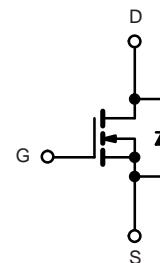


General Description

The IRFZ44NS/IRFZ44N uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.



N-Channel MOSFET

Product Summary

V_{DS}	60V
I_D (at $V_{GS}=-10V$)	50A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 12mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 16mΩ



Absolute Maximum Ratings(TA=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous ^{Note3}	I_D	50	A
		33	A
Drain Current-Pulsed ^{Note1}	I_{DM}	200	A
Avalanche Energy ^{Note4}	E_{AS}	64	mJ
Maximum Power Dissipation	P_D	105	W
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

Thermal Resistance

Parameter	Symbol	Min.	Typ.	Max	Unit
Thermal Resistance,Junction-to-Case	R_{eJC}	-	-	1.4	°C/W

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

OFF CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_{DS}=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1.0	μA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA

ON CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.0	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_{DS}=30A$	-	12	17	$m\Omega$
		$V_{GS}=4.5V, I_{DS}=20A$	-	16	21	$m\Omega$

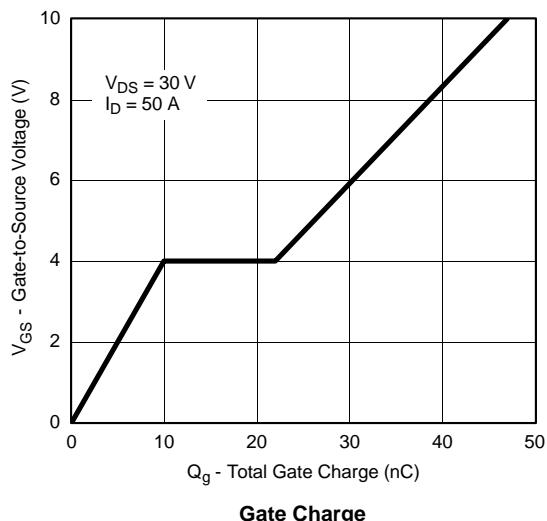
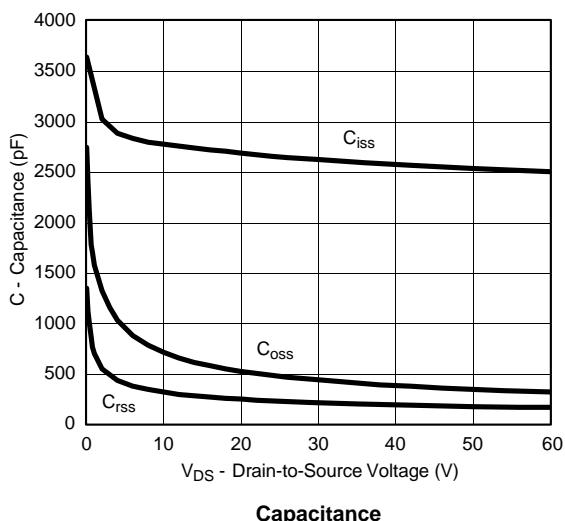
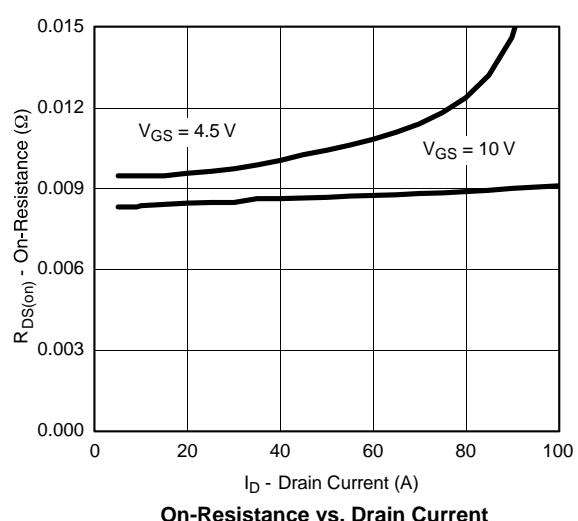
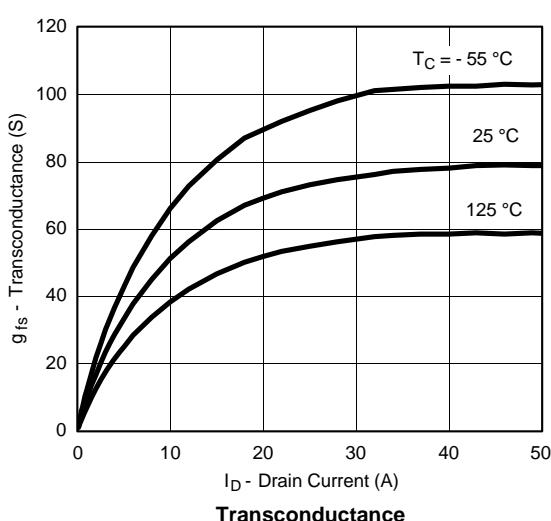
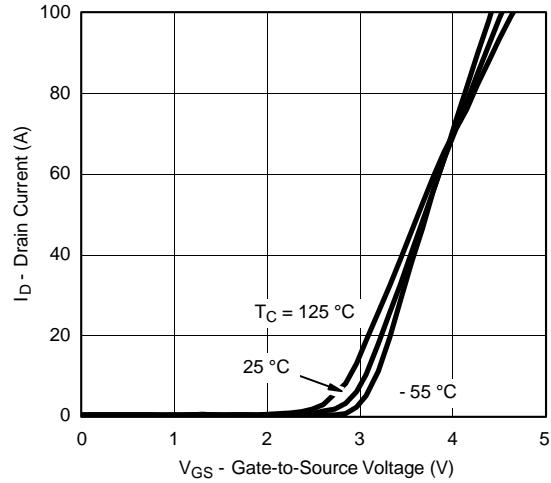
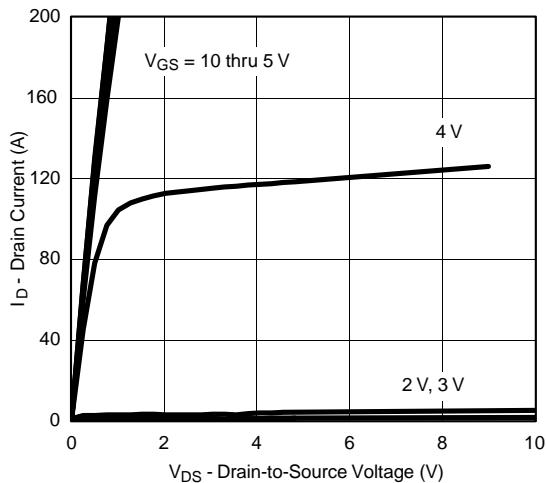
DYNAMIC CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V,$ $f=1MHz$	-	2928	-	pF
Output Capacitance	C_{oss}		-	141	-	
Reverse Transfer Capacitance	C_{rss}		-	120	-	

SWITCHING CHARACTERISTICS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Delay Time	$T_{d(on)}$	$V_{GS}=10V, V_{DS}=30V,$ $R_{GEN}=1.8\Omega$ $I_D=25A$	-	7.5	-	ns
Rise Time	t_r		-	6.0	-	
Turn-Off Delay Time	$T_{d(off)}$		-	28.4	-	
Fall Time	t_f		-	5.5	-	
Total Gate Charge at 10V	Q_g	$V_{DS}=30V, I_{DS}=25A,$ $V_{GS}=10V$	-	50	-	nC
Gate to Source Gate Charge	Q_{gs}		-	6	-	
Gate to Drain "Miller" Charge	Q_{gd}		-	15	-	

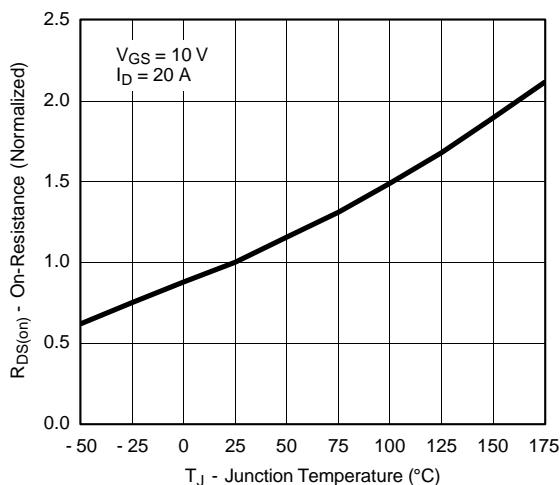
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_{DS}=30A$	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$T_{J}=25^{\circ}C, I_F=25A$	-	29	-	nS
Reverse Recovery Charge	Q_{rr}		-	42	-	nC

Notes:

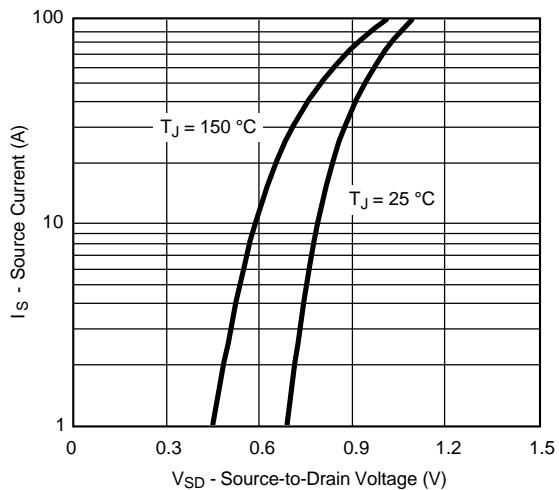
- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, $t \leq 10sec$.
- 3: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 4: EAS condition: $L=0.5mH, VDD=10V, VG=10V, V_{GATE}=20V, \text{Start } T_J=25^{\circ}C$.

TYPICAL CHARACTERISTICS (25 °C unless noted)

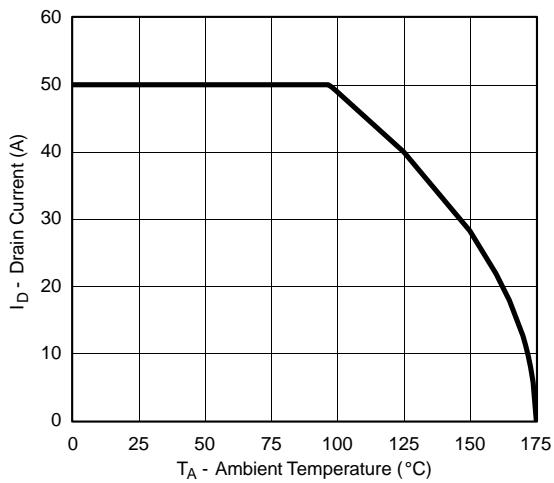
TYPICAL CHARACTERISTICS (25 °C unless noted)



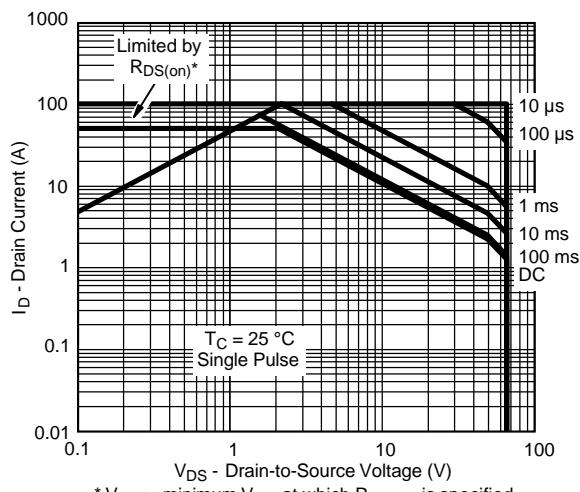
On-Resistance vs. Junction Temperature



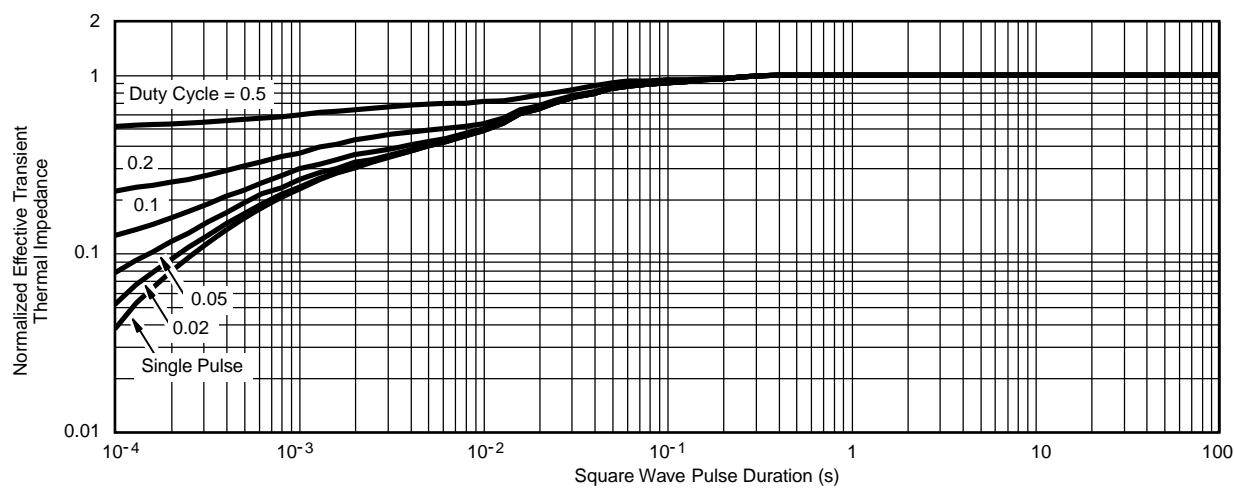
Source-Drain Diode Forward Voltage



Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

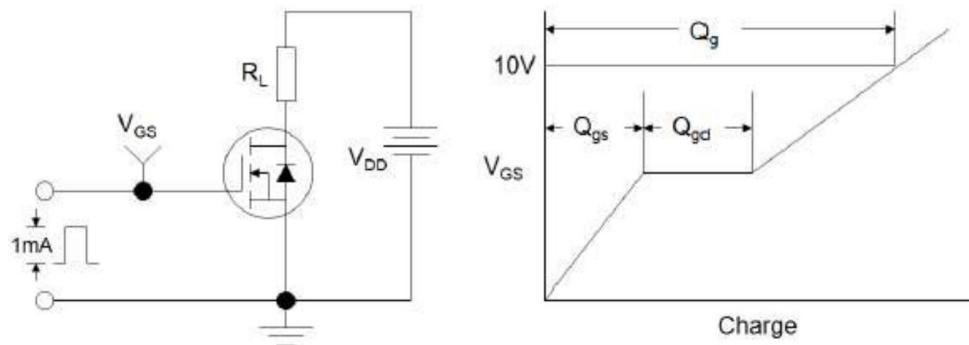
Test Circuit

Figure 1: Gate Charge Test Circuit & Waveform

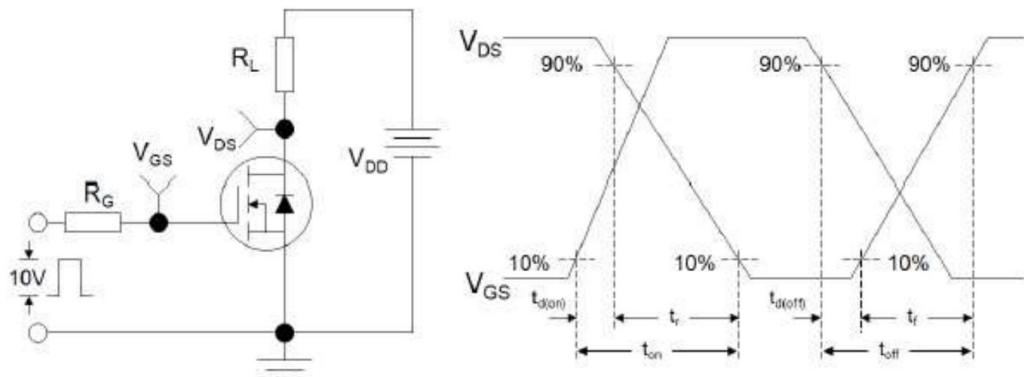


Figure 2: Resistive Switching Test Circuit & Waveforms

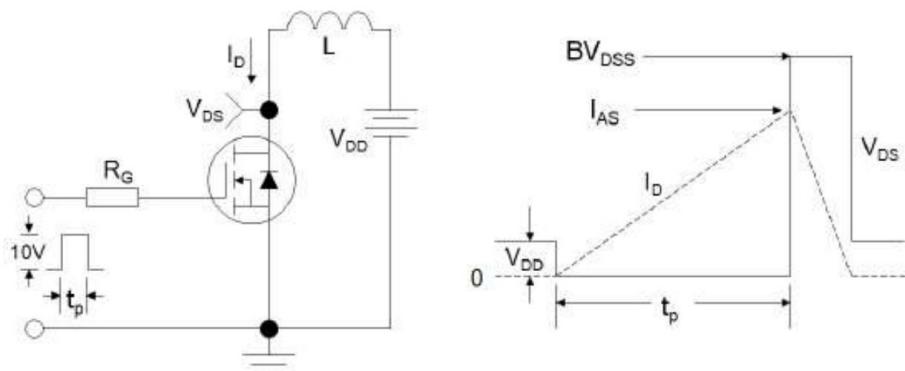
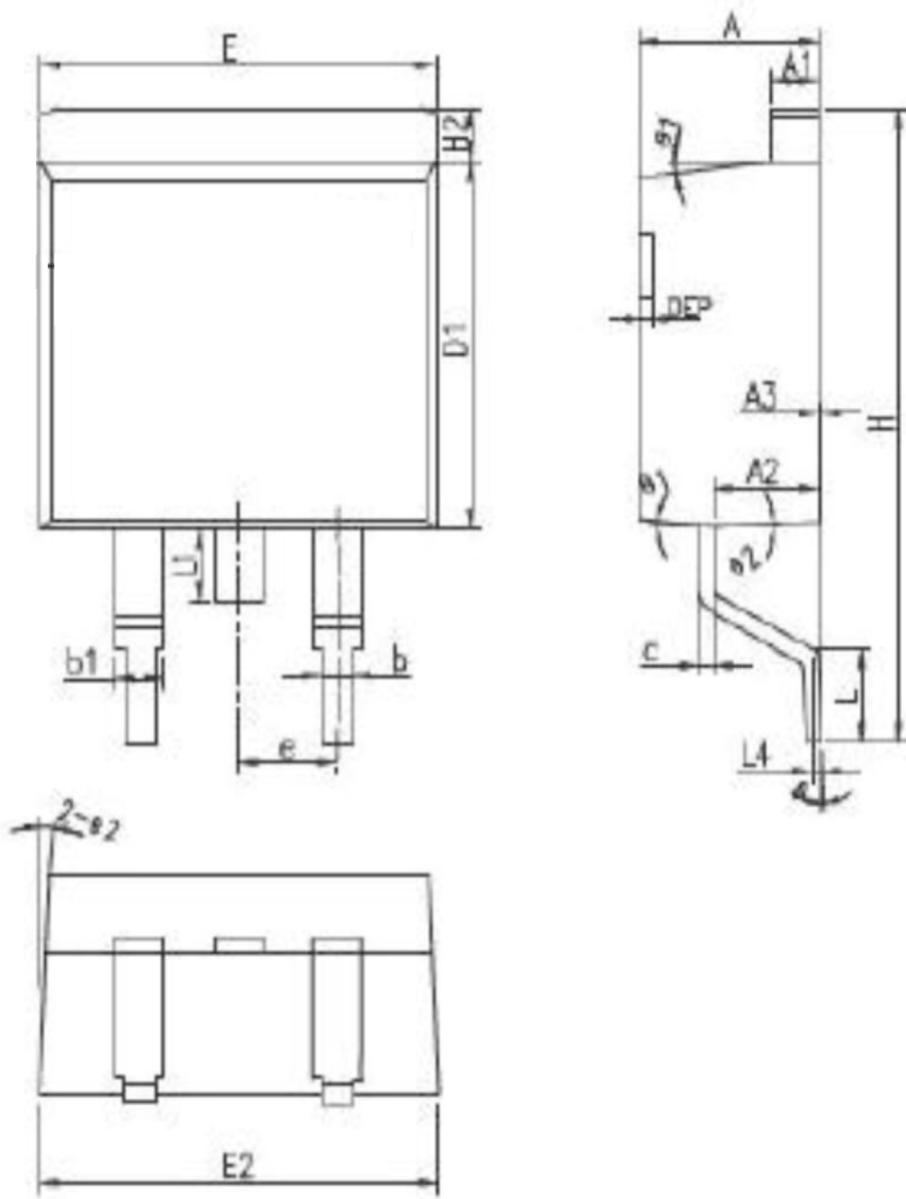


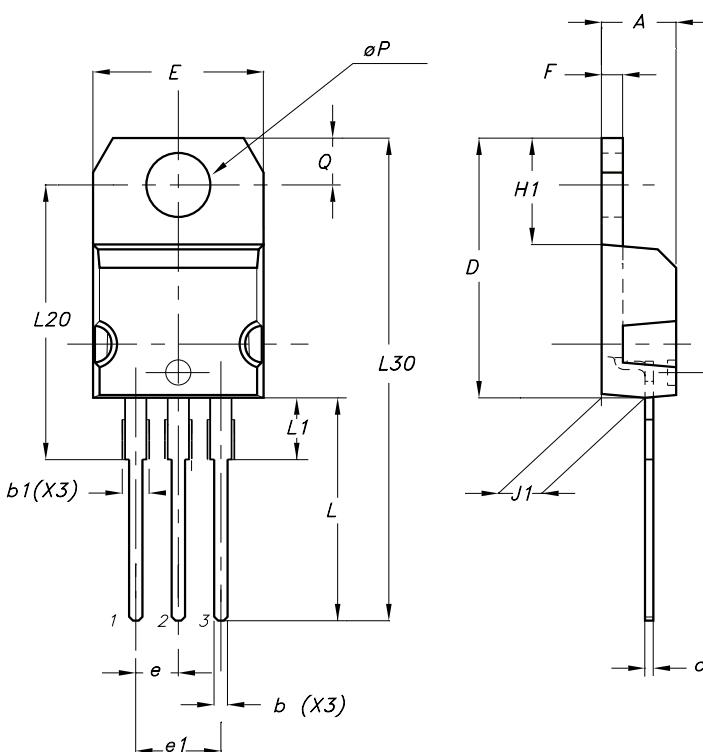
Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

PACKAGES DIMENSION : TO-263



Symbol	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	4.40	4.57	4.57	0.173	0.180	0.185
A1	1.22	1.27	1.27	0.048	0.050	0.052
A2	2.59	2.69	2.69	0.102	0.106	0.110
A3	0.00	0.10	0.10	0.000	0.004	0.008
b	0.77	0.813	0.813	0.030	0.032	0.035
b1	1.20	1.270	1.270	0.047	0.050	0.054
c	0.34	0.381	0.381	0.013	0.015	0.019
D1	8.60	8.70	8.99	0.339	0.343	0.354
E	10.00	10.16	10.16	0.394	0.400	0.404
E2	10.00	10.10	10.10	0.394	0.398	0.402
e	2.54BSC			0.100BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L4	0.25BSC			0.010BSC		
θ	0°	5°	8°	0°	5°	8°
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°
DEP	0.05	0.10	0.20	0.002	0.004	0.008

PACKAGES DIMENSION : TO-220



DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.067
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.600		0.620
E	10.0		10.40	0.393		0.409
e	2.4		2.7	0.094		0.106
e1	4.95		5.15	0.194		0.203
F	1.23		1.32	0.048		0.051
H1	6.2		6.6	0.244		0.260
J1	2.40		2.72	0.094		0.107
L	13.0		14.0	0.511		0.551
L1	3.5		3.93	0.137		0.154
L20		16.4			0.645	
L30		28.9			1.138	
φP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRFZ44NS	TO-263	800	Tape and reel
UMW IRFZ44N	TO-220	1000	Tube and box