Features

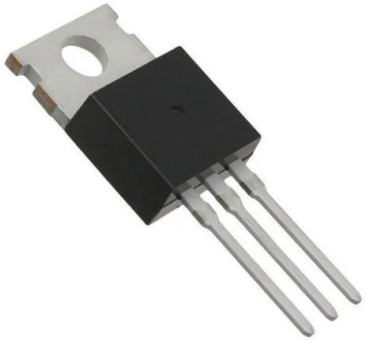
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- $R_{DS(on).typ}$=2.6mΩ@V_{GS}=10V
- High Reliability Capability

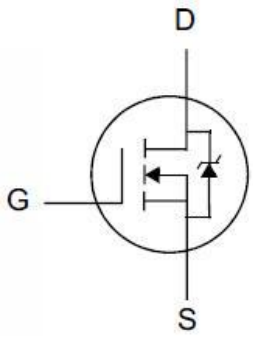
Application

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

Product Summary

V_{DS}	100V
$R_{DS(on).typ@VGS=10V}$	2.6mΩ
I_D	185A





Package Marking and Ordering Information

Type	Package	Marking	Reel Size	Qty
LR030N10SM3	TO-220	LR030N10SM3	-	50

Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DS}	100	V
Continuous Drain Current T_C = 25°C T_C = 100°C	I_D	 185 130	A
Pulsed Drain Current	$I_{D\ pulse}$	740	A
Avalanche Energy, Single Pulse	E_{AS}	1369	mJ
Gate-emitter Voltage	V_{GS}	±20	V
Power Dissipation, T_C = 25℃	P_D	231	W
Operating Junction And Storage Temperature	T_j , T_{stg}	-55~150	℃

Thermal Resistance

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance, Junction to Case	R_{thJC}	-	0.54	℃/W
Thermal Resistance, Junction to Ambient	R_{thJA}	-	60	℃/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=250uA	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2	3	4	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V	-	-	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=75A	-	2.6	3.0	mΩ
Dynamic Characteristic						
Input Capacitance	C_{iss}	V_{GS}=0V,	-	8822	-	pF
Output Capacitance	C_{oss}	V_{DS}=40V,	-	1839	-	
Reverse Transfer Capacitance	C_{rss}	f=1MHz	-	102	-	
Gate Total Charge	Q_g	V_{GS}=10V,	-	187	-	nC
Gate-Source charge	Q_{gs}	V_{DS}=50V,	-	56	-	
Gate-Drain charge	Q_{gd}	I_D=90A	-	51	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V,	-	35	-	ns
Turn-on Rise Time	t_r	V_{DD}=50V,	-	40	-	
Turn-off Delay Time	$t_{d(off)}$	I_D=20A,	-	89	-	
Turn-off Fall Time	t_f	R_G=1.6Ω	-	30	-	

Body Diode Characteristic

Body Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_{SD}=90A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F=90A,	-	89	-	ns
Reverse Recovery Charge	Q_{rr}	dI_F/dt=100A/us	-	213	-	nC

Typical Performance Characteristics

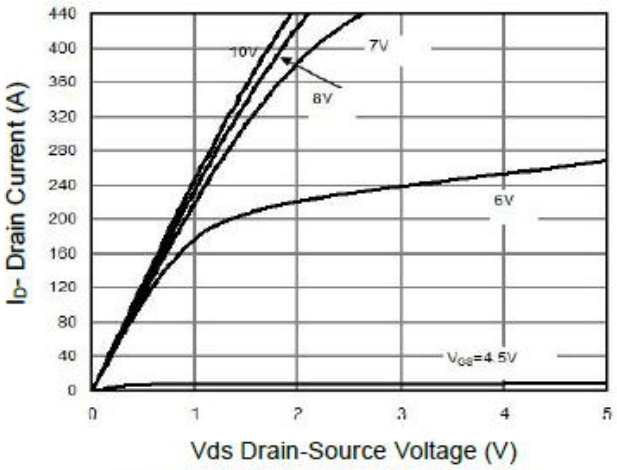


Figure 1 Output Characteristics

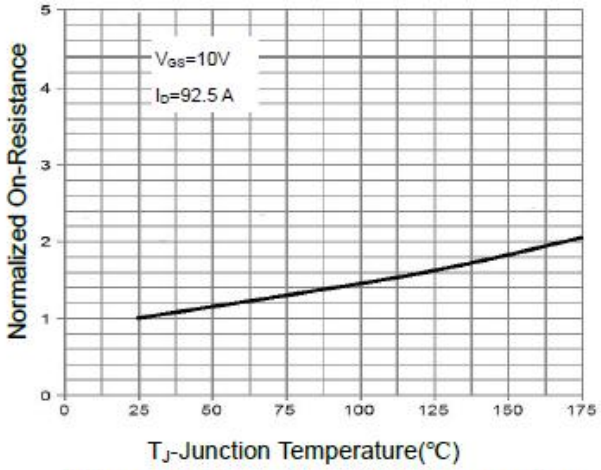


Figure 4 Rdson-Junction Temperature

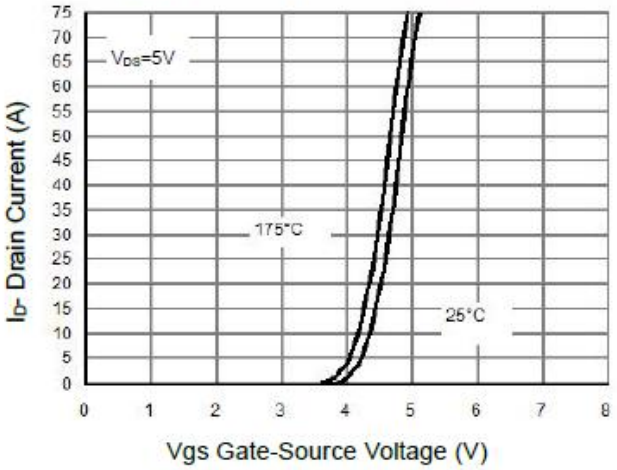


Figure 2 Transfer Characteristics

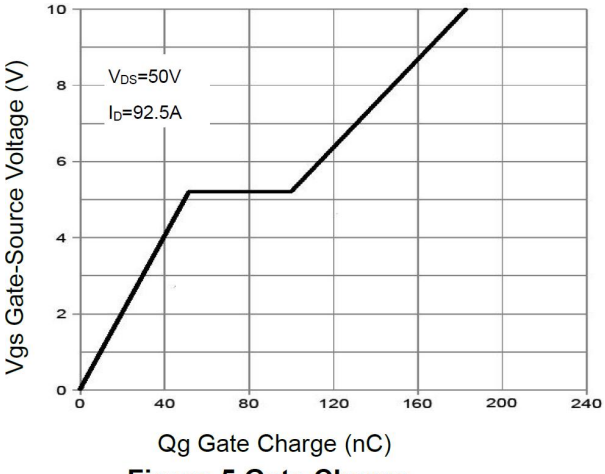


Figure 5 Gate Charge

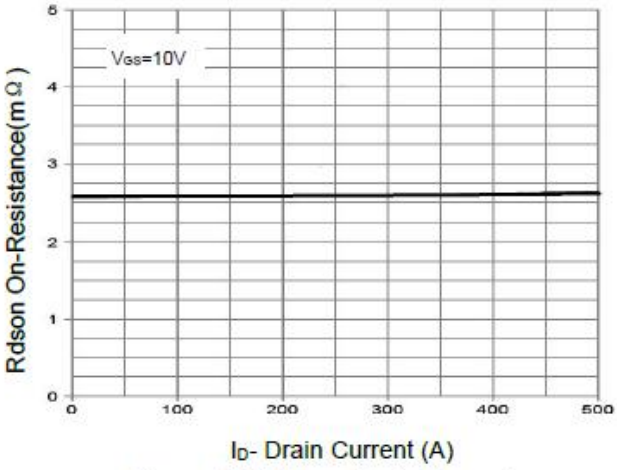


Figure 3 Rdson- Drain Current

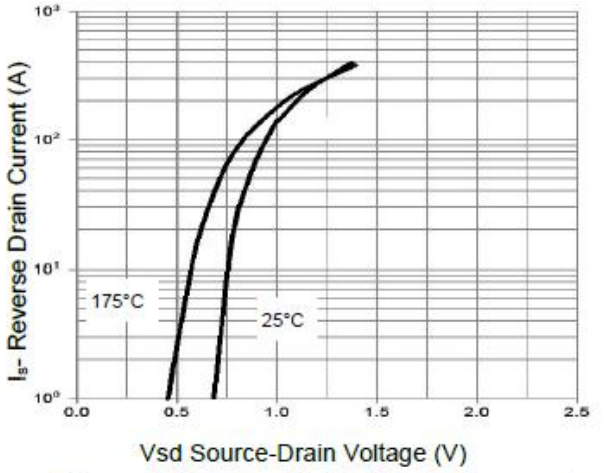


Figure 6 Source- Drain Diode Forward

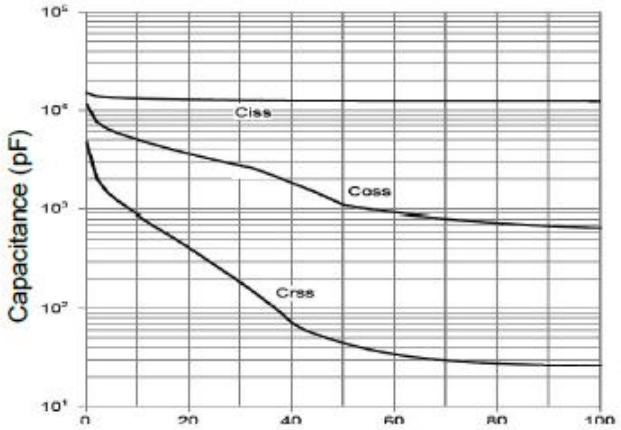


Figure 7 Capacitance vs Vds

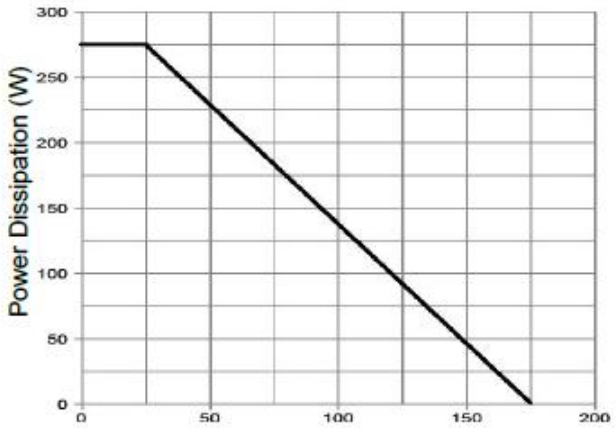


Figure 9 Power De-rating

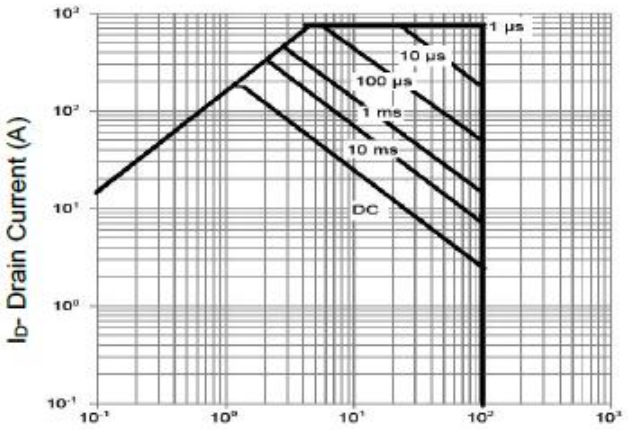
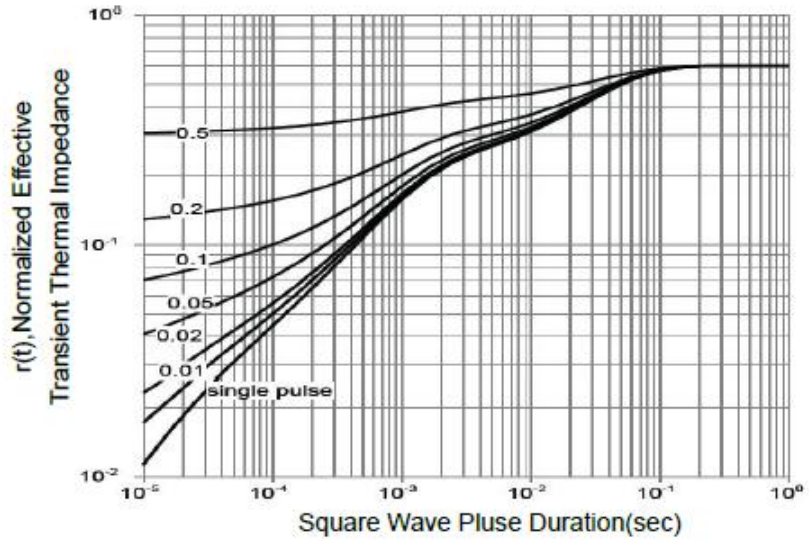


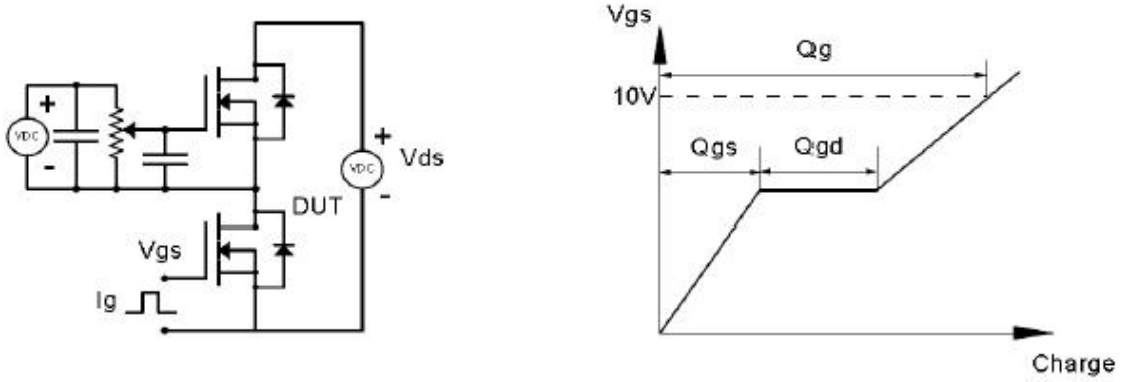
Figure 8 Safe Operation Area (Note 3)

Figure 10 Current De-rating

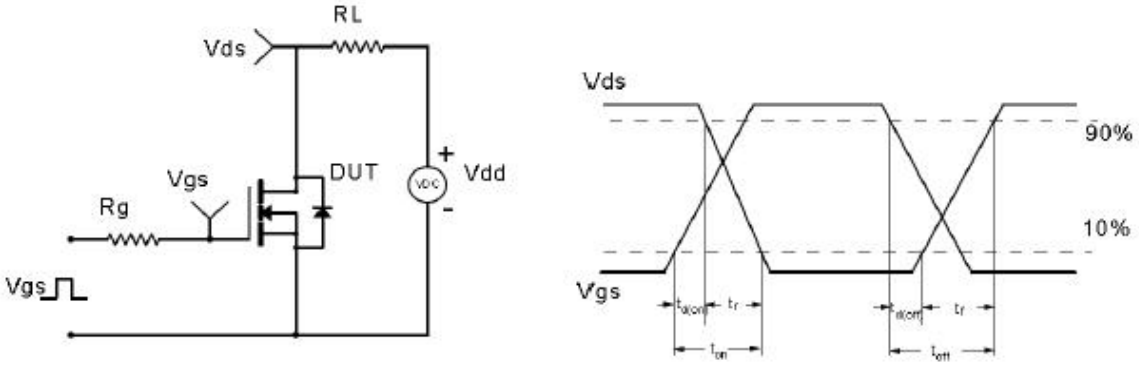


Test Circuit & Waveform

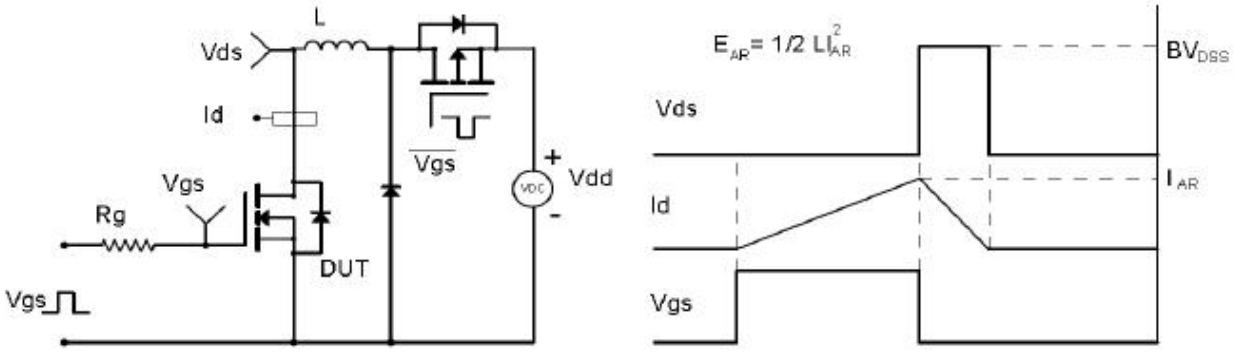
Gate Charge Test Circuit & Waveform



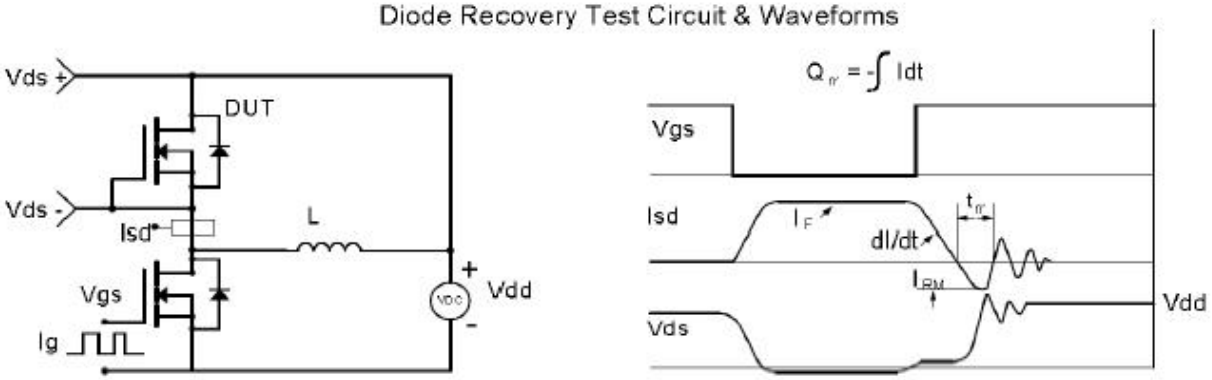
Resistive Switching Test Circuit & Waveforms



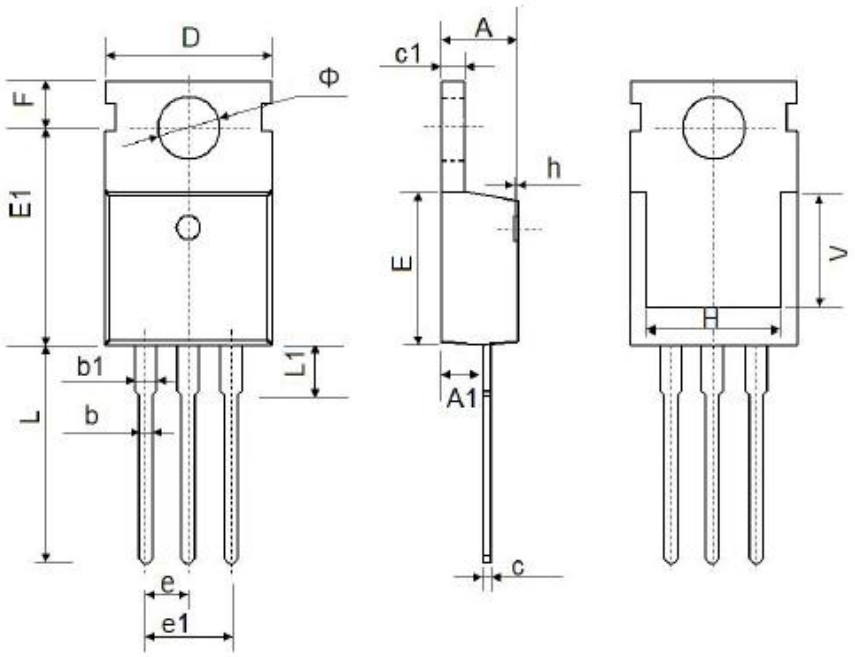
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Outline: TO-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	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150