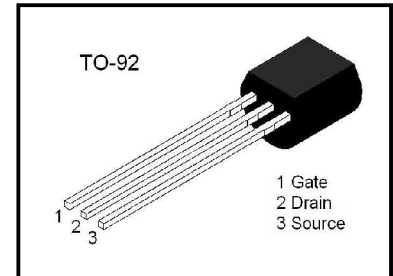
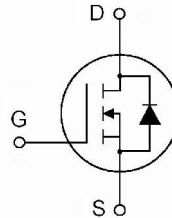


General Description

The 2N70 is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

Features

- $R_{DS(ON)} < 6.3\Omega$ @ $V_{GS}=10V$, $I_D=1A$
- Fast switching capability
- Avalanche energy specified
- Improved dv/dt capability, high ruggedness



Absolute Maximum Ratings ($T_A = 25^\circ C$)

Parameter		Symbol	Ratings	Units
Gate-Drain Voltage		V_{DSS}	700	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	2.0	A
	Pulsed (Note 2)	I_{DM}	8.0	
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	140	mJ
	Repetitive (Note 2)	E_{AR}	2.8	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation		P_D	0.75	W
Operation Junction Temperature		T_J	150	$^\circ C$
Storage Temperature Range		T_{STG}	-55~150	$^\circ C$

Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by T_J

3. $L=45mH$, $I_{AS}=2.0A$, $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_J = 25^\circ C$

4. $I_{SD} \leq 2.0A$, $di/dt \leq 200A/\mu s$, $V_{DD} \leq B_{VDSS}$, Starting $T_J = 25^\circ C$

Thermal Characteristics

Parameter	Symbol	Ratings	Units
Junction to Ambient	$R_{\theta JA}$	120	$^\circ C/W$
Junction to Case	$R_{\theta JC}$	12	$^\circ C/W$

Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

Parameter		Symbol	Conditions	Value			Unit
				Min	Typ	Max	
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	700			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			10	μA
			V _{DS} = 480V, T _C = 125°C			100	
Gate-Body Leakage Current	Forward	I _{GSS}	V _{GS} = 30V, V _{DS} = 0V			100	nA
	Reverse		V _{GS} = -30V, V _{DS} = 0V			-100	
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D = 250 μA		0.4		V/°C
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2		4	V
Static Drain-Source On-Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D =1A			6.3	Ω
Forward Transconductance		g _{FS}	V _{DS} =50V, I _D =1A(Note1)		2.25		S
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz			350	pF
Output Capacitance		C _{OSS}				50	pF
Reverse Transfer Capacitance		C _{RSS}				7	pF
Switching Characteristics							
Turn-On Delay Time		t _{D (ON)}	V _{DD} =350V, I _D =2.0A, R _G = 25Ω(Note1, 2)			30	ns
Rise Time		t _R				60	ns
Turn-Off Delay Time		t _{D(OFF)}				50	ns
Fall Time		t _F				60	ns
Total Gate Charge		Q _G	V _{DS} =560V, V _{GS} =10V, I _D =2.0A (Note1, 2)			11	nC
Gate-Source Charge		Q _{GS}			1.6		nC
Gate-Drain Charge		Q _{GD}			4.3		nC
Drain-Source Diode Characteristics							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0 V, I _{SD} = 2.0 A			1.4	V
Continuous Drain-Source Current		I _{SD}				2.0	A
Pulsed Drain-Source Current		I _{SM}				8.0	A
Reverse Recovery Time		t _{RR}	V _{GS} = 0 V, I _{SD} = 2.4 A		260		ns
Reverse Recovery Charge		Q _{RR}	di/dt =100 A/μs (Note1)		0.72		μC

Note: 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
2. Essentially Independent of Operating Temperature

Typical Characteristics

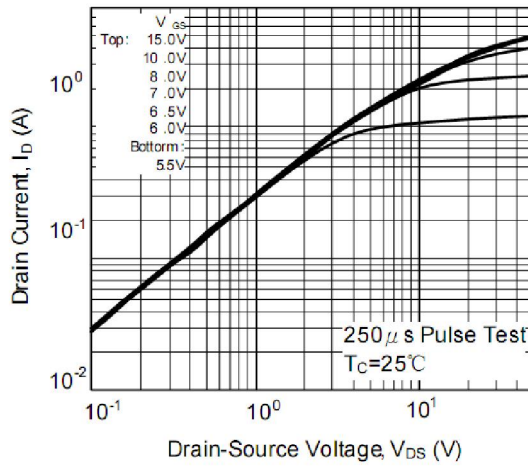


Figure 1. On-Region Characteristics

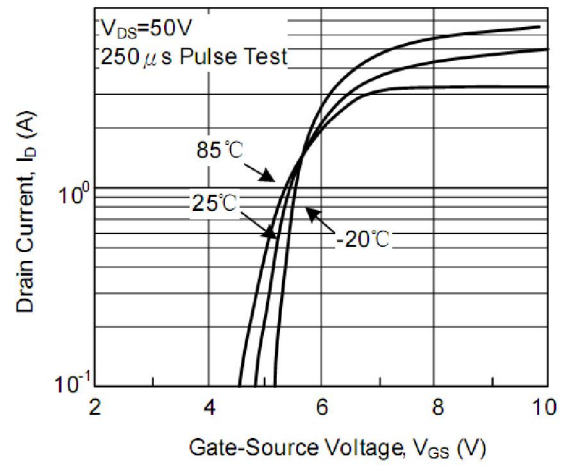


Figure 2. Transfer Characteristics

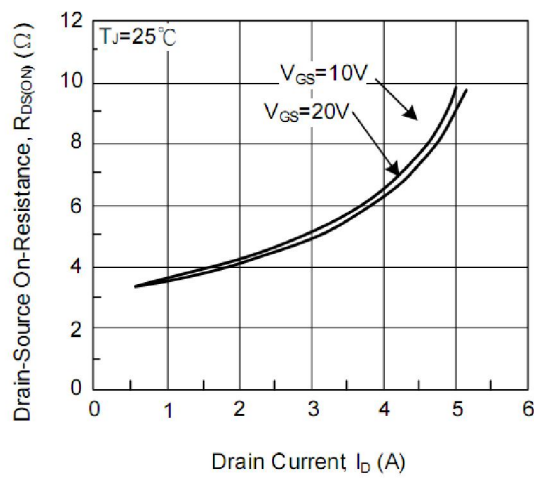


Figure 3 On-Resistance Variation vs. Drain Current and Gate Voltage

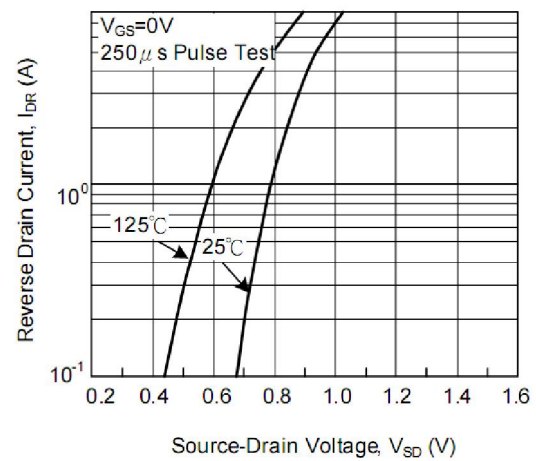


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

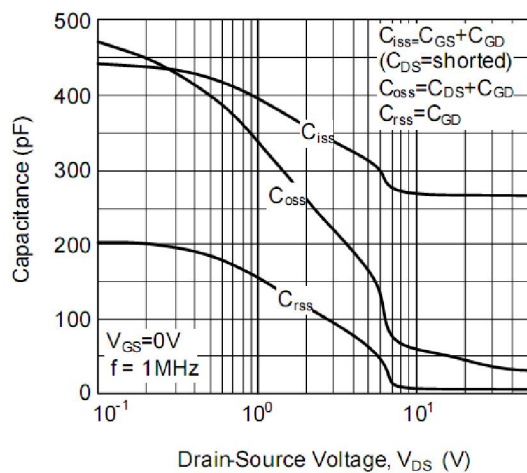


Figure 5 Capacitance vs. Drain-Source Voltage

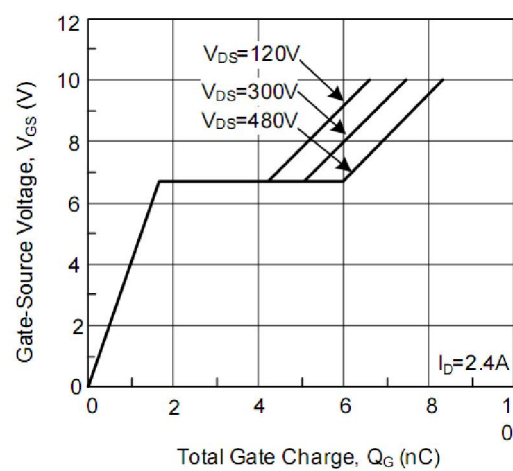


Figure 6 Gate Charge vs. Gate Charge Voltage

Typical Characteristics

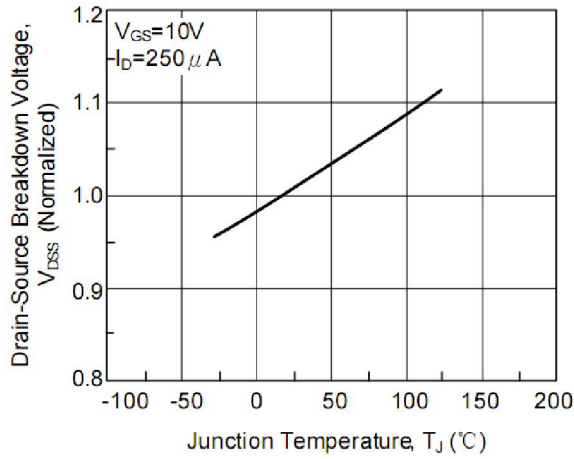


Figure 7. Breakdown Voltage vs. Temperature

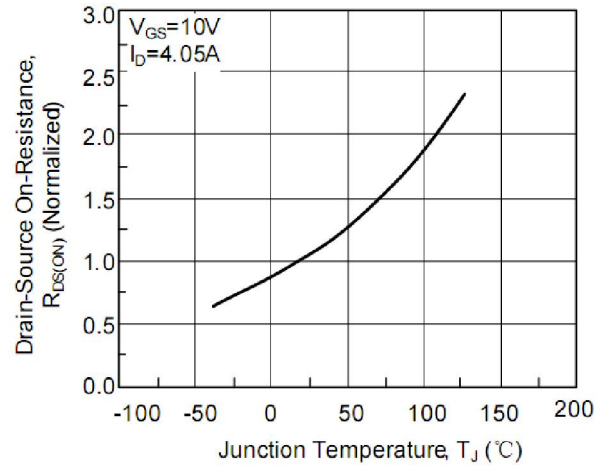


Figure 8. On-Resistance vs. Temperature

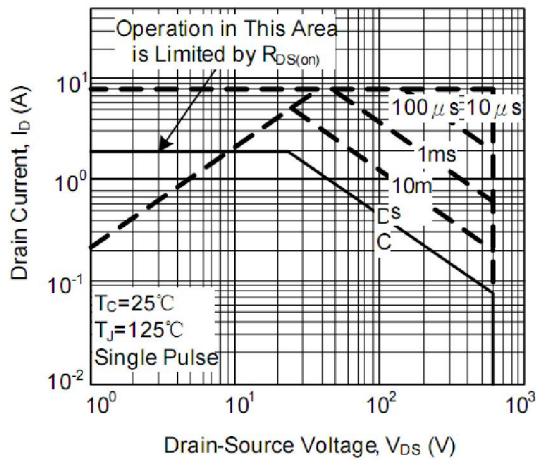


Figure 9 Max. Safe Operating Area

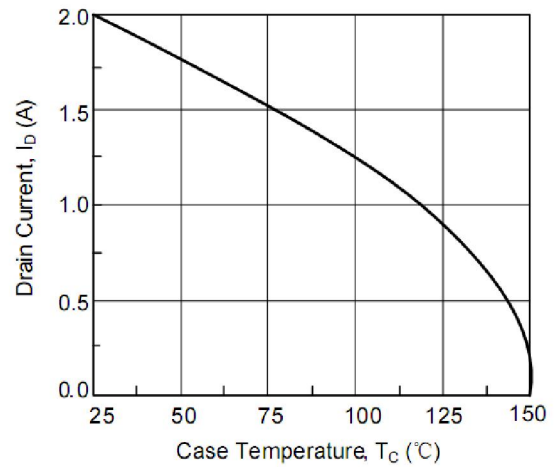


Figure 9. Max. Drain Current vs. Case Temperature

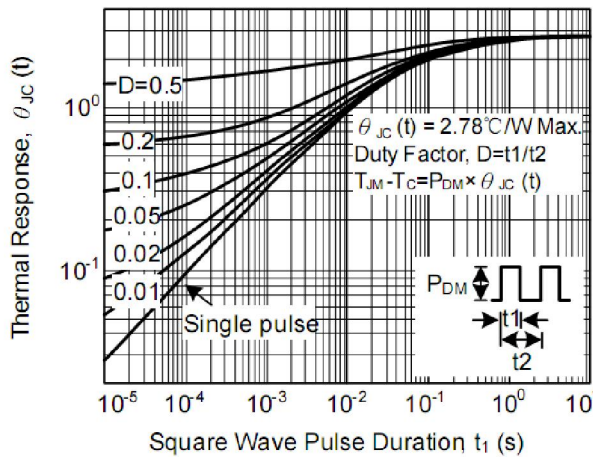


Figure 10 Thermal Response

Test Circuits And Waveforms

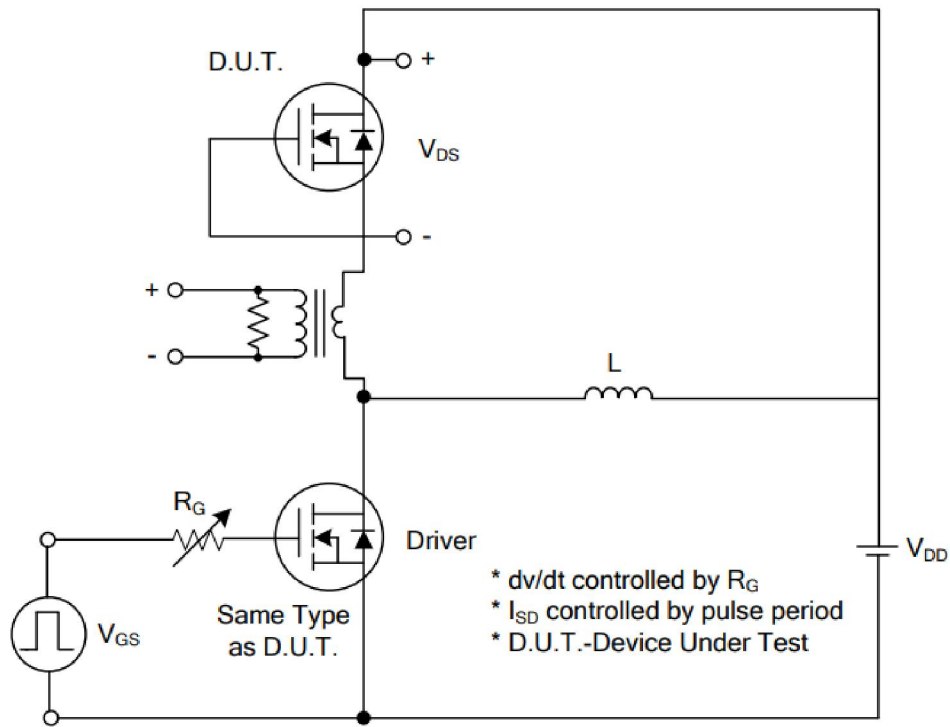


Fig. 11A Peak Diode Recovery dv/dt Test Circuit

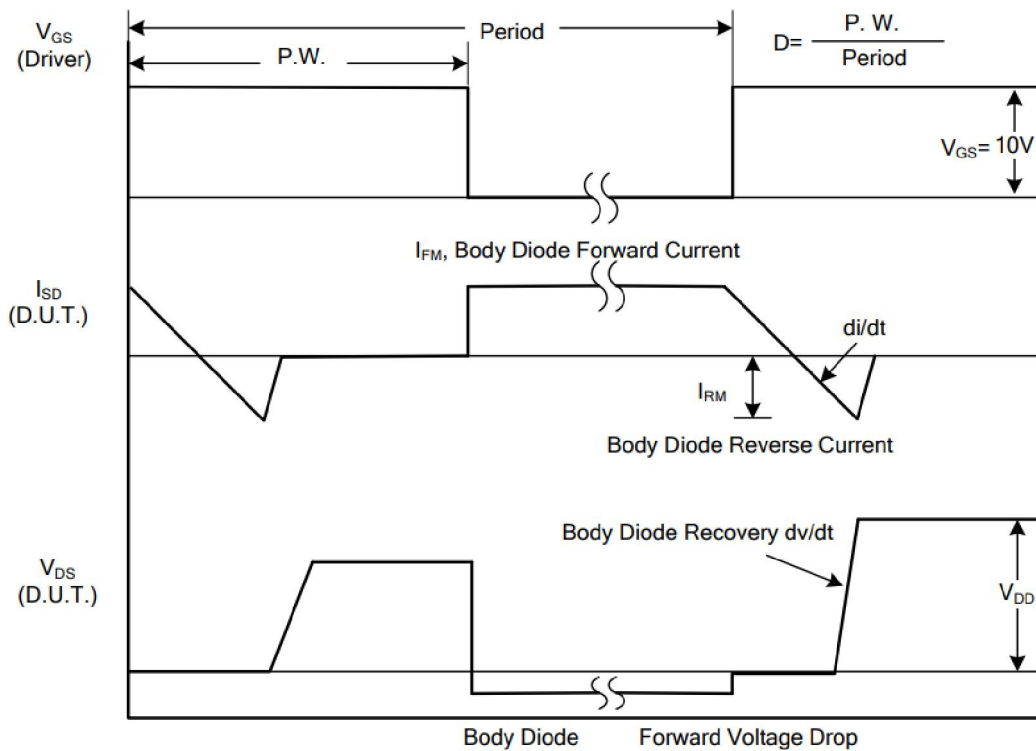


Fig. 11B Peak Diode Recovery dv/dt Waveforms

Test Circuits And Waveforms

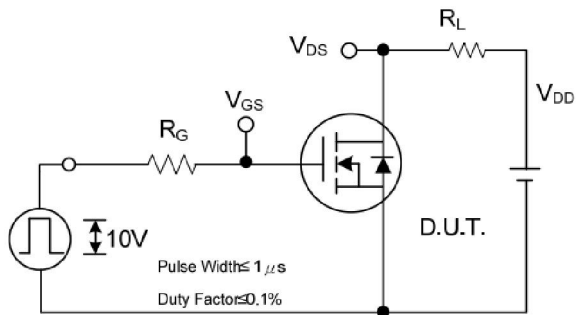


Fig. 12A Switching Test Circuit

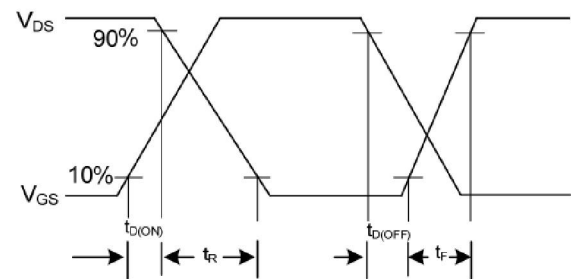


Fig. 12B Switching Waveforms

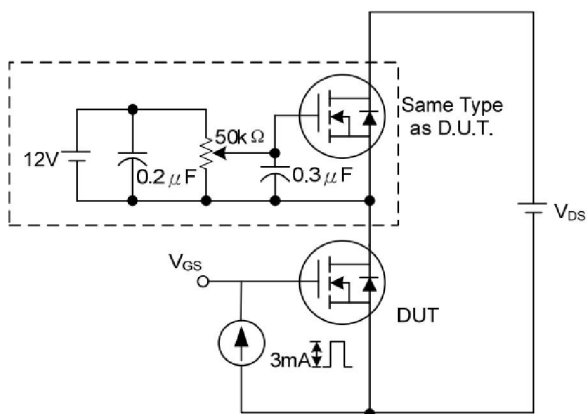


Fig. 13A Gate Charge Test Circuit

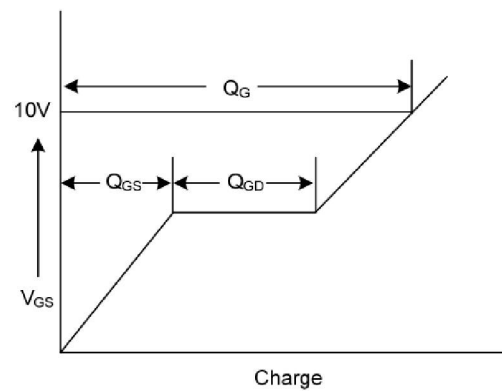


Fig. 13B Gate Charge Waveform

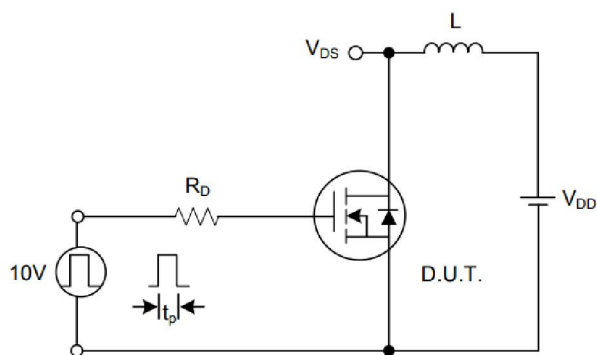


Fig. 14A Unclamped Inductive Switching Test Circuit

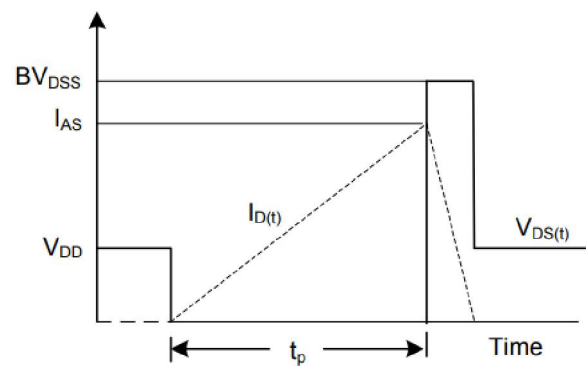
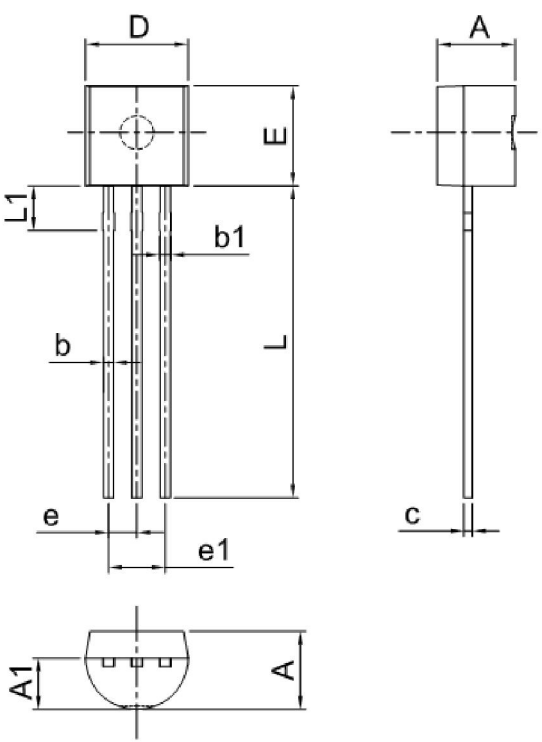


Fig. 14B Unclamped Inductive Switching Waveforms

Package Dimensions

	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	3.30	3.70	0.130	0.146
A1	2.30	2.70	0.091	0.106
b	0.40	0.50	0.016	0.020
b1	0.50	0.70	0.020	0.028
c	0.35	0.45	0.014	0.018
D	4.45	4.70	0.175	0.185
E	4.40	4.65	0.173	0.183
e	1.17	1.37	0.046	0.054
e1	2.34	2.64	0.092	0.104
L	13.50	14.50	0.531	0.571
L1	1.80	2.20	0.071	0.087