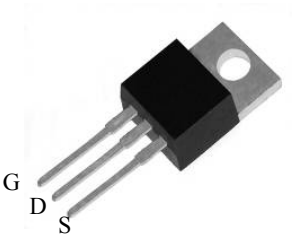
N-Channel MOSFET

Lead Free Package and Finish

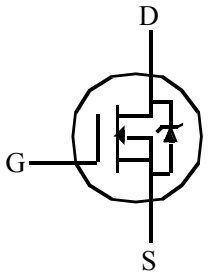
Applications:
- Automotive
- DC Motor Control
- Class D Amplifier

V_{DSS}	$R_{DS(on)}$(Max)	I_D
100V	48mΩ	33A

Features:
- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves



TO-220 Not to Scale



Ordering Information

PART NUMBER	PACKAGE	BRAND
CS540B8	TO-220	CS540B8

Absolute Maximum Ratings Tc= 25℃ unless otherwise specified

Symbol	Parameter	Maximum	Units
V_{DSS}	Drain-to-Source Voltage (NOTE *1)	100	V
I_D	Continuous Drain Current	33	A
I_D@ 100 ℃	Continuous Drain Current	Figure 3	
I_{DM}	Pulsed Drain Current, V_{GS}@ 10V (NOTE *2)	110	
P_D	Power Dissipation	128	W
	Derading Factor above 25 ℃	0.86	W/ ℃
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy L=1.3 mH, ID=20 Amps	260	mJ
I_{AS}	Pulsed Avalanche Rating	Figure 8	A
dv/dt	Peak Diode Recovery dv/dt (NOTE *3)	3.0	V/ns
T_L T_{PKG}	Maximum Temperature for Soldering Leads at 0.063in(1.6mm) from Case for 10 seconds Package Body for 10 seconds	 300 260	℃
T_J and T_{STG}	Operation Junction and Storage Temperature Range	-55 to 175	℃

**Drain Current limited by Maximum Junction Temperature*

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

Thermal Resistance

Symbol	Parameter	Maximum	Units	Test Condition
$R_{\theta JC}$	Junction-to-Case	1.17	℃/W	Water cooled heat sink, P_D adjusted for a peak junction temperature of +175℃.
$R_{\theta JA}$	Junction-to-Ambient	62	℃/W	1 cubic foot chamber, free air.

Electrical Characteristics（T_J= 25℃ unless otherwise specified）：

OFF Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
V_{DSS}	Drain-to-Source Breakdown Voltage	100	--	--	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	--	0.71	--	V/℃	Reference to 25℃, ID=250uA
I_{DSS}	Drain-to-Source Leakage Current	--	--	25	uA	V_{DS} = 100V, V_{GS}= 0V, T_a = 25℃
		--	--	250		V_{DS} =80V, V_{GS}= 0V, T_a = 125℃
$I_{GSS(F)}$	Gate-to-Source Forward Leakage	--	--	+100	nA	V_{GS} =+20V
$I_{GSS(R)}$	Gate-to-Source Reverse Leakage	--	--	-100		V_{GS} =-20V

ON Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
$R_{DS(ON)}$	Drain-to-Source On-Resistance	--	43	48	mΩ	V_{GS}=10V,I_D=16A (NOTE*4)
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	--	21	--	S	V_{DS}=30V, I_D =16A (NOTE*4)

Dynamic Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
C_{iss}	Input Capacitance	--	1614	--	pF	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz Figure 14
C_{oss}	Output Capacitance	--	511	--		
C_{rss}	Reverse Transfer Capacitance	--	204	--		
Q_g	Total Gate Charge	--	48	--	nC	V_{DD} =80V I_D =16A V_{GS} = 10V Figure 15
Q_{gs}	Gate-to-Source Charge	--	7.2	--		
Q_{gd}	Gate-to-Drain (“Miller”)Charge	--	23	--		

Resistive Switching Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
$t_{d(ON)}$	Turn-on Delay Time	--	13	--	ns	V_{DD} = 50V I_D =16A V_{GS} = 10V R_G = 5.1Ω
trise	Rise Time	--	30	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	50	--		
t_{fall}	Fall Time	--	25	--		

Source-Drain Diode Characteristics						
Symbol	Parameter	Rating			Units	Test Conditions
		Min.	Typ.	Max.		
I_S	Continuous Source Current (Body Diode)	--	--	33	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current (Body Diode)	--	--	110	A	
V_{SD}	Diode Forward Voltage	--	--	1.5	V	I_S=16A,V_{GS}=0V
trr	Reverse Recovery Time	--	145	175	ns	V_{GS}=0V I_F=16A, di/dt=100A/us
Qrr	Reverse Recovery Charge	--	624	745	nC	

Notes:

***1.** T_J=+25℃ to +175℃.

***2.** Repetitive rating; pulse width limited by maximum junction temperature.

***3.** I_{SD}=16A di/dt≤100A/us, V_{DD}≤BV_{DSS}, T_J=+175℃.

***4.** Pulse width≤380us; duty cycle≤2%.

Characteristics Curve:

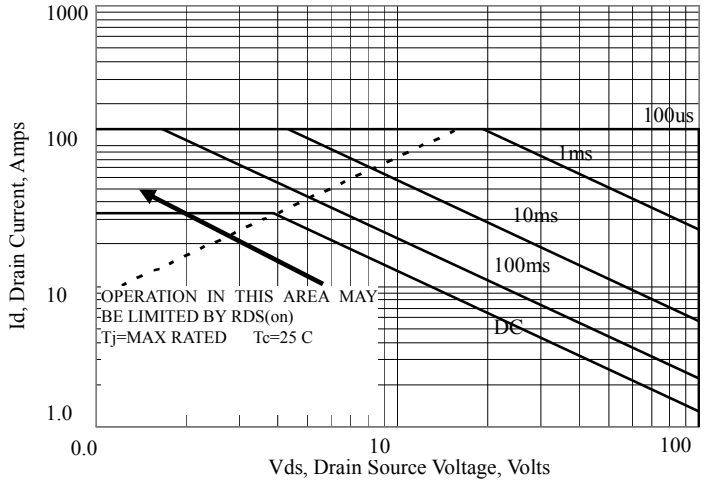


Figure 1 Maximum Forward Bias Safe Operating Area

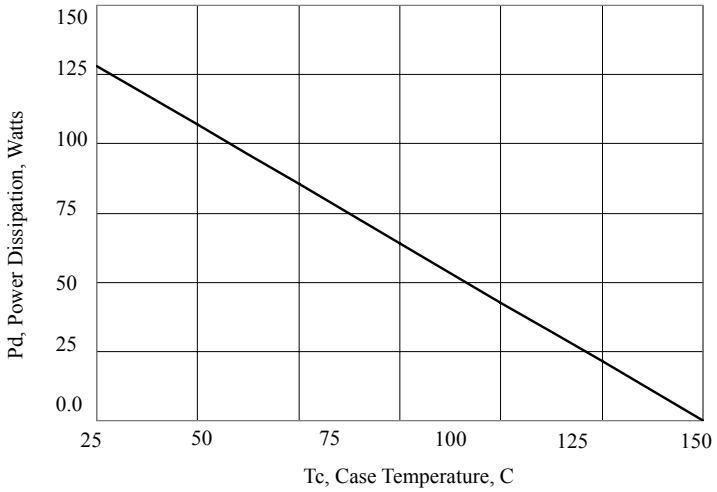


Figure 2 Maximum Power Dissipation vs Case Temperature

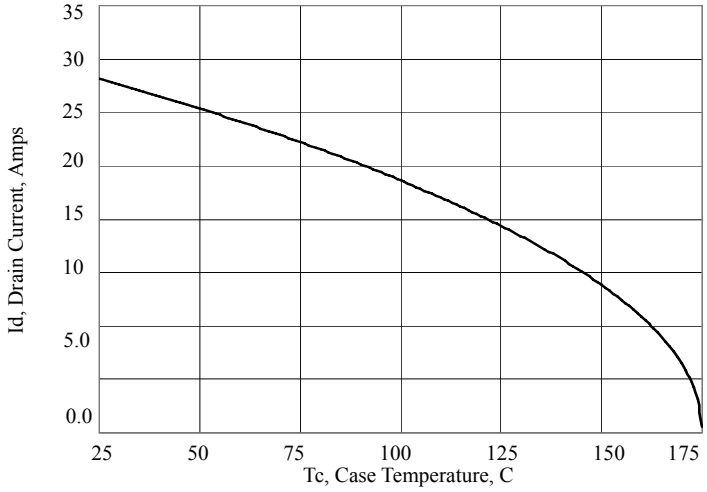


Figure 3 Maximum Continuous Drain Current vs Case Temperature

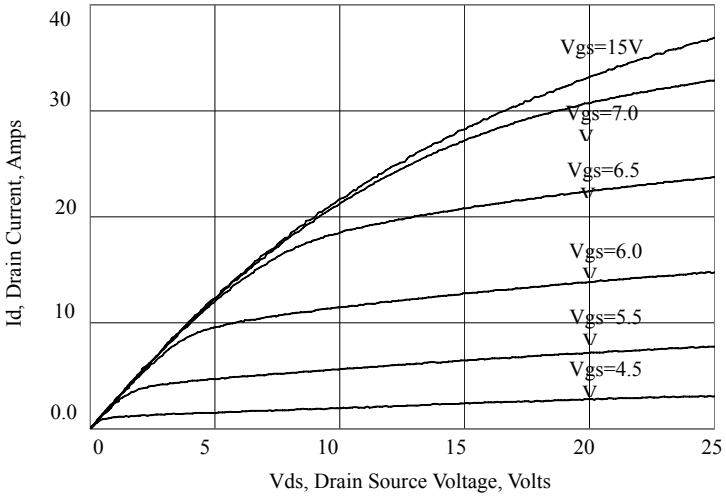


Figure 4 Typical Output Characteristics

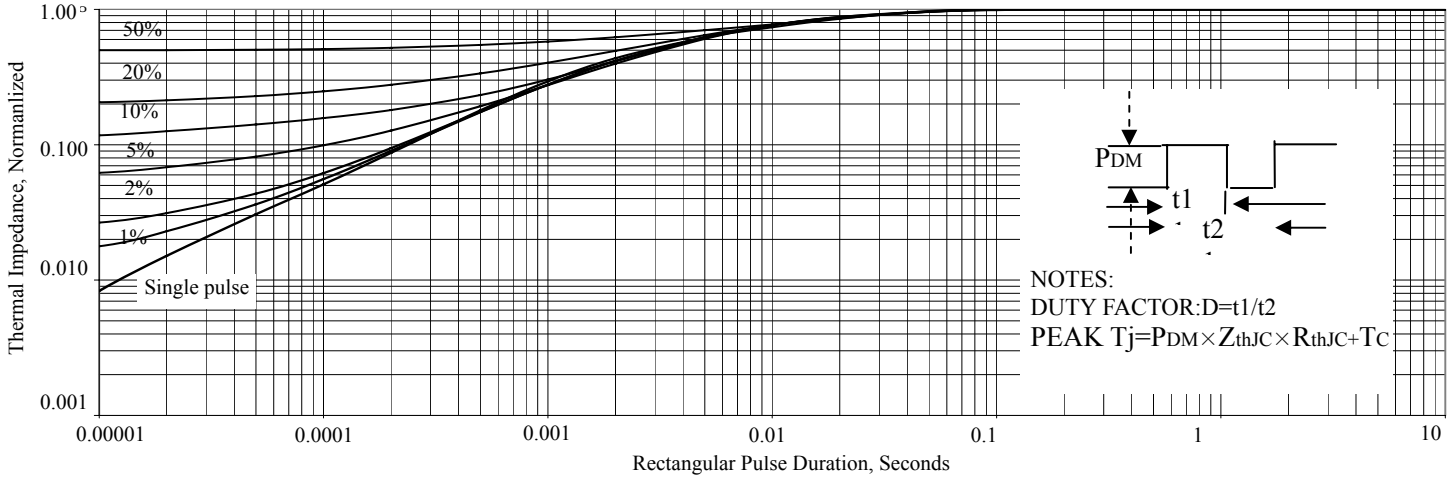


Figure 5 Maximum Effective Thermal Impedance, Junction to case

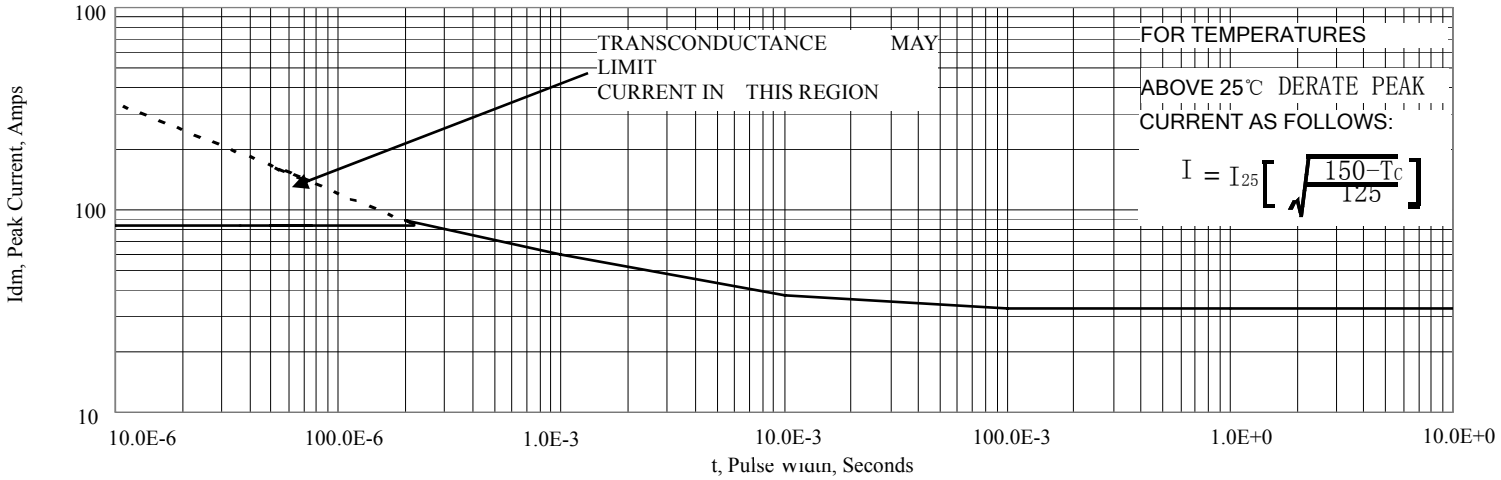


Figure 6 Maximum Peak Current Capability

Test Circuit and Waveform:

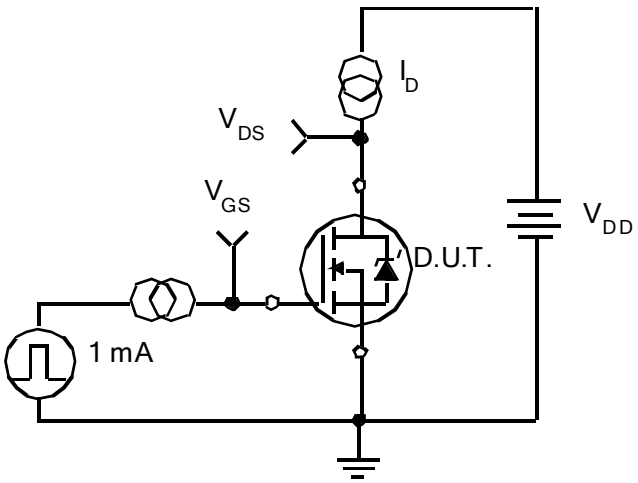


Figure 7 Gate Charge Test Circuit

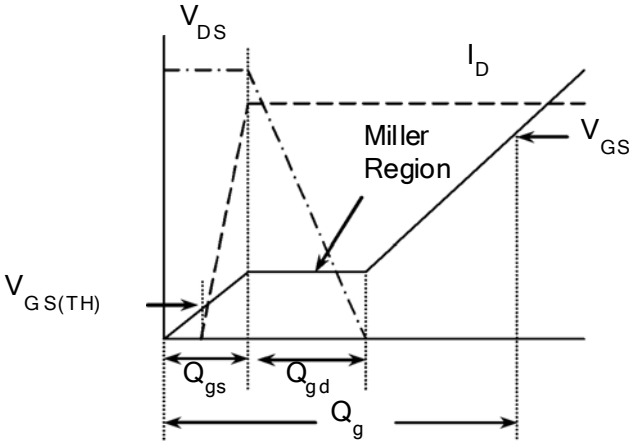


Figure 8 Gate Charge Waveform

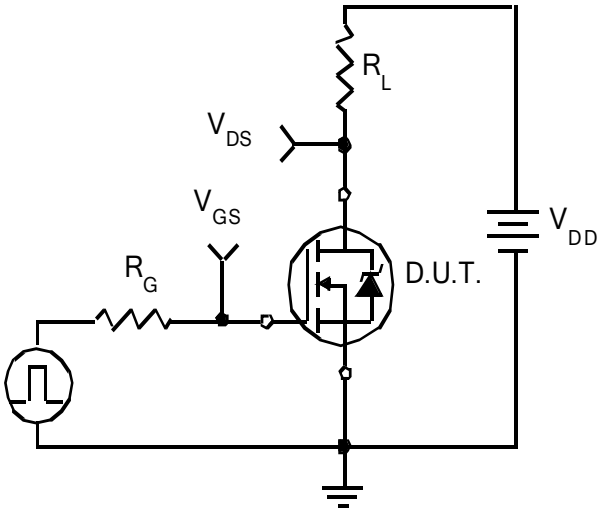


Figure 9 Resistive Switching Test Circuit

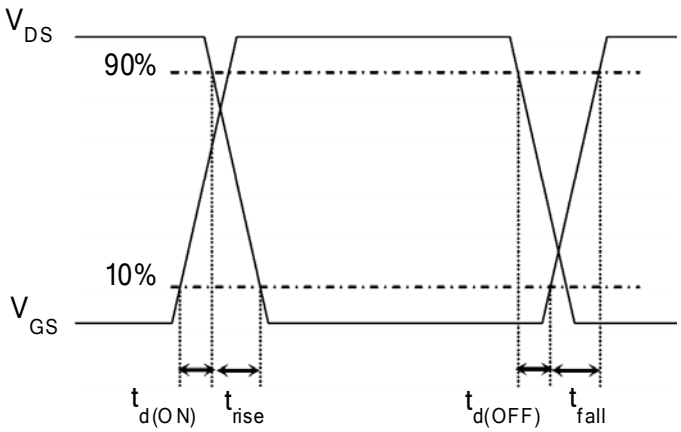


Figure 10 Resistive Switching Waveform

Test Circuit and Waveform:

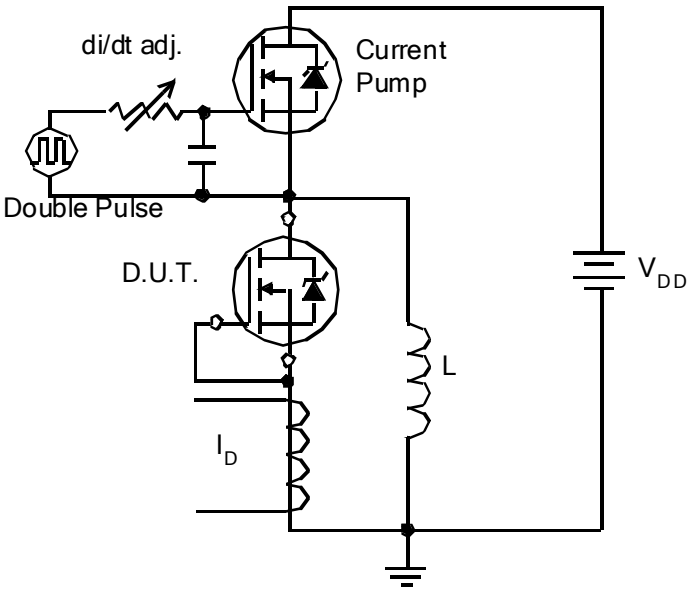


Figure 11 Diode Reverse Recovery Test Circuit

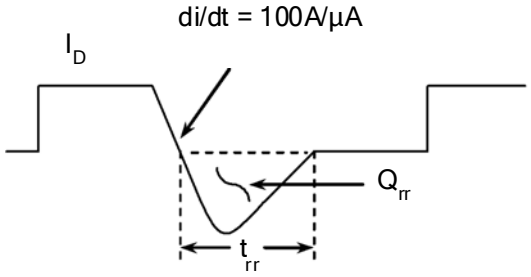


Figure 12 Diode Reverse Recovery Waveform

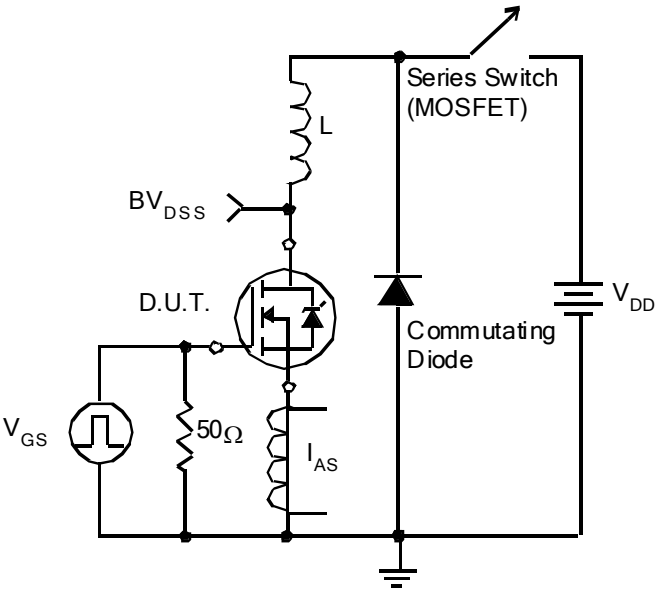


Figure 13 Undamped Inductive Switching Test Circuit

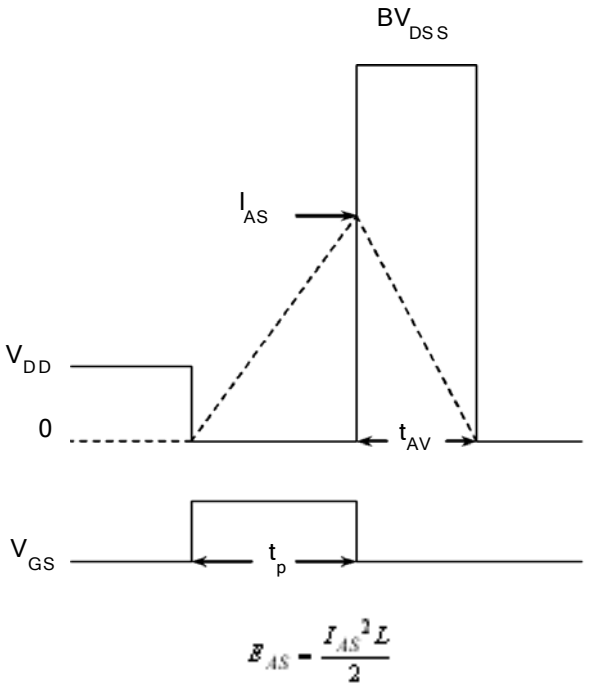
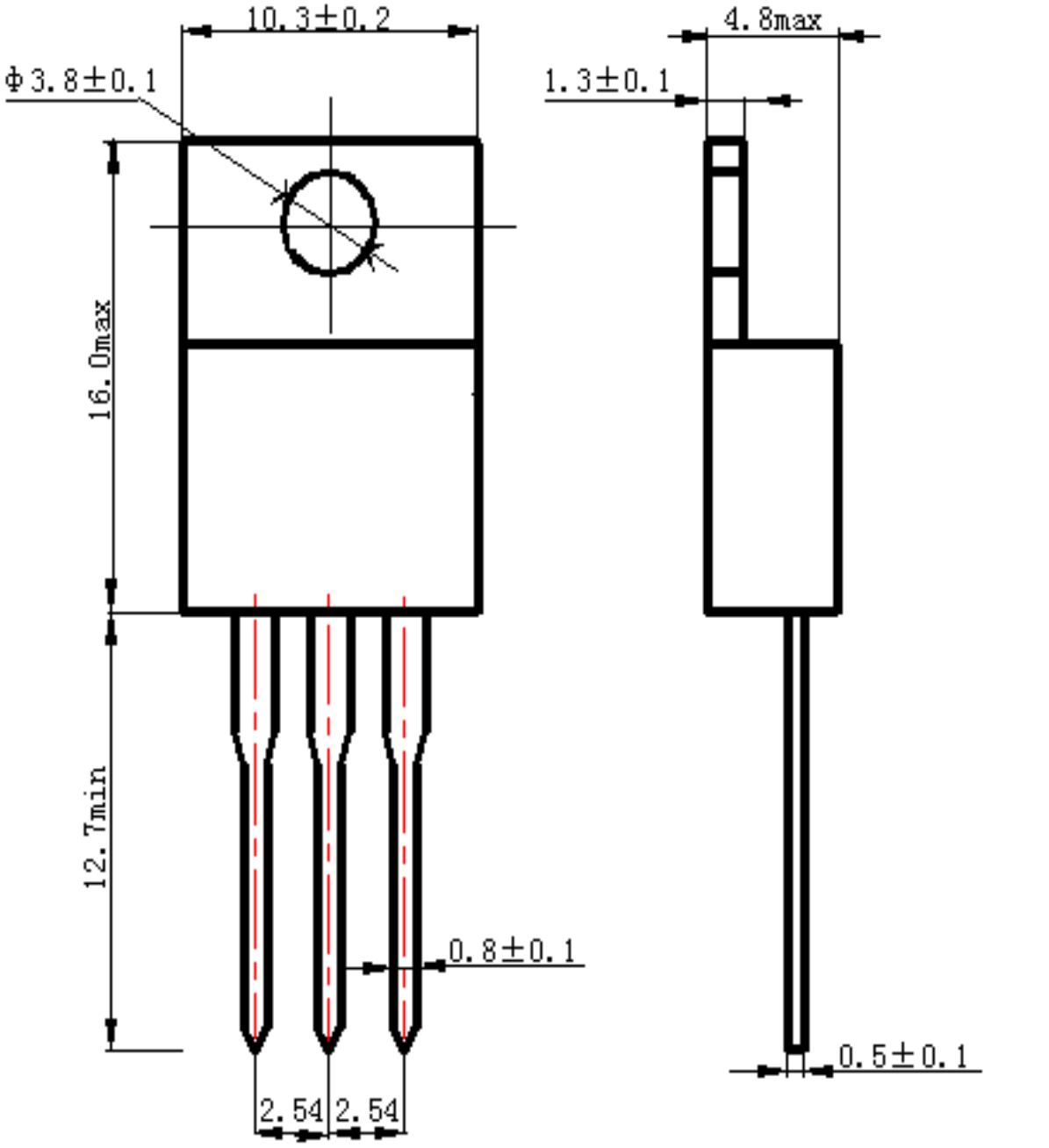


Figure 14 Undamped Inductive Switching Waveform

Package Information：



Unit: mm

TO-220 Package

Part's Name	Hazardous Substance					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Limit	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
Lead Frame	○	○	○	○	○	○
Molding Compound	○	○	○	○	○	○
Chip	○	○	○	○	○	○
Wire Bonding	○	○	○	○	○	○
Solder	×	○	○	○	○	○
Note	○：Means the hazardous material is under the criterion of SJ/T11363-2006. ×：Means the hazardous material exceeds the criterion of SJ/T11363-2006. The plumbum element of solder exist in products presently, but within the allowed range of Eurogroup's RoHS.					

Warnings

1. Exceeding the maximun ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximun ratings of the device.
2. When installing the heatsink, please pay attention to the torsional moment and the smoothness of the heatsink.
3. VDMOSFETs is the device which is sensitive to the static electricity, it is necessory to protect the device from being damaged by the static electricity when using it.
4. This publication is made by Huajing Microelectronics and subject to regular change without notice.

Add： No.14 Liangxi RD. Wuxi, Jiangsu, China Mail：214061 http://www. crhj.com.cn
Tel: 0510-85807228 Fax: 0510-85800864

Marketing Part： Post：214061 Tel / Fax：0510-85807228-3663/5508
E-mail：zhaol@crhj.com.cn 0510-85800360（Fax）

Application and Service：Post：214061 Tel / Fax：0510-85807228-3399 / 2227
E-mail：apply@crhj.com.cn