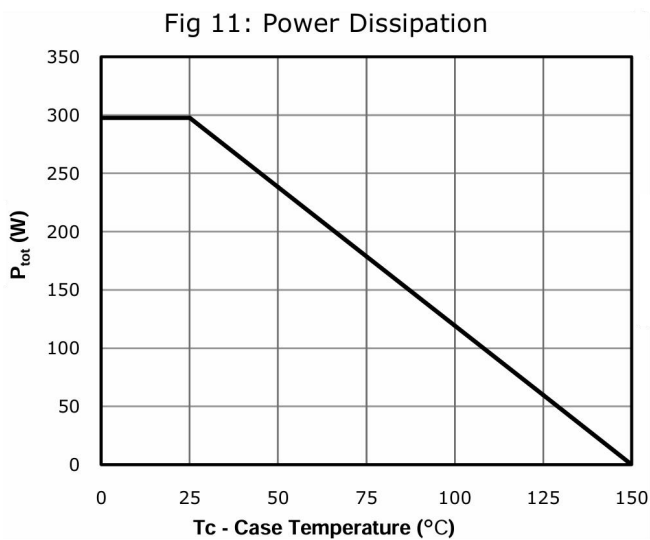
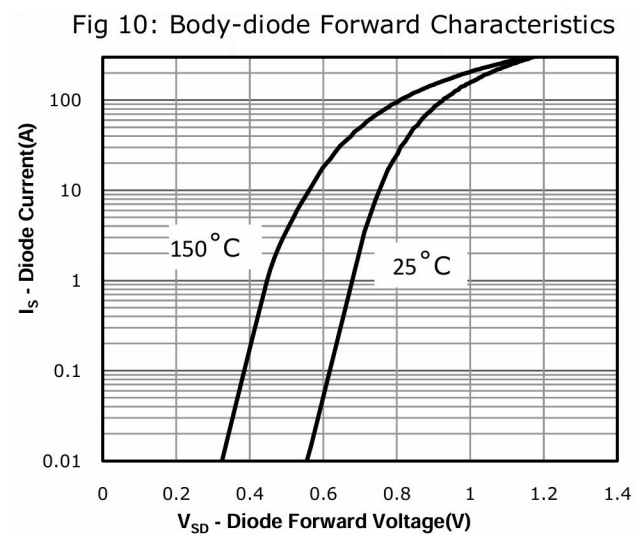
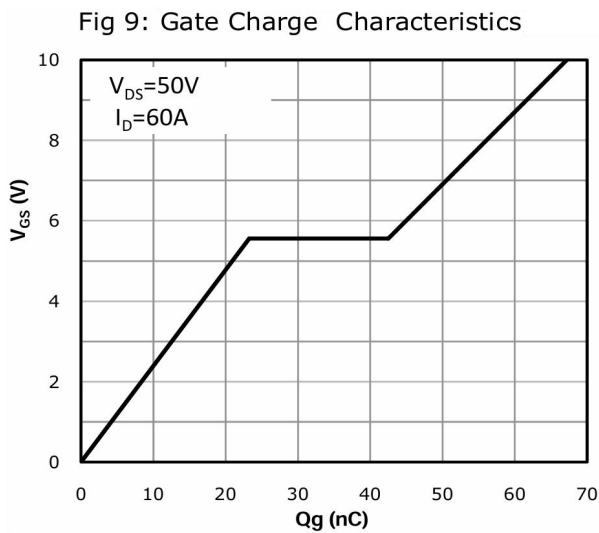
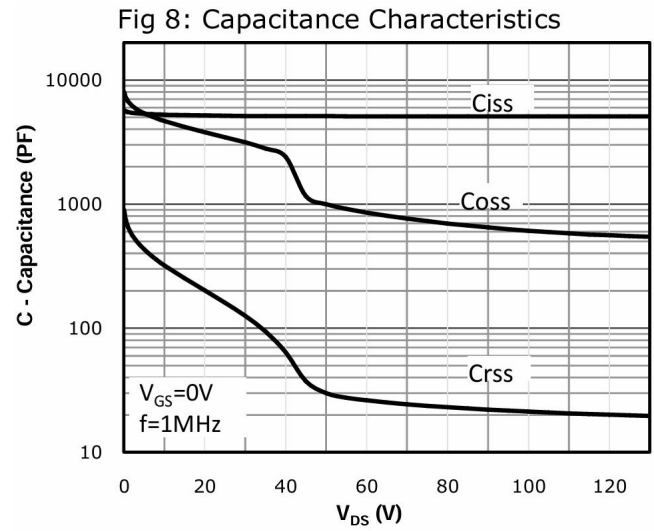
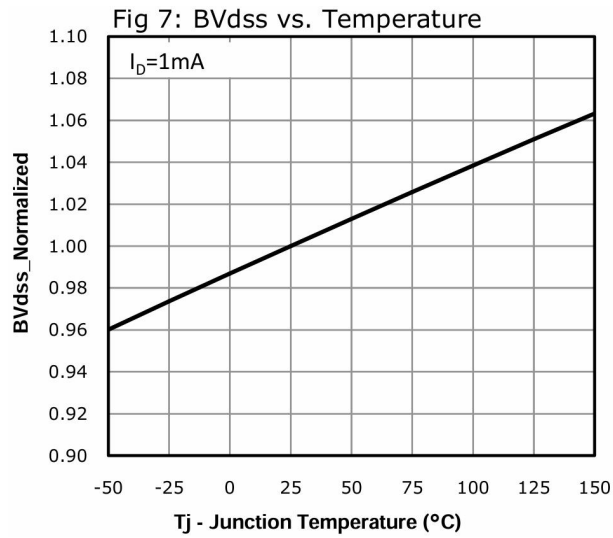


Fig 13: Safe Operating Area

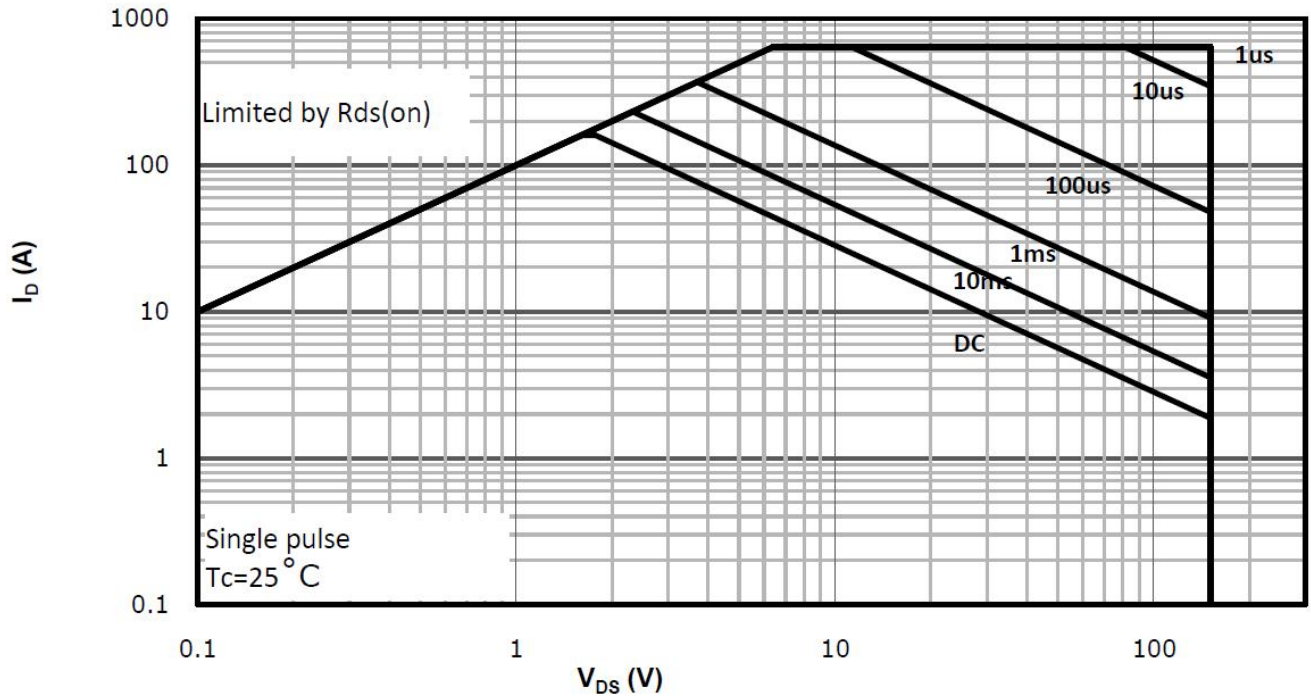
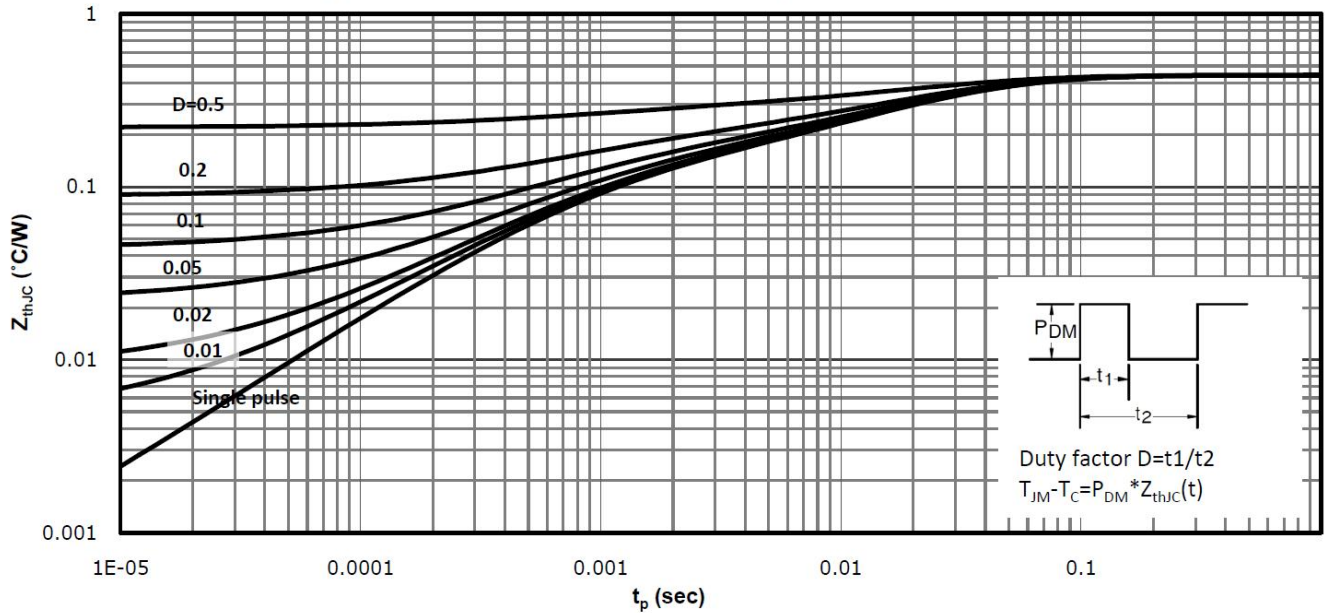
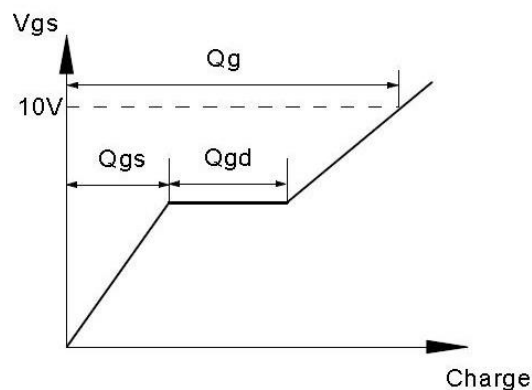
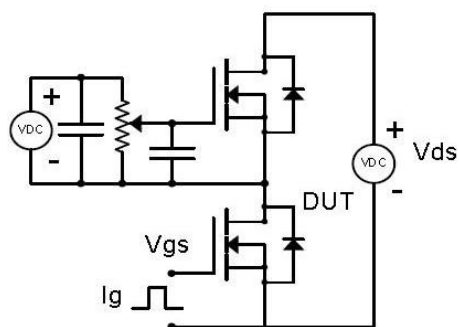


Fig 14: Max. Transient Thermal Impedance

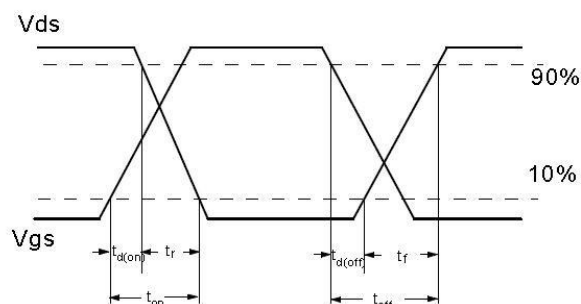
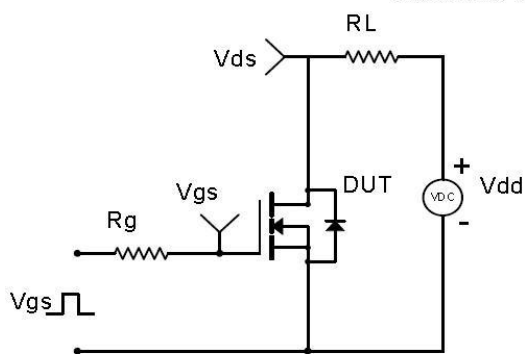


Test Circuit & Waveform

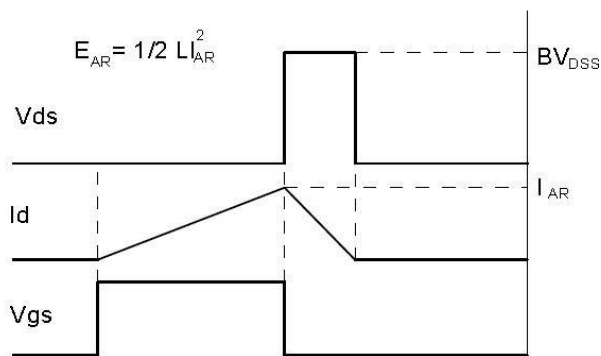
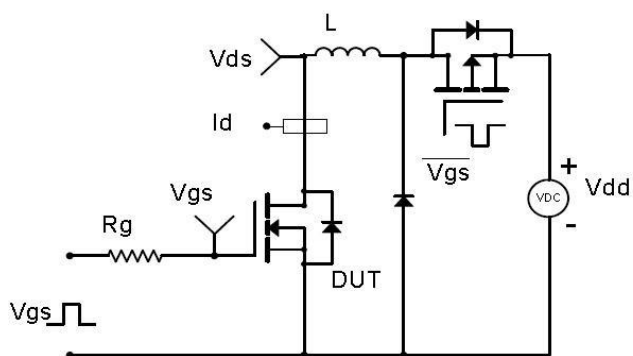
Gate Charge Test Circuit & Waveform



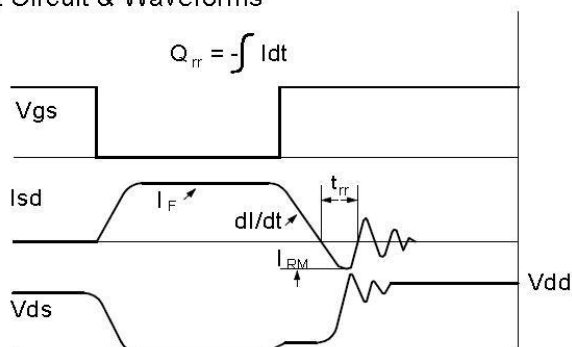
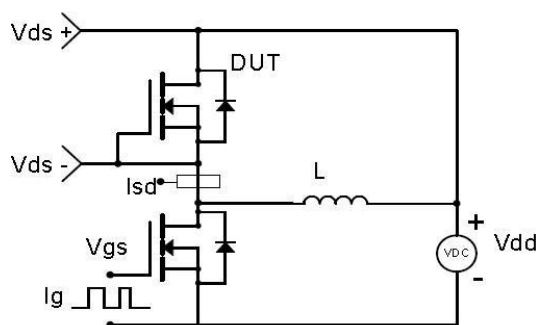
Resistive Switching Test Circuit & Waveforms



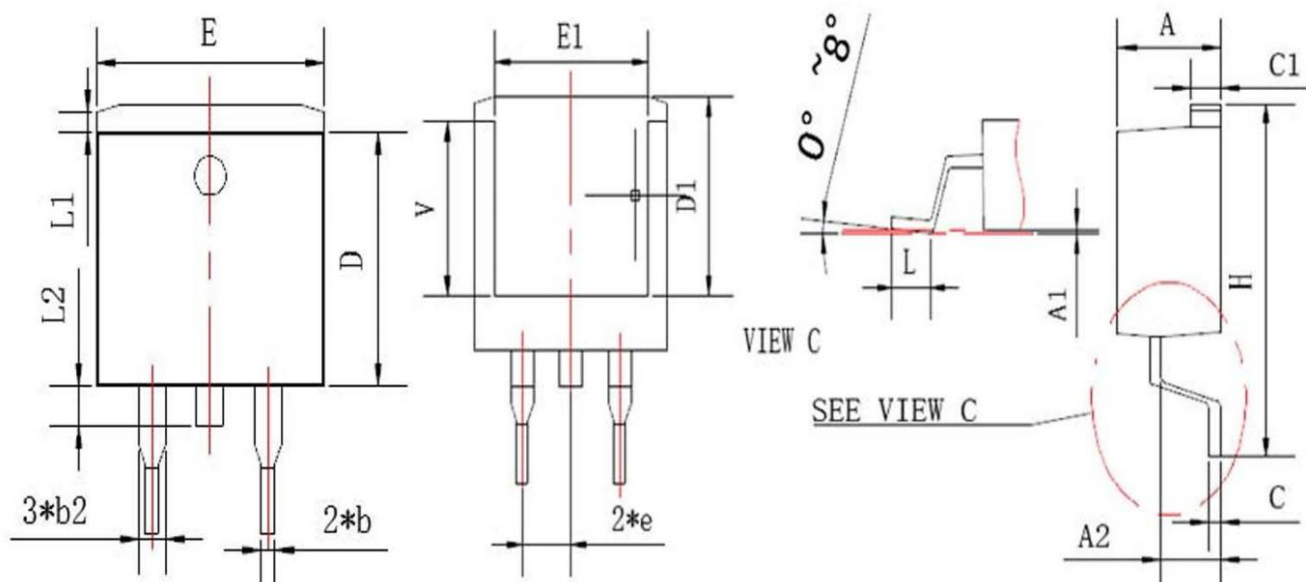
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

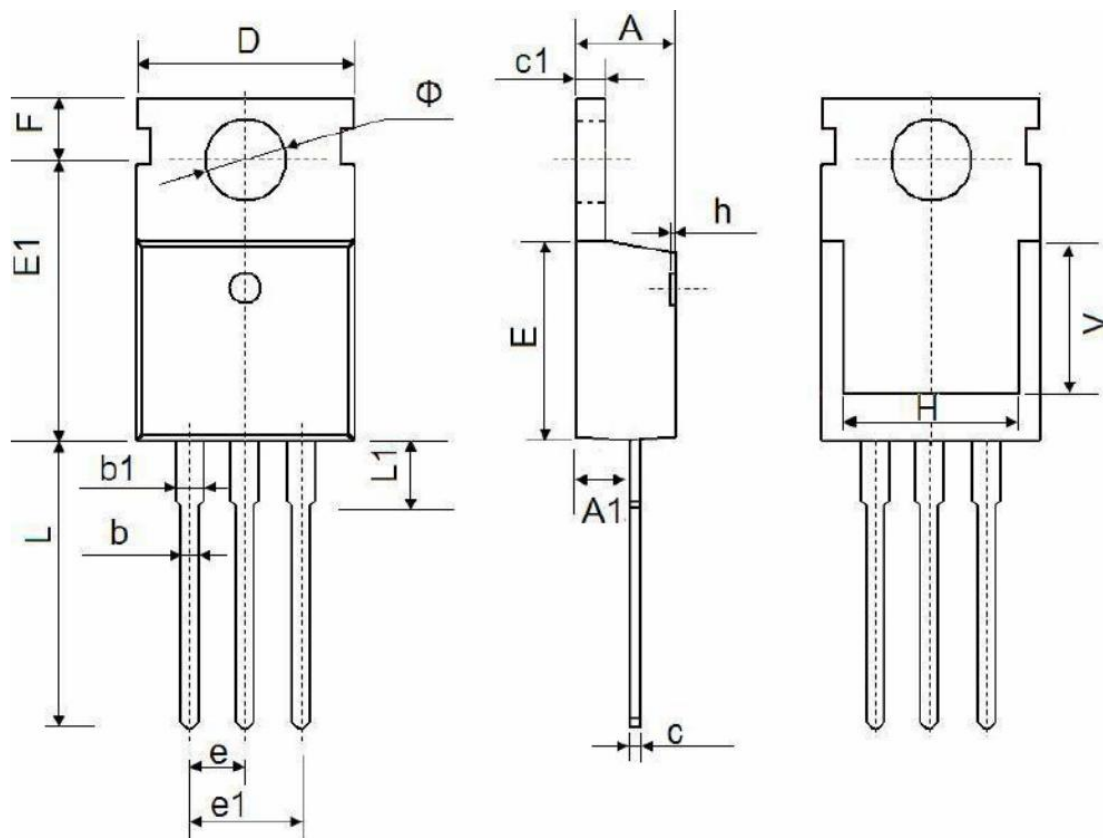


Package Outline:TO-263



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.80	0.169	0.189
A1	0.00	0.25	0.000	0.010
A2	2.35	2.70	0.093	0.106
b	0.70	0.94	0.028	0.037
b2	1.15	1.35	0.045	0.053
C	0.35	0.65	0.014	0.026
C1	1.20	1.40	0.047	0.055
D	8.40	9.40	0.331	0.370
D1	7.80	8.10	0.307	0.319
e	2.540 Typ.		0.100 Typ.	
E	9.85	10.30	0.388	0.406
E1	7.00	8.50	0.276	0.335
H	15.00	15.70	0.591	0.618
L	2.30	2.80	0.091	0.110
L1	0.90	1.30	0.035	0.051
V	6.700Ref.		0.264Ref	
L2	1.00	1.50	0.039	0.059

Package Outline:TO-220



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 Typ.		0.100 Typ.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 Ref.		0.295 Ref.	
Φ	3.400	3.800	0.134	0.150

Revision History:

Revision	Date	Major changes
1.0	2025/11/6	Release of Preliminary version.