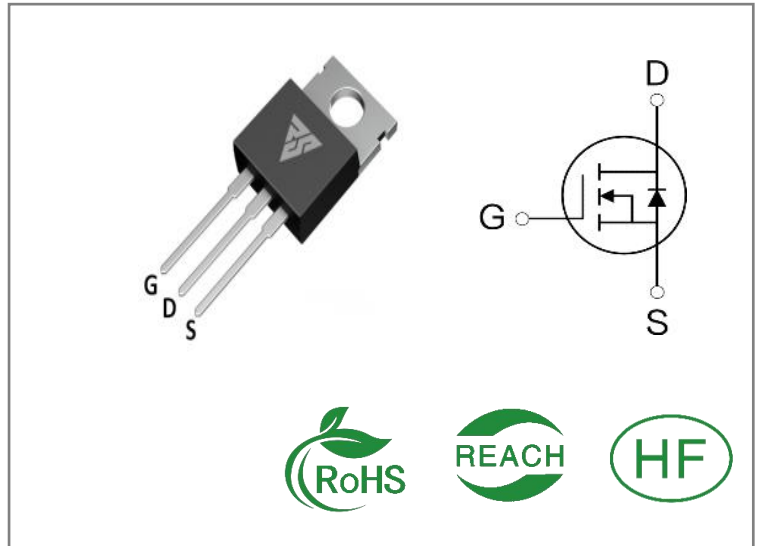


ID	R <sub>DS(ON)</sub> (Typ)	VDSS
78A	8.2mΩ	100V


**Applications:**

- Load Switch
- PWM Applications
- Power Managment

**Features:**

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

**Ordering Information**

Part Number	Package	Marking	Packing	Qty.
RS100N78T	T0-220	RS100N78T	Tube	50 PCS

**Absolute Maximun Ratings** Tc= 25°C unless otherwise specified

Symbol	Parameter	RS100N78T	Units
VDSS	Drain-to-Source Voltage	100	V
ID	Continuous Drain Current TC=25°C	78	A
ID	Continuous Drain Current TC=100°C	45	
IDM	Pulsed Drain Current	312	
PD	Power Dissipation	78	W
VGS	Gate- to- Source Voltage	±20	V
EAS	Single Pulse Avalanche Engergy L = 0.5mH,VDS = 50V, RG = 25Ω, Tj = 25°C	81	mJ
TL TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

\* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the“ Absolute Maximum Ratings” Table may cause permanent damage to the device.

**Thermal Resistance**

Symbol	Parameter	RS100N78T	Units	Test Conditions
R $\theta$ JC	Junction-to-Case	1.6	°C / W	Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 °C
R $\theta$ JA	Junction-to-Ambient	50		1 cubic foot chamber, free air.

**OFF Characteristics** T<sub>J</sub>= 25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain- to- source Breakdown Voltage	100	--	--	V	VGS=0V, ID=250μA
IDSS	Drain- to- Source Leakage Current	--	--	1	μA	VDS=80V, VGS=0V
IGSS	Gate- to- Source Forward Leakage	--	--	100	nA	VGS=20V , VDS=0V
	Gate- to- Source Reverse Leakage	--	--	-100		VGS=-20V , VDS=0V

**ON Characteristics** T<sub>J</sub>=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain- to- Source On-Resistance	--	8.2	9.5	mΩ	VGS=10V, ID=20A
		--	11.3	13.5	mΩ	VGS=4.5V, ID=10A
VGS(TH)	Gate Threshold Voltage	1.2	1.8	2.6	V	VGS=VDS, ID=250μA

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn- on Delay Time	--	17	--	nS	VDS=50V ID=20A RG=3Ω VGS=10V
trise	Rise Time	--	4	--		
td(OFF)	Turn- OFF Delay Time	--	32	--		
tfall	Fall Time	--	8	--		

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	2018	--	pF	VGS= 0V VDS=50V f=1MHz
Coss	Output Capacitance	--	580	--		
Crss	Reverse Transfer Capacitance	--	28	--		
Qg	Total Gate Charge	--	38.5	--	nC	VDS= 50V ID=20A VGS=10V
Qgs	Gate- to- Source Charge	--	8	--		
Qgd	Gate-to-Drain(" Miller") Charge	--	9	--		

**Source- Drain Diode Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	78	A	Integral pn- diode in MOSFET
ISM	Maximum Pulsed Current	--	--	312	A	
VSD	Diode Forward Voltage	--	--	1.0	V	IS=20A,VGS=0V
trr	Reverse Recovery Time	--	50.4	--	nS	VGS=0V IS=20A di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	68	--	nC	

**Notes:**

- \* 1. Repetitive rating, pulse width limited by maximum junction temperature.
- \* 2. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 1\%$

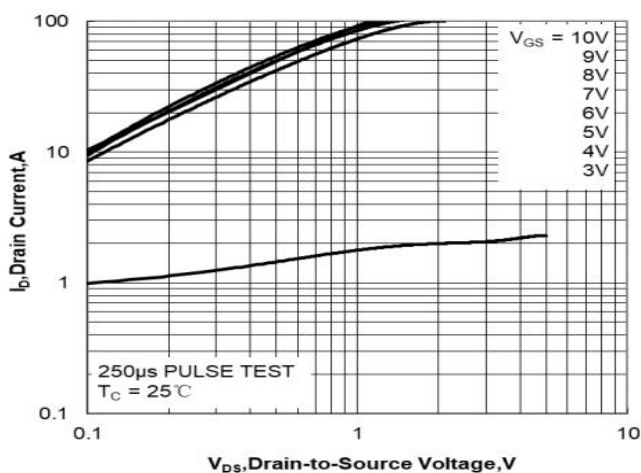
**Typical Feature Curve**


Figure 1. Output Characteristics

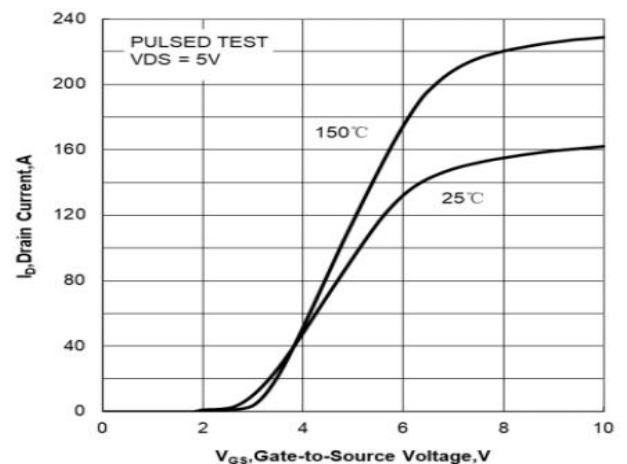


Figure 2. Transfer Characteristics

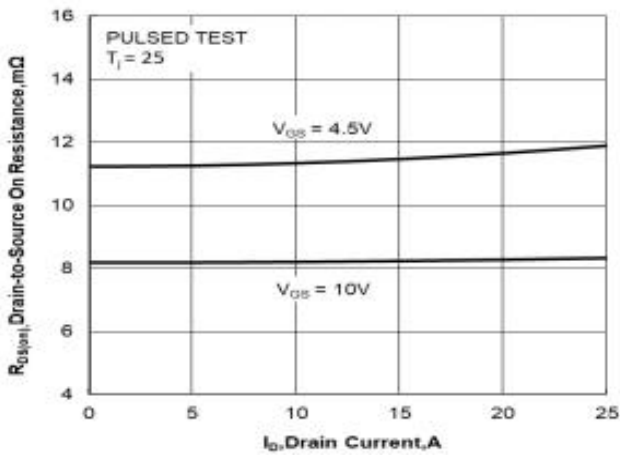


Figure 3. Drain-to-Source On Resistance vs Drain Current

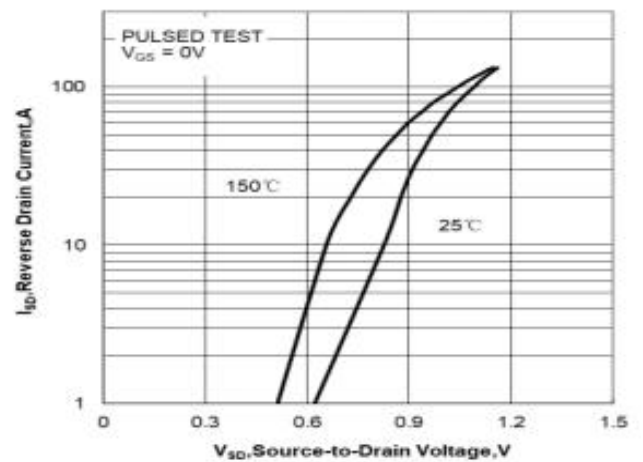


Figure 4. Body Diode Forward Voltage vs Source Current and Temperature

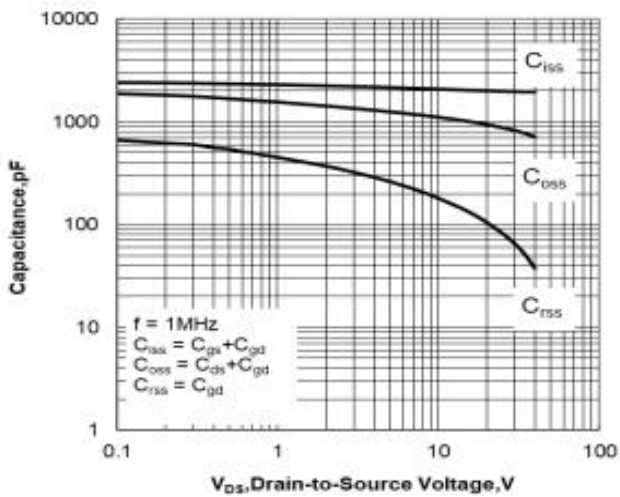


Figure 5. Capacitance Characteristics

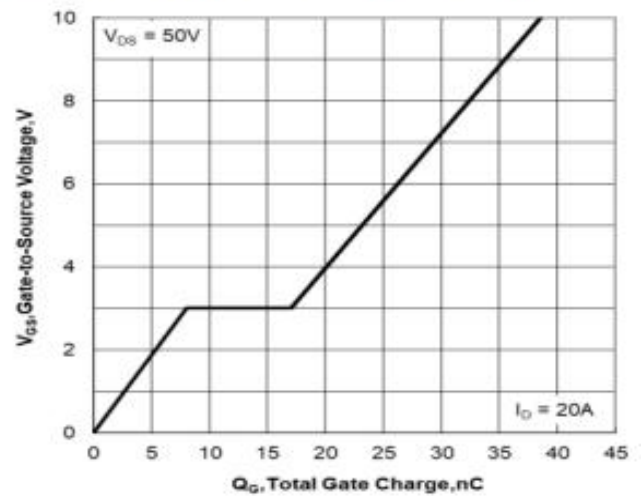


Figure 6. Gate Charge Characteristics

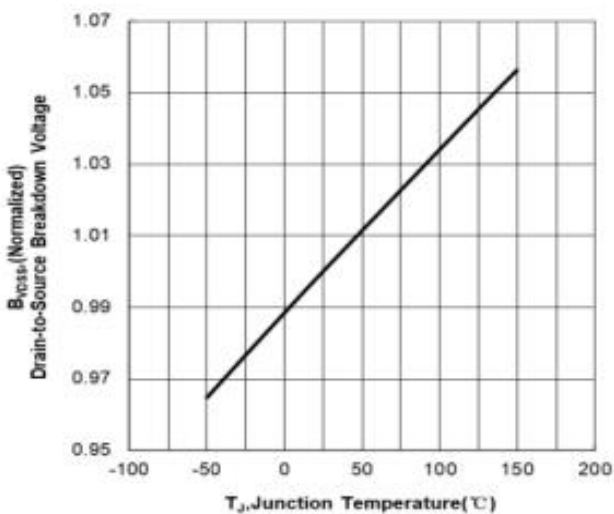


Figure 7. Normalized Breakdown Voltage vs Junction Temperature

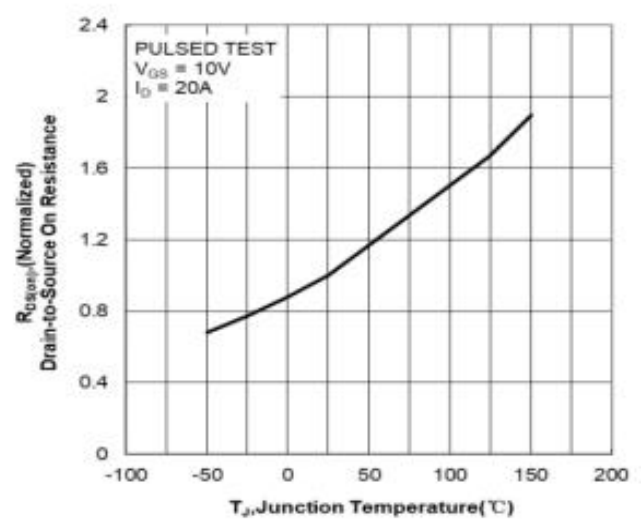


Figure 8. Normalized On Resistance vs Junction Temperature

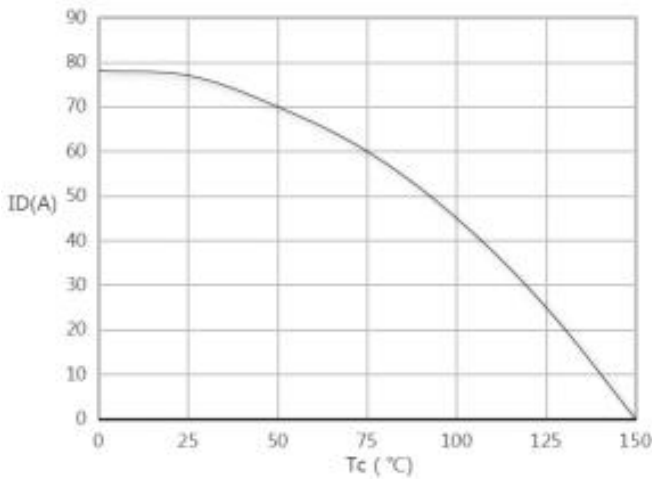


Figure 9. Maximum Continuous Drain Current vs Case Temperature

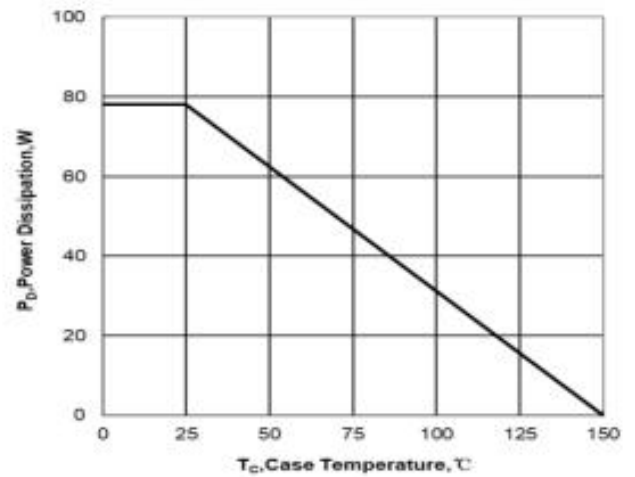


Figure 10. Maximum Power Dissipation vs Case Temperature

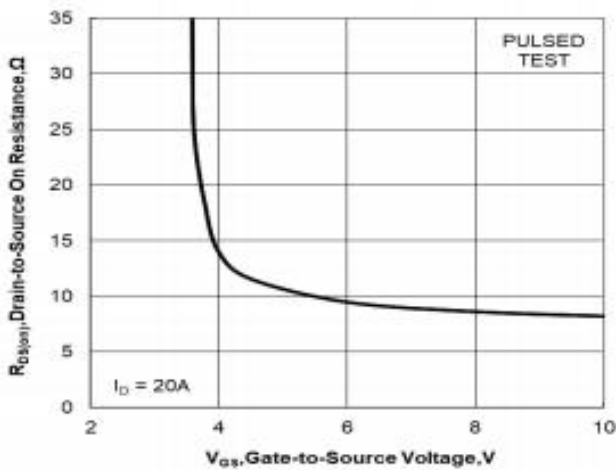


Figure 11. Drain-to-Source On Resistance vs Gate Voltage and Drain Current

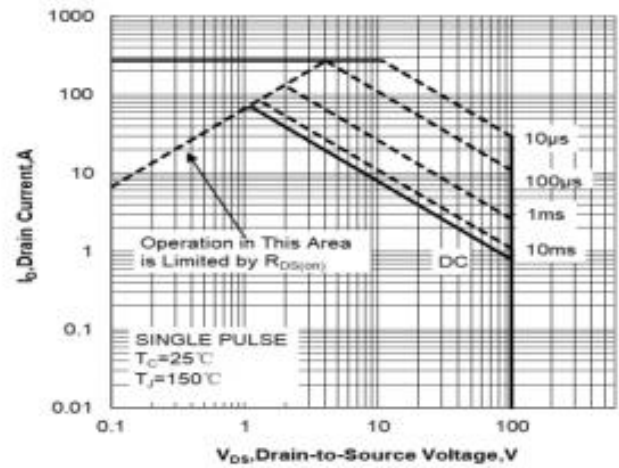


Figure 12. Maximum Safe Operating Area

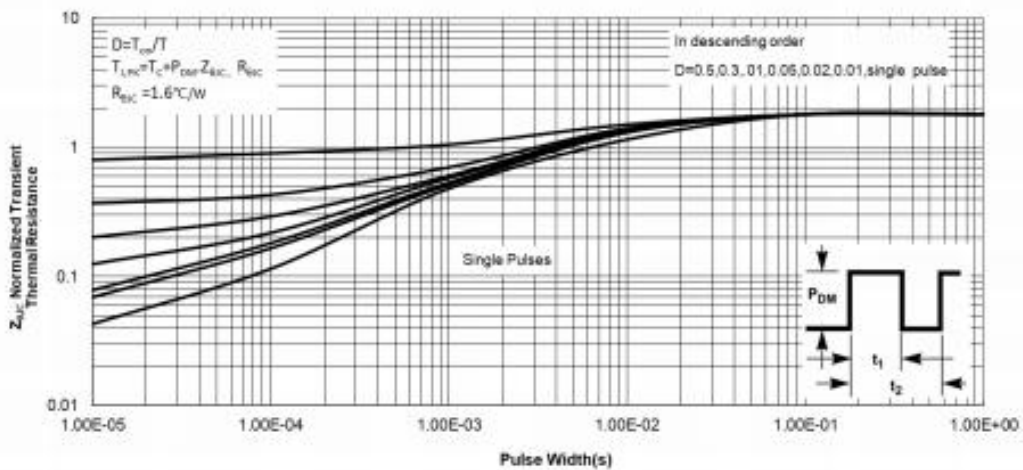


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Case



Test circuits and Waveforms

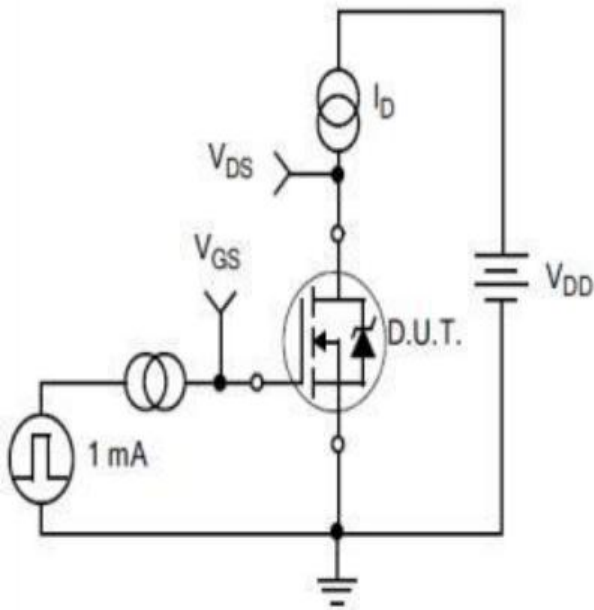


Figure A.  
Gate Charge Test Circuit

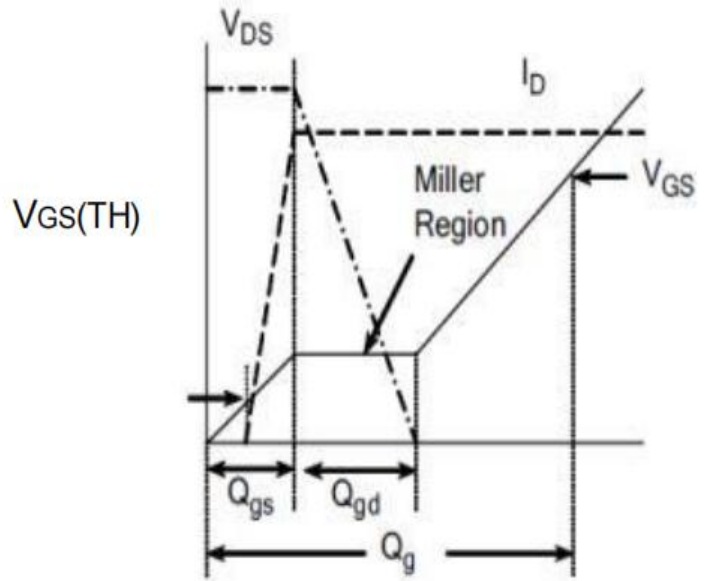


Figure B.  
Gate Charge Waveform

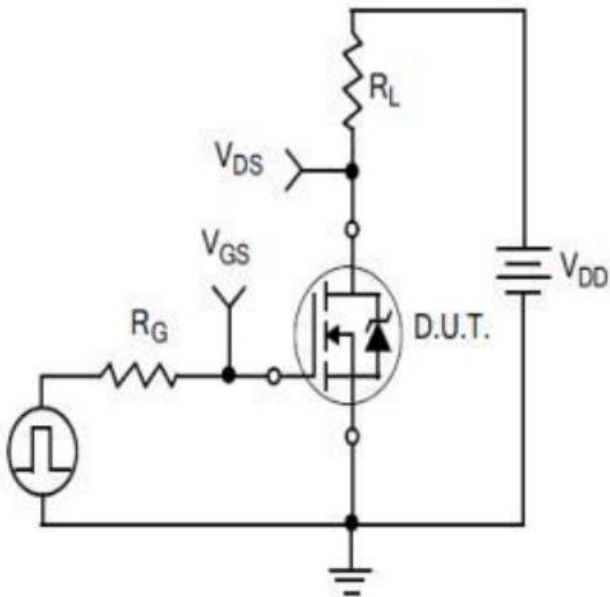


Figure C.  
Resistive Switching Test Circuit

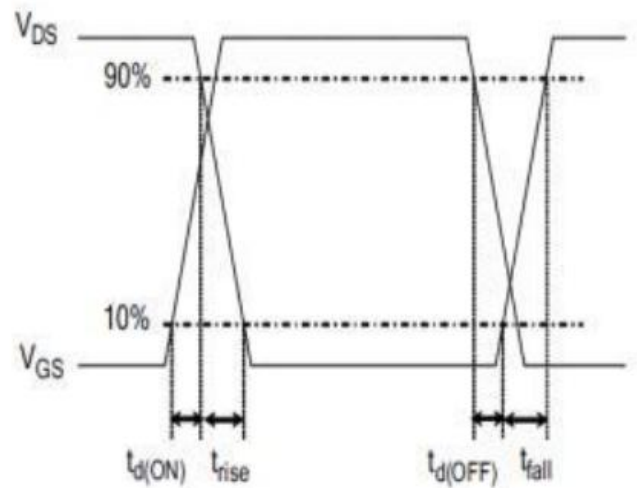


Figure D.  
Resistive Switching Waveforms

Test circuits and Waveforms

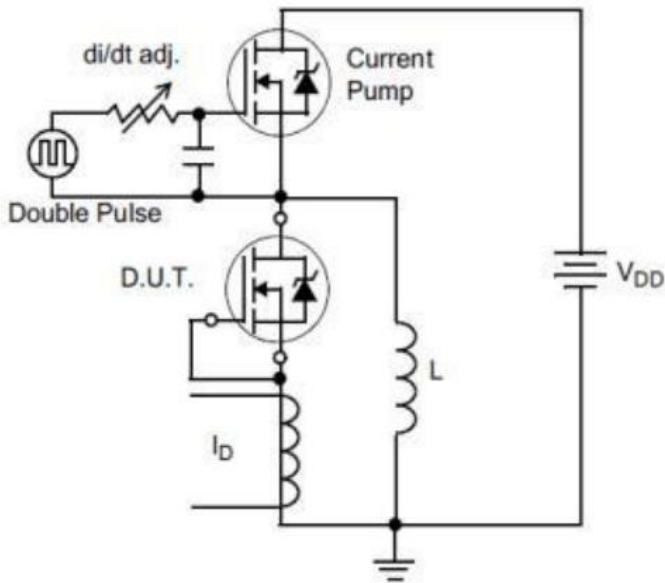


Figure E. Diode Reverse Recovery Test Circuit

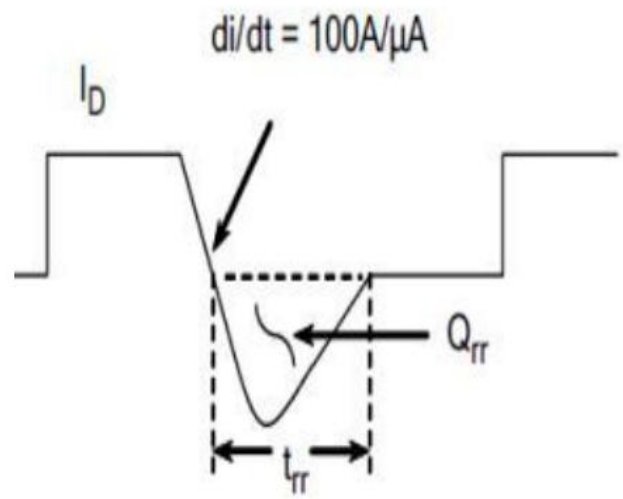


Figure F. Diode Reverse Recovery Waveform

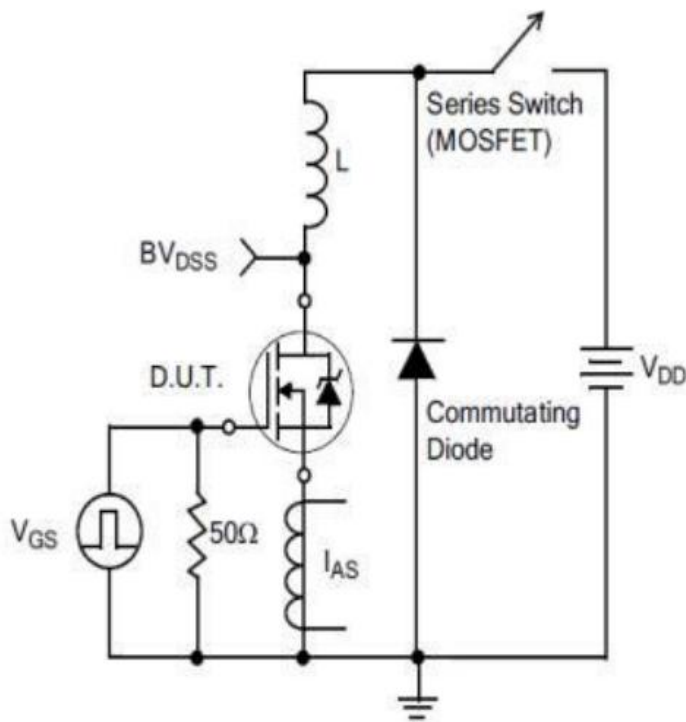
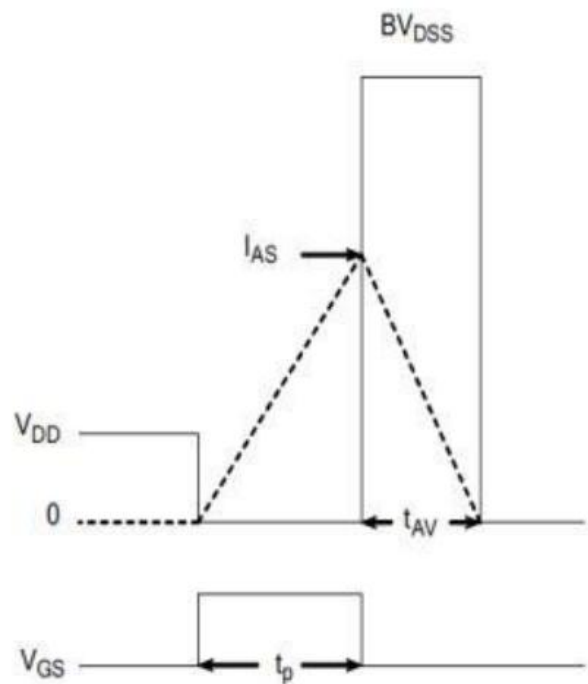


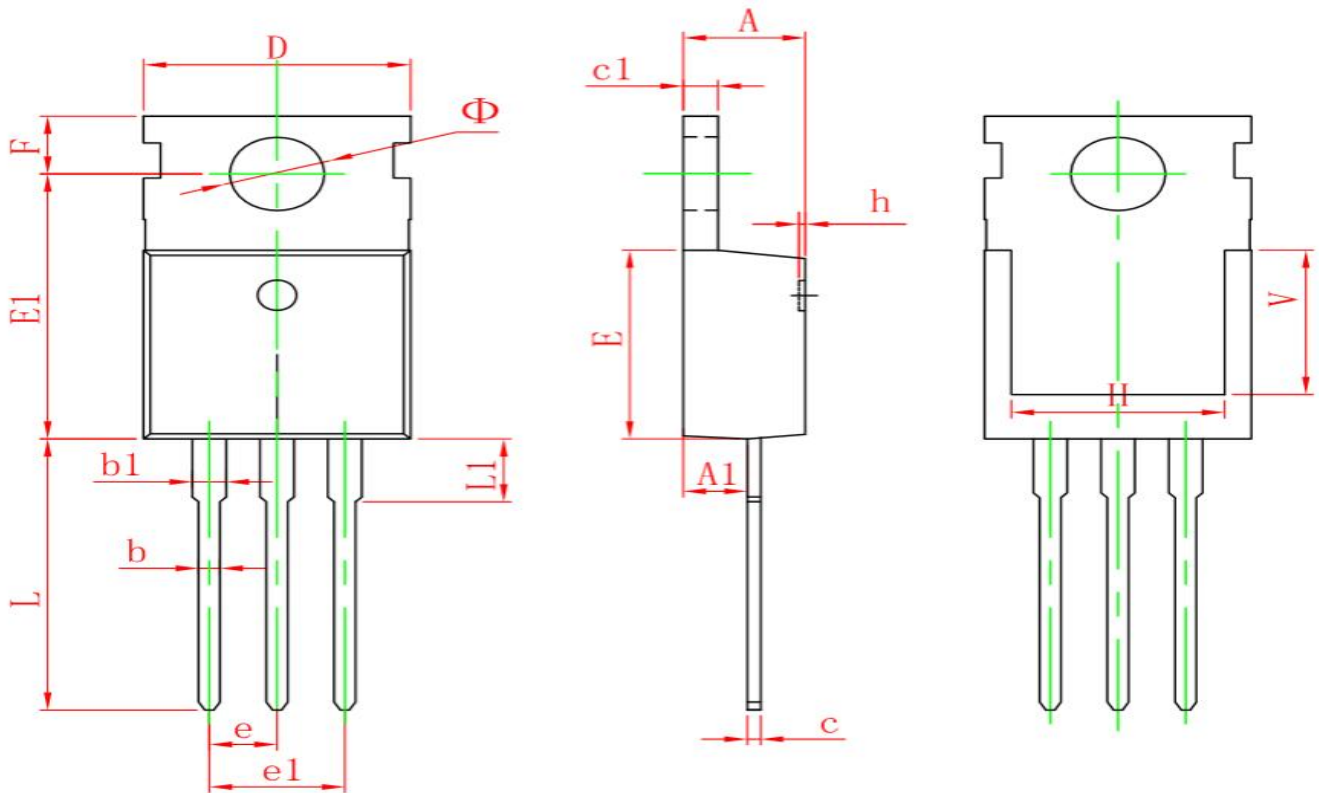
Figure G. Unclamped Inductive Switching Test Circuit



$$EAS = \frac{I_{AS}^2 L}{2}$$

Figure H. Unclamped Inductive Switching Waveforms

Package outline drawing(TO-220 Unit: mm)



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	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
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



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