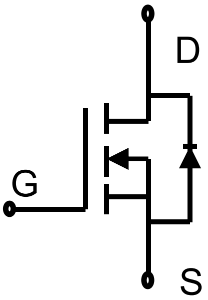
WLP080R10

N-Ch 100V 101A 8.0mΩ Power MOSFETs

Description

These N-Channel enhancement mode power field effect transistors are using shielded gate trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance,provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.



N-Channel MOSFET

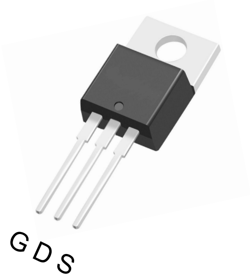
Features

- 100V,101A, $R_{DS(on),max}$ =8.0mΩ@V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

Pin Configuration

Applications

- Motor Drives
- UPS
- DC-DC Converter



TO-220

Product Summary

V_{DSS}	100V
$R_{DS(on),max}$@ V_{GS}=10V	8.0mΩ
I_D	101A

Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Continuous drain current (T_C = 25°C)	I_D	101	A
Continuous drain current (T_C = 100°C)		64	A
Pulsed drain current[1)]	I_{DM}	404	A
Gate-Source voltage	V_{GSS}	±20	V
Avalanche energy[2)]	E_{AS}	132	mJ
Power Dissipation (T_C = 25°C) TO-220	P_D	147	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case TO-220	$R_{\theta JC}$	0.85	°C/W
Thermal Resistance, Junction-to-Ambient TO-220 [3)]	$R_{\theta JA}$	62	°C/W

Electrical Characteristics

T_J = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=250uA	100	---	---	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	2	---	4	V
Drain-source leakage current	I_{DSS}	V_{DS}=100 V, V_{GS}=0 V, T_J = 25°C	---	---	1	μA
		V_{DS}=100V, V_{GS}=0 V, T_J = 150°C	---	---	100	μA
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20 V, V_{DS}=0 V	---	---	100	nA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20 V, V_{DS}=0 V	---	---	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=30 A,				
		T_J = 25°C	---	7.1	8.0	mΩ
		T_J = 150°C	---	12.8	---	
Forward transconductance	g_{fs}	V_{DS} =5V , I_D=30A	---	65	---	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, F = 1MHz	---	1895	---	pF
Output capacitance	C_{oss}		---	572.5	---	
Reverse transfer capacitance	C_{rss}		---	11.8	---	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50V,V_{GS}=10V, I_D = 30A	---	16.6	---	ns
Rise time	t_r		---	20	---	
Turn-off delay time	$t_{d(off)}$		---	68	---	
Fall time	t_f		---	20.8	---	
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	1.7	---	Ω
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DS}=50 V, I_D=50A, V_{GS}= 10 V	---	10	---	nC
Gate to drain charge	Q_{gd}		---	4.2	---	
Gate charge total	Q_g		---	28.3	---	
Drain-Source diode characteristics and Maximum Ratings						
Continuous Source Current	I_S		---	---	101	A
Pulsed Source Current	I_{SM}		---	---	404	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=30A, T_J=25℃	---	0.9	---	V
Reverse Recovery Time	t_{rr}	I_S=30A, di/dt=100A/us, T_J=25℃	---	50	---	ns
Reverse Recovery Charge	Q_{rr}		---	72	---	nC

Notes:

1: Repetitive Rating: Pulse width limited by maximum junction temperature.

2: V_{DD}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=23A, R_G=25Ω, Starting T_J=25℃.

3: The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

Electrical Characteristics Diagrams

Figure 1.On-Region Characteristics

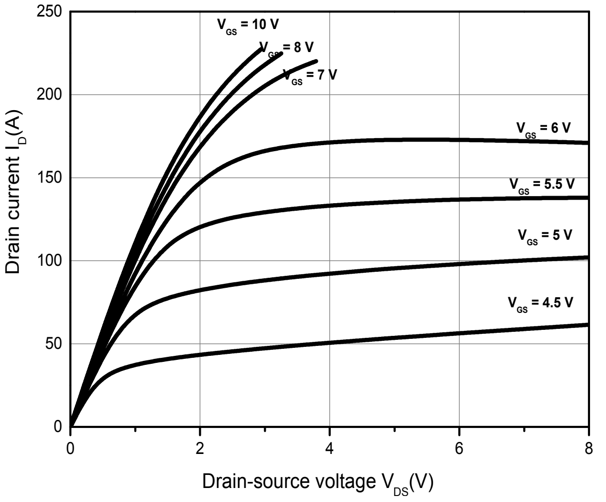


Figure 2.Transfer Characteristics

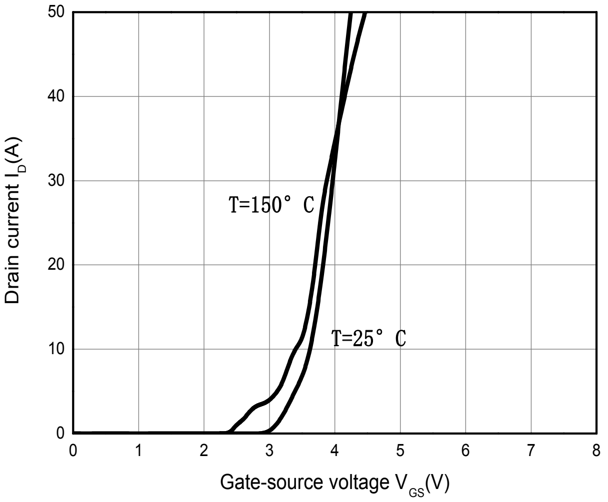


Figure 3.Body-Diode Characteristics

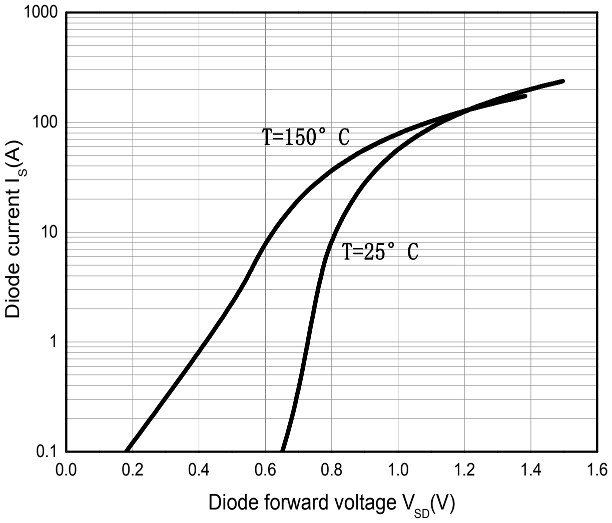


Figure 4.On-Resistance Variation vs.Drain Current

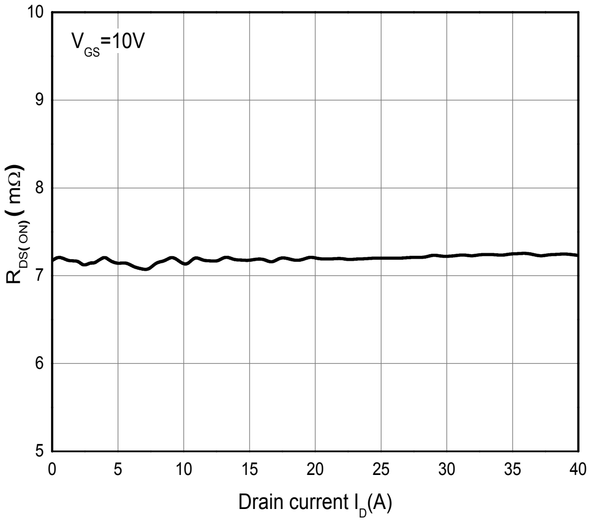


Figure 5.Rds(on) vs. Gate Voltage

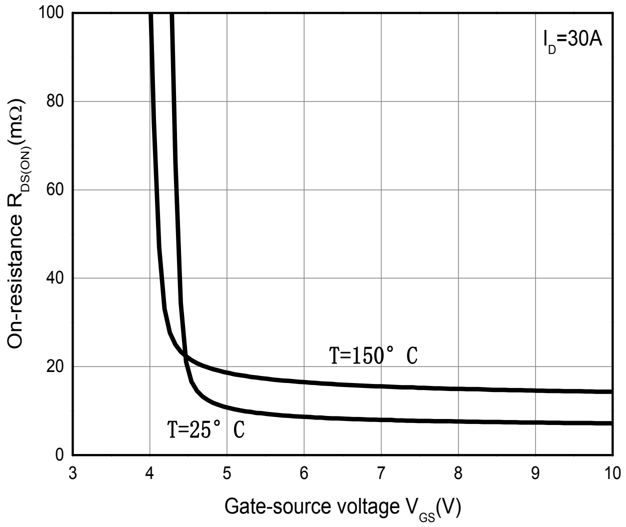
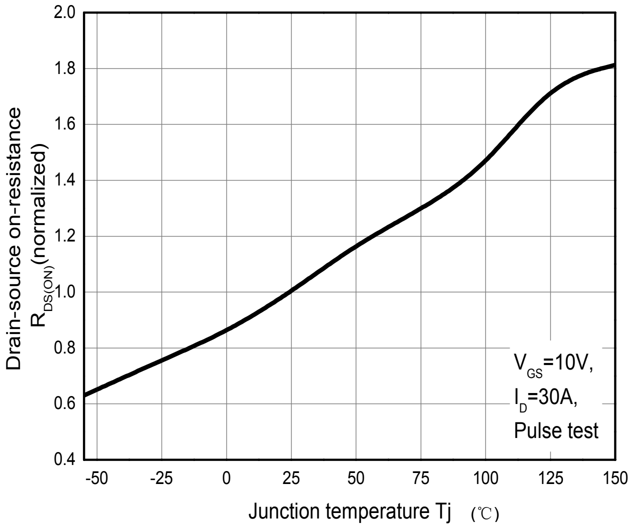


Figure 6.On-Resistance vs.Temperature



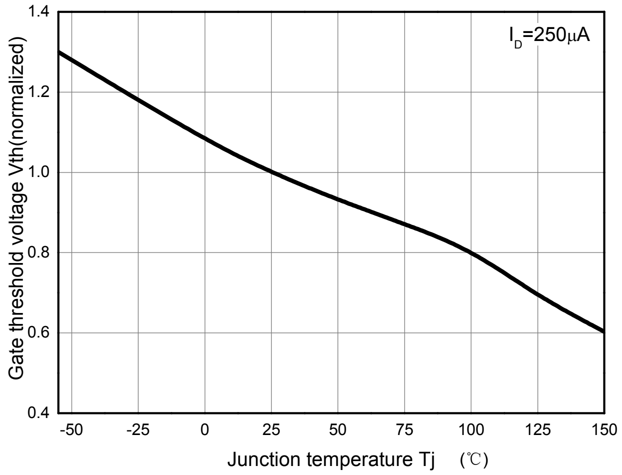


Figure 7.Threshold Voltage vs.Temperature

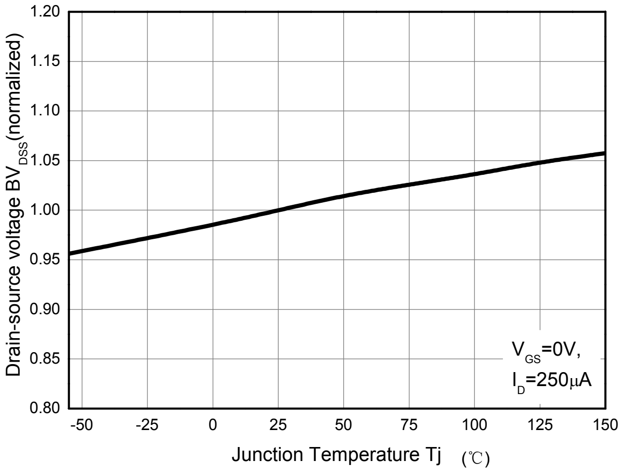


Figure 8.Breakdown Voltage vs.Temperature

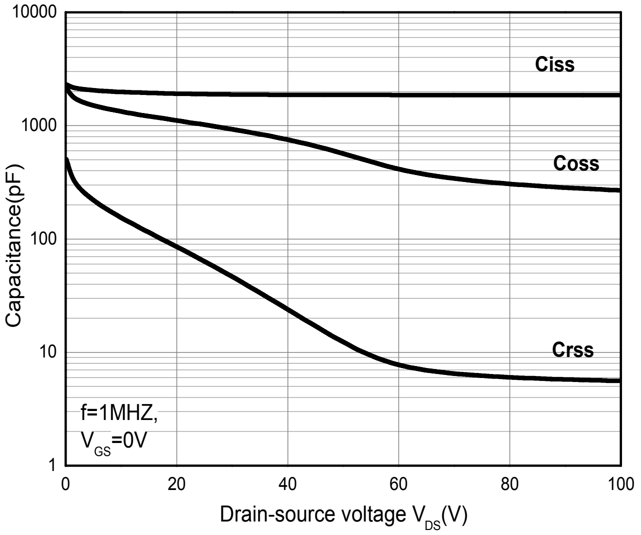


Figure 9.Capacitance Characteristics

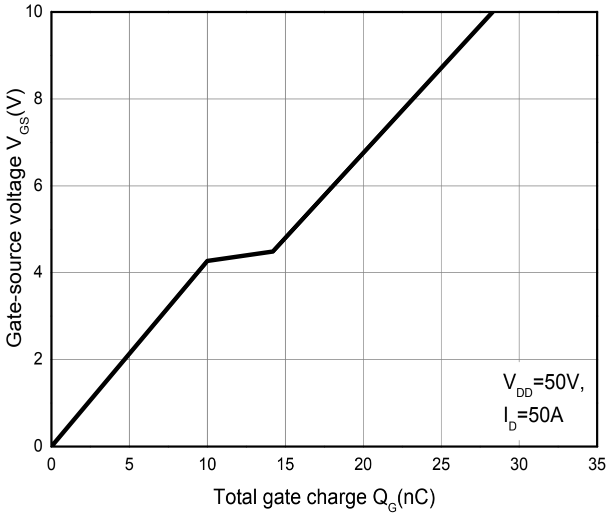


Figure 10.Gate Charge Characteristics

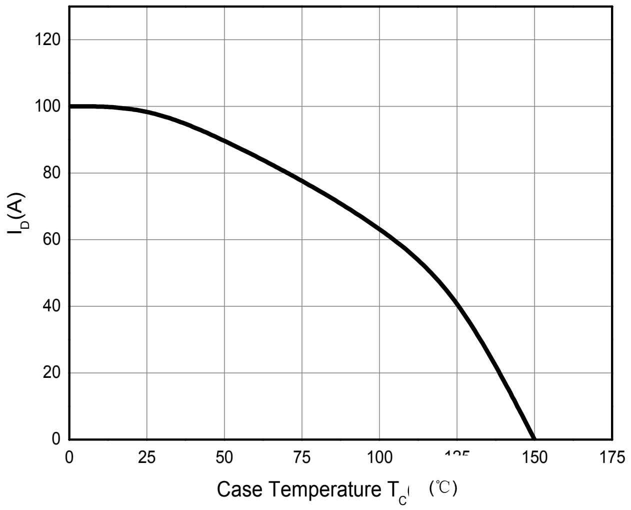


Figure 11.Drain Current Derating

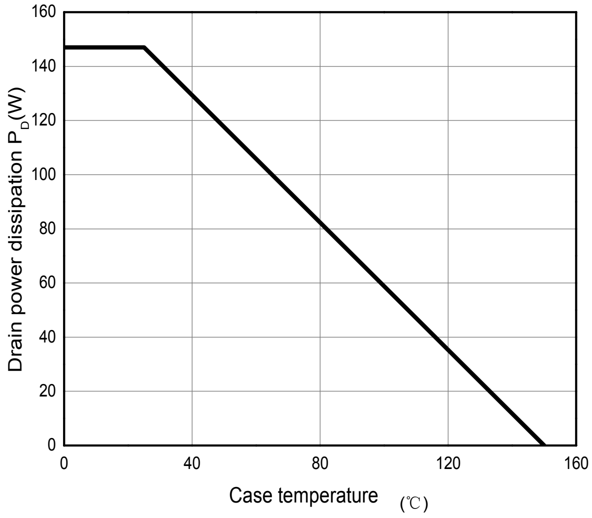


Figure 12.Power Dissipation vs.Temperature

Figure 13.Maximum Safe Operating Area

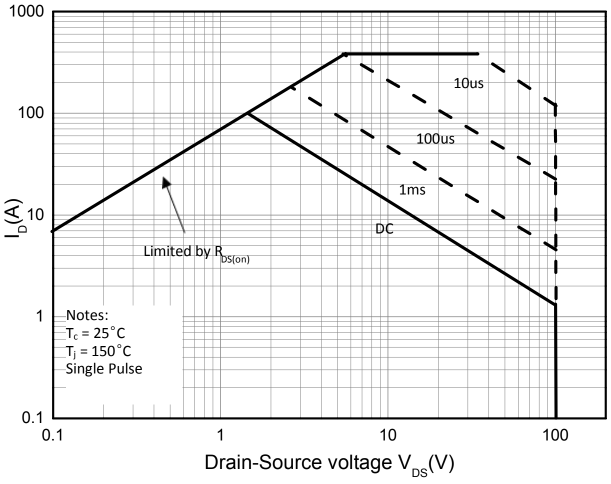
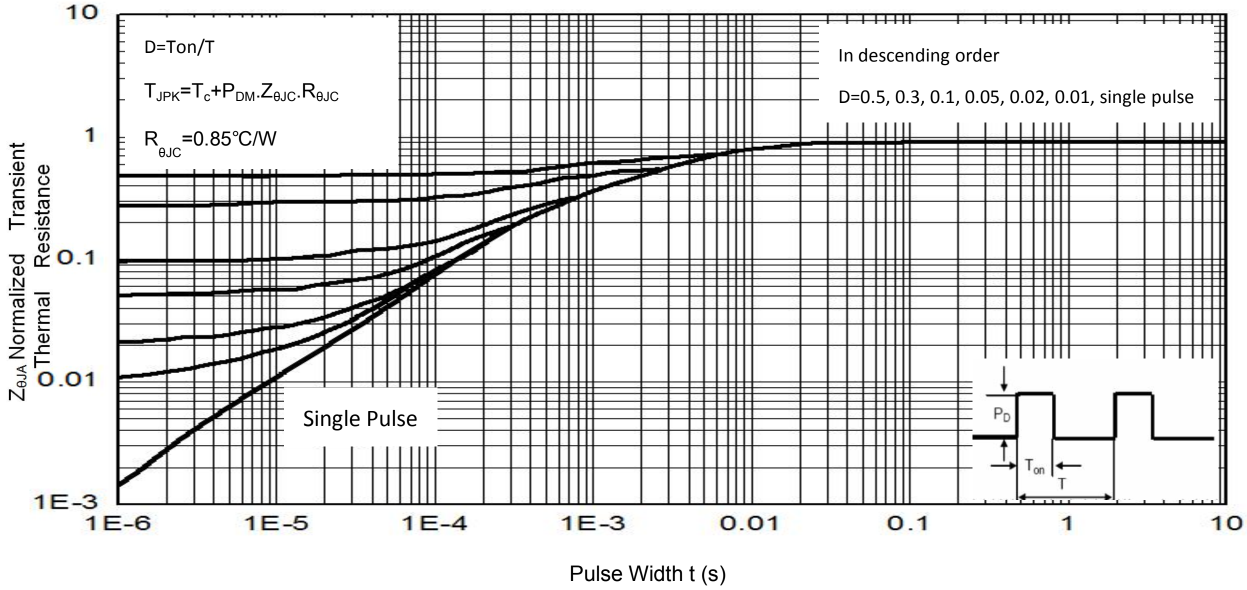
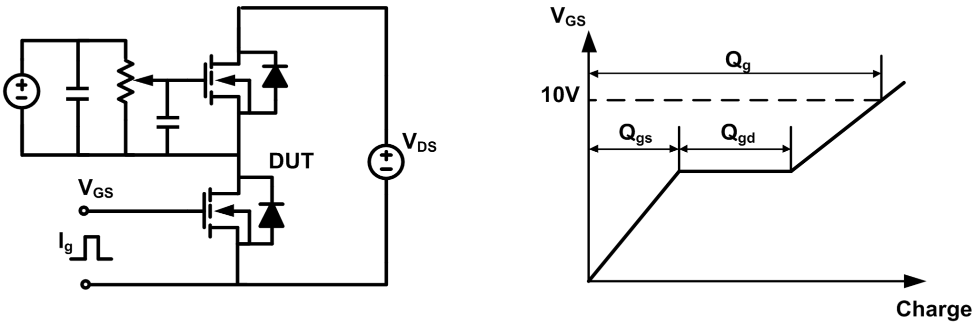


Figure 14. Normalized Maximum Transient Thermal Impedance (RthJC)

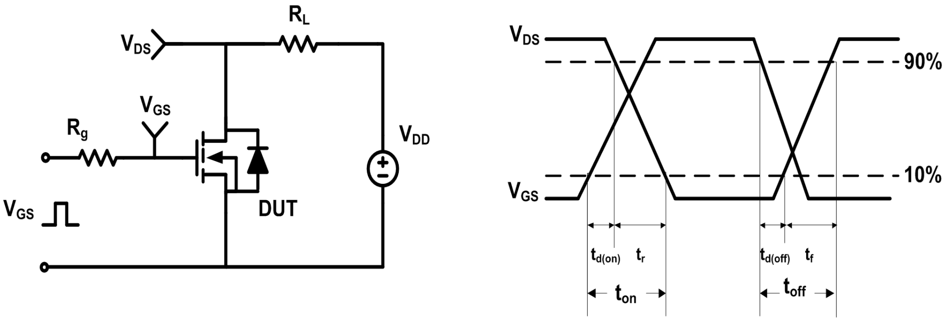


Test Circuit & Waveforms

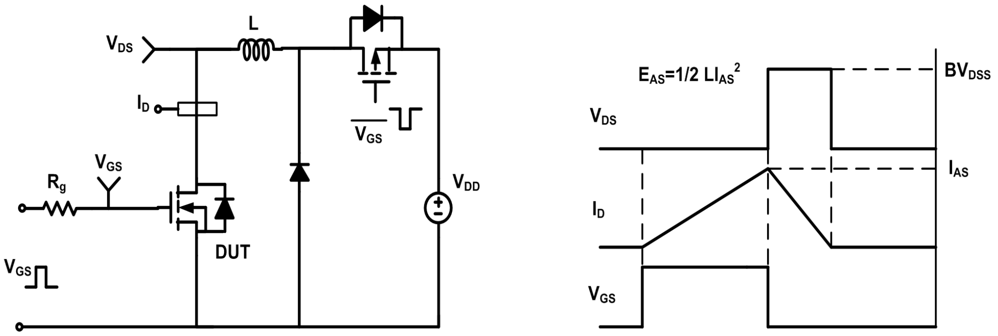
Gate Charge Test Circuit & Waveform



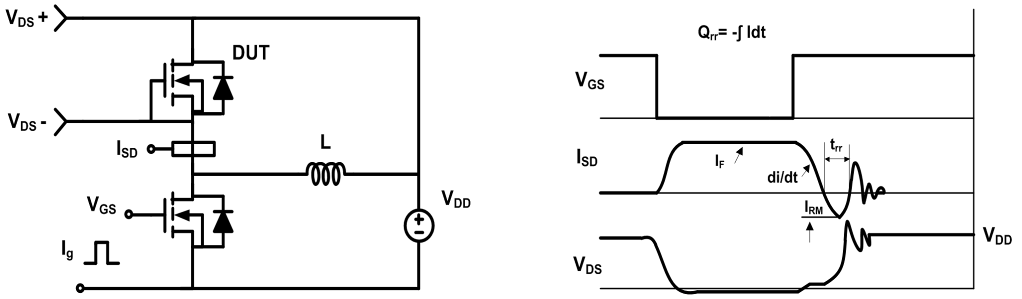
Resistive Switching Test Circuit & Waveform



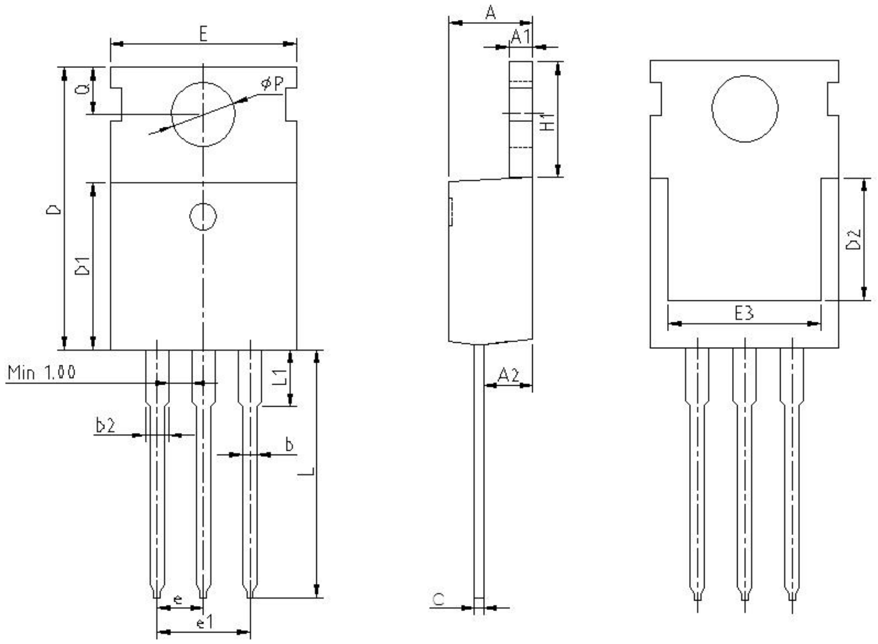
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



Mechanical Dimensions for TO-220



DIMENSIONS IN MILLITMETERS			DIMENSIONS IN INCHES	
SYMBOL	MIN	MAX	MIN	MAX
A	4.25	4.7	0.167	0.185
A1	1.2	1.4	0.047	0.055
A2	2.2	2.92	0.087	0.115
b	0.7	0.97	0.028	0.038
b2	1.14	1.78	0.045	0.070
c	0.4	0.61	0.016	0.024
D	14.32	16.1	0.564	0.634
D1	8.39	9.4	0.330	0.370
D2	5.5	7	0.217	0.276
E	9.7	10.36	0.382	0.408
E3	7	8.78	0.276	0.346
e	2.54BSC		0.1BSC	
e1	5.08BSC		0.2BSC	
H1	6.25	6.85	0.246	0.270
L	12.75	14.4	0.502	0.567
L1	-	4.05	-	0.159
ΦP	3.4	3.8	0.134	0.150
Q	2.54	3	0.100	0.118