

1、主要参数 Main Characteristics

2、用途 Applications

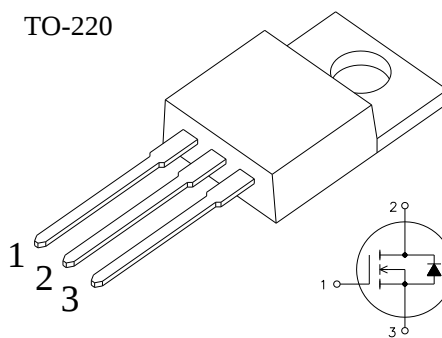
- 高频开关电源 High frequency switching mode power supply
- DC/DC 变换器 DC/DC Converter
- 高频开关与同步整流 high-frequency switching and synchronous rectification
- UPS 电源 Uninterruptible Power Supply
- PFC 功率因数校正 Power Factor Correction

3、产品特性 Features

- 超低通态电阻的高密度单元设计 High density cell design for ultra low Rdson
- 低 Crss (典型值 12pF) Low Crss (typical 12pF)
- 低栅漏电荷降低开关损耗 Low gate to drain charge to switching losses
- 产品全部经过雪崩测试 100% avalanche tested
- 高抗 dv/dt 能力 Improved dv/dt capability
- RoHS 产品 RoHS product

V_{DSS}	60	V
I_D	80	A
P_D	200	W
$R_{DS(ON)TYP}$	5.3	m Ω

TO-220



1 栅极(G) 2 漏极 (D) 3 源极(S)

4. 电特性 Electrical Characteristics

4.1 极限值 Absolute Ratings ($T_C = 25^{\circ}\text{C}$)

参 数 名 称 Parameter	符号 Symbol	额定值 Value	单位 Unit
漏极-源极电压 Drain-Source Voltage	V_{DSS}	60	V
连续漏极电流 Drain Current -continuous	I_D	$T_C = 25^{\circ}\text{C}$ 80 $T_C = 100^{\circ}\text{C}$ 15	A
最大脉冲漏极电流 (注 1) Drain Current - pulse (note 1)	I_{DM}	320	A
栅源电压 Gate-Source Voltage	V_{GS}	± 20	V
单脉冲雪崩能量 (注 4) Single Pulsed Avalanche Energy (note 4)	E_{AS}	300	mJ
二极管反向恢复最大电压变化速率 Peak Diode Recovery dv/dt	dv/dt	3.0	V/ns
耗散功率 Power Dissipation	P_D	200	W
结温, 贮存温度 Operating and Storage Temperature Range	T_j, T_{stg}	150, $-55 \sim 150$	$^{\circ}\text{C}$

4.2 电参数 Electrical Characteristics (T_c = 25℃)

参 数 名 称 Parameter	符 号 Symbol	测 试 条 件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
截止特性 Off –Characteristics						
漏源击穿电压 Drain-Source Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
漏源击穿电压温度系数 Breakdown Voltage Temperature Coefficient	△ BV _{DSS} / △T _J	I _D = 250 μA		0.71		V/℃
漏源漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0 , 25℃			1	μ A
		V _{DS} =48V,V _{GS} =0 , 125℃			100	
栅源漏电流 Gate-body leakage current	I _{GSS}	V _{GS} = ± 20V			± 100	nA
导通特性 On-Characteristics						
静态导通电阻 Static Drain-Source On-Resistance	R _{DSON} *	V _{GS} =10V, I _D =20A		5.3	6.0	mΩ
		V _{GS} =4.5V, I _D =20A		6.5	7.8	
阈值电压 Gate Threshold Voltage	V _{GS (TH)}	V _{DS} =V _{GS} , I _D =250μA	1.2	1.8	2.2	V
跨导 Forward Transconductance	g _{fs}	V _{DS} =10V, I _p =20A	35			S
脉冲宽度 tp≤380μs,占空比 δ≤2%						
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =30V f=1.0MH		2100		pF
输出电容 Output capacitance	C _{oss}			359		
反向传输电容 Reverse transfer capacitance	C _{rss}			12		
开关特性 Switching Characteristics						
开启延迟(时间) Turn-On delay time	t _{d(ON)}	V _{DD} = 30V V _{GS} = 10V I _D = 20A R _G = 4.7Ω		9		nS
上升时间 Turn-On rise time	t _r			3		
关断延迟(时间) Turn-Off delay time	t _{d(OFF)}			31		
下降时间 Turn-Off Fall time	t _f			5		
栅极电荷 Total Gate Charge	Qg	I _D =20A,V _{DS} =30V V _{GS} = 10V		36.6		nC
栅源电荷 Gate-Source charge	Qgs			6.7		
栅漏电荷 Gate-Drain charge	Qgd			5.8		

源-漏二极管特性 Drain-Source Diode Characteristics						
源漏二极管连续电流 (Note 2) Maximum Continuous Drain-Source Diode Forward Current (Note 2)	I_{SD}	$T_c = 25\text{ }^{\circ}\text{C}$			60	A
源漏二极管脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SDM}				240	A
源漏二极管正向压降 (Note 3) Drain-Source Diode Forward Voltage (Note 3)	V_{FSD}	$I_{SD}=20\text{A}, V_{GS}=0$			1.2	V
反向恢复时间 Reverse recovery time	t_{rr}	$I_{SD}=20\text{A}, T_j = 25\text{ }^{\circ}\text{C}$ $dI_F/dt=100\text{A}/\mu\text{s}, V_{GS}=0\text{V}$		40		nS
反向恢复电荷 Reverse recovery charge	Q_{rr}			50		nC

参数名称 Parameter	符号 Symbol	额定值 Value	单位 Unit
热阻 (结到壳) Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.625	$^{\circ}\text{C}/\text{W}$
热阻 (结到环境) Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$

注:

- 1 重复脉冲, 宽度由最高结温限制
- 2 表面安装在 FR4 板上, $t \leq 10$ 秒
- 3 脉冲测试: 脉冲宽度 $\leq 300\text{ }\mu\text{s}$, 占空比 $\leq 2\%$,
- 4 EAS 条件: $T_j=25\text{ }^{\circ}\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$,
 $L=0.5\text{mH}$, $R_g=25\Omega$

Notes:

- 1 Pulse width limited by maximum junction temperature
- 2 Surface Mounted on FR4 Board, $t \leq 10$ sec.
- 3 Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.
- 4 EAS condition: $T_j=25\text{ }^{\circ}\text{C}$
 $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$

5. 特性曲线 Characteristics Curve

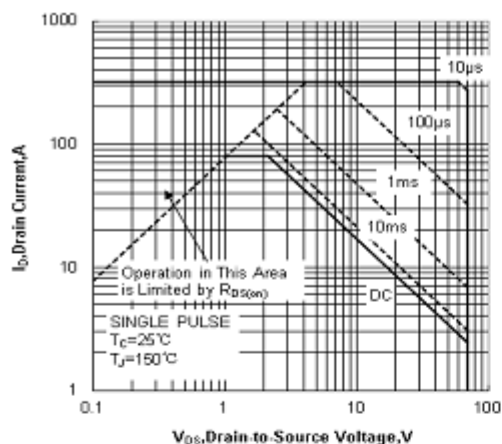


Figure 1 Maximum Forward Bias Safe Operating Area

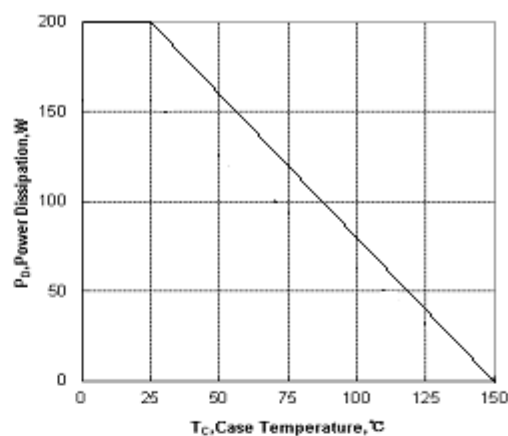


Figure 2 Maximum Power Dissipation vs Case Temperature

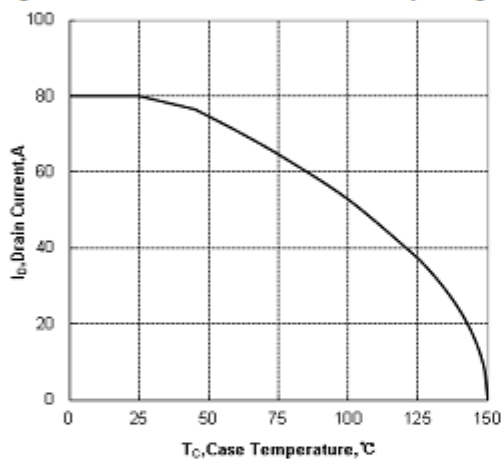


Figure3 Maximum Continuous Drain Current
vs Case Temperature

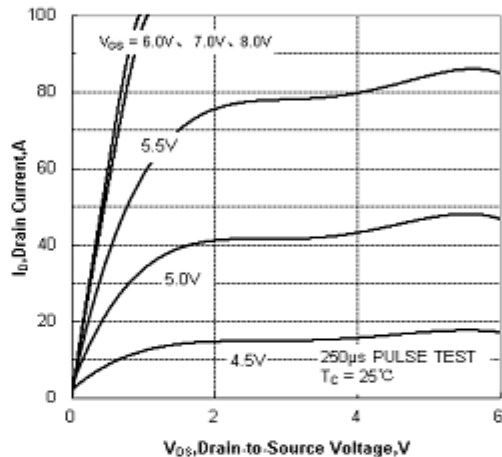


Figure 4 Typical Output Characteristics

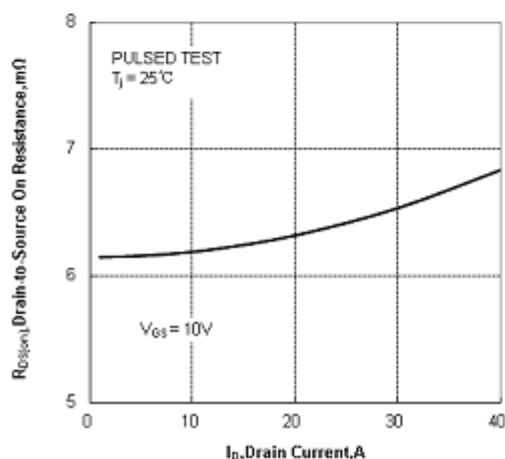


Figure 5 Drain-to-Source On Resistance vs Drain Current

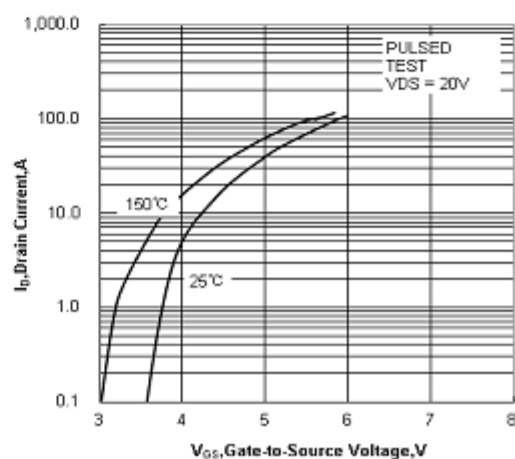


Figure 6 Typical Transfer Characteristics

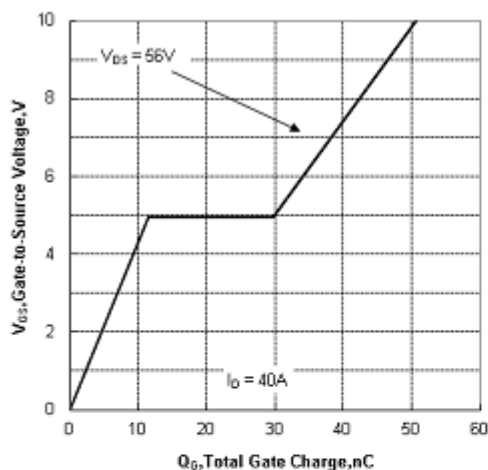


Figure 7 Typical Gate Charge vs Gate to Source Voltage

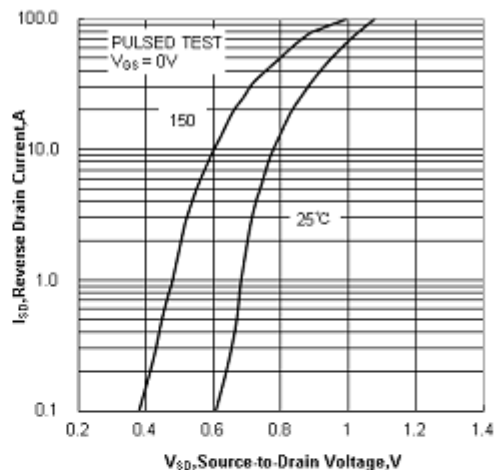


Figure 8 Typical Body Diode Transfer Characteristics

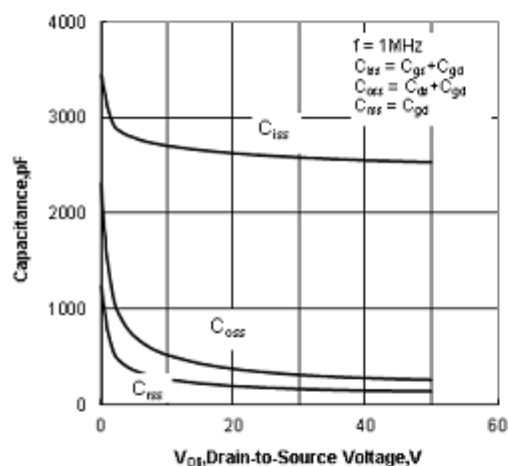


Figure 9 Typical Capacitance vs Drain to Source Voltage

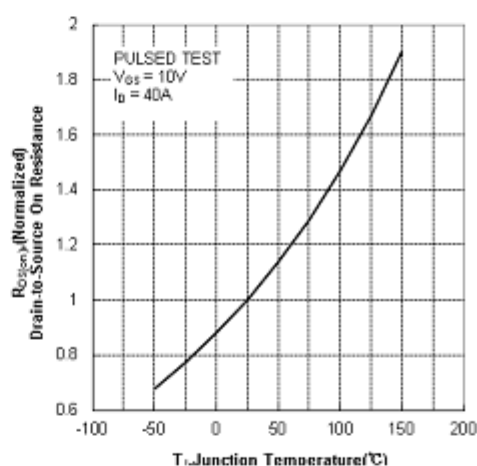


Figure 10 Typical Drain to Source on Resistance vs Junction Temperature

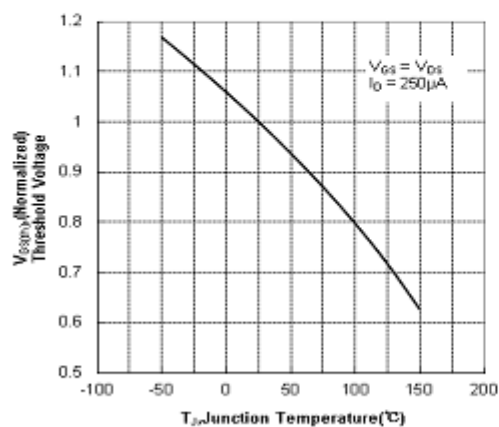


Figure 11 Typical Threshold Voltage vs Junction Temperature

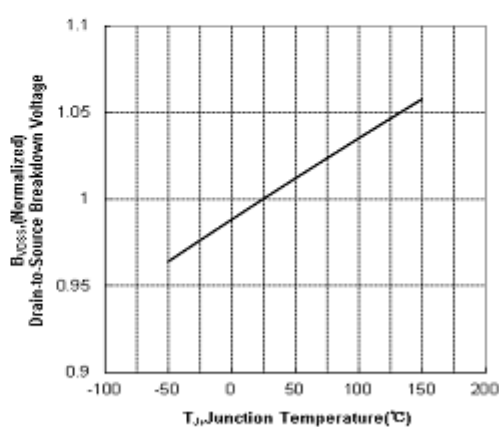


Figure 12 Typical Breakdown Voltage vs Junction Temperature

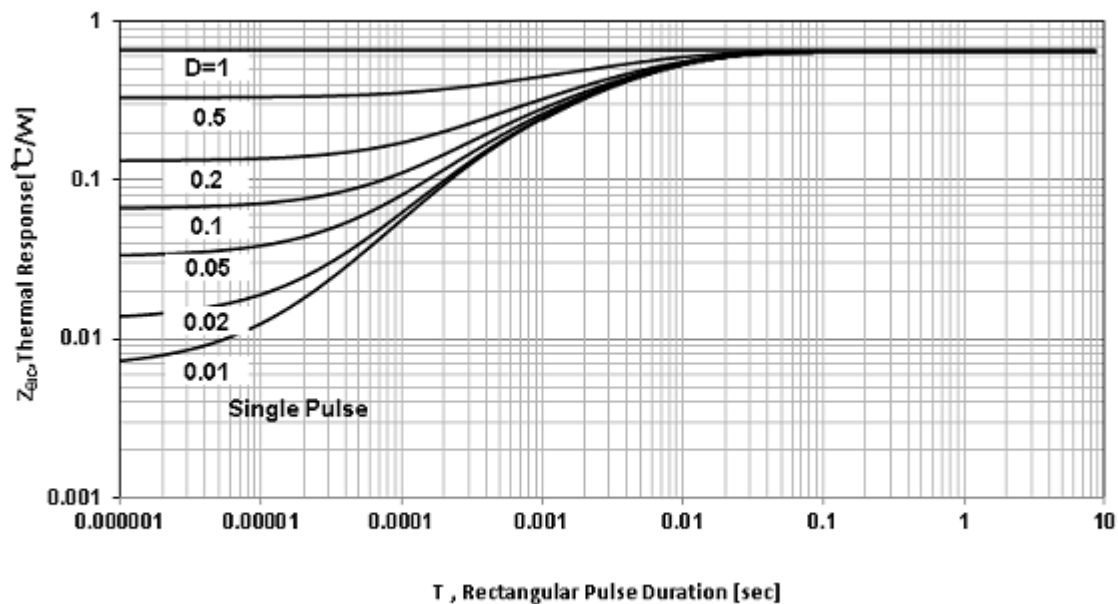


Figure 13 Maximum Effective Transient Thermal Impedance, Junction-to-Case

Test Circuit and Waveform

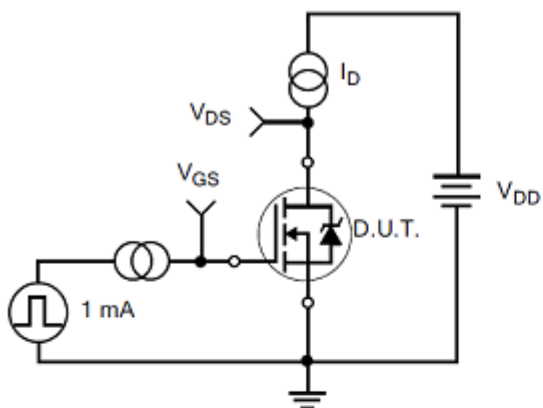


Figure 14. Gate Charge Test Circuit

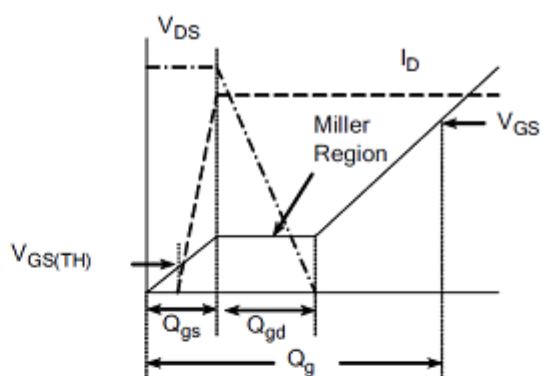


Figure 15. Gate Charge Waveforms

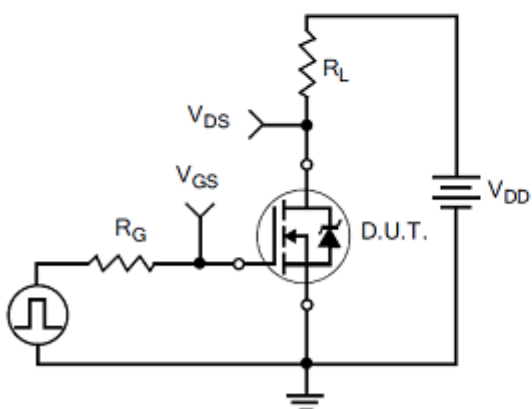


Figure 16. Resistive Switching Test Circuit

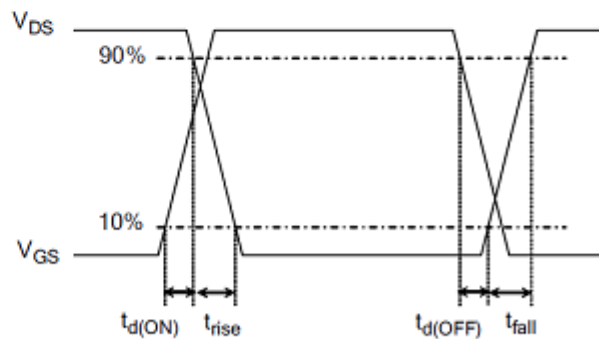


Figure 17. Resistive Switching Waveforms

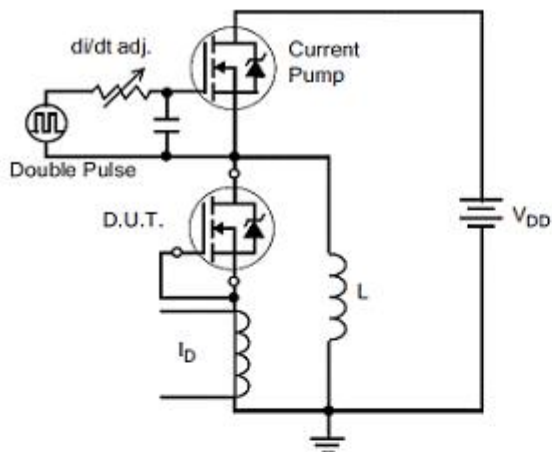


Figure 18. Diode Reverse Recovery Test Circuit

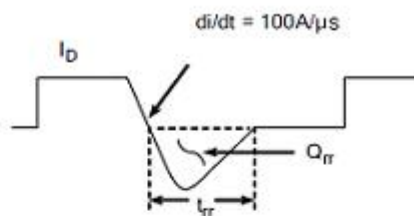


Figure 19. Diode Reverse Recovery Waveform

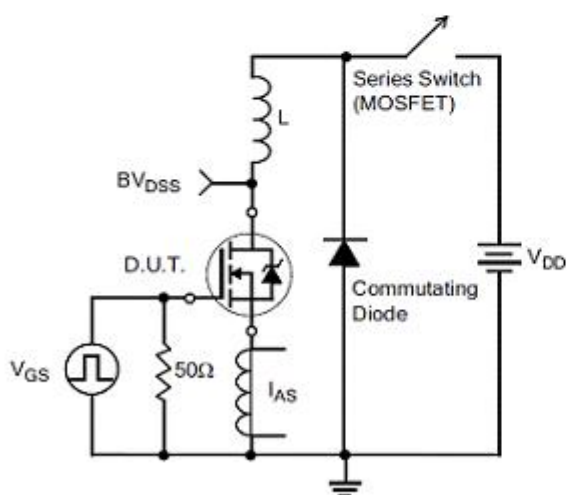


Figure20.Unclamped Inductive Switching Test Circuit

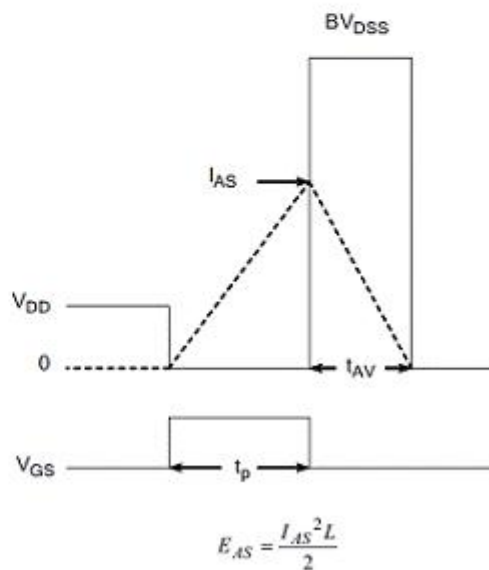
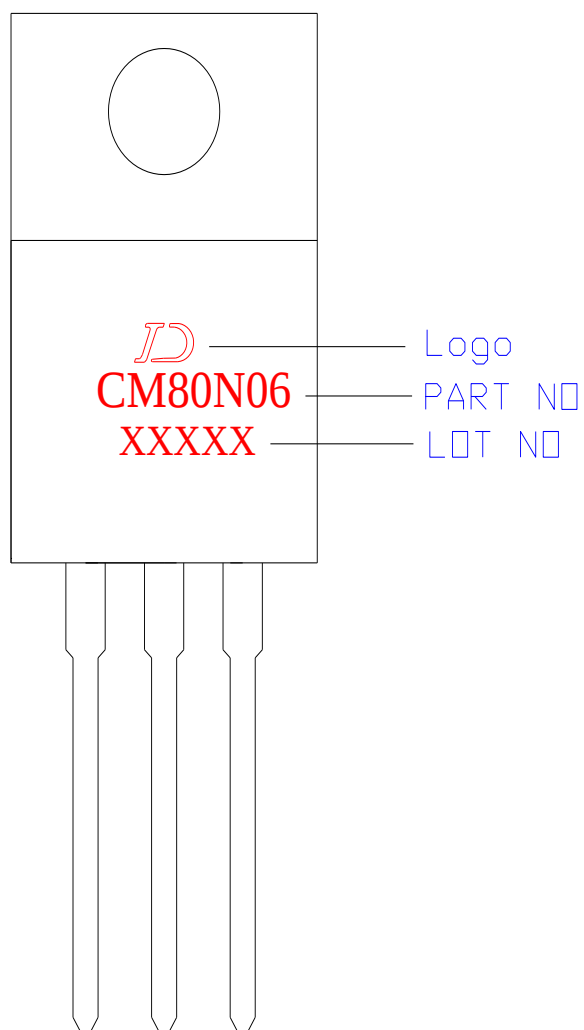


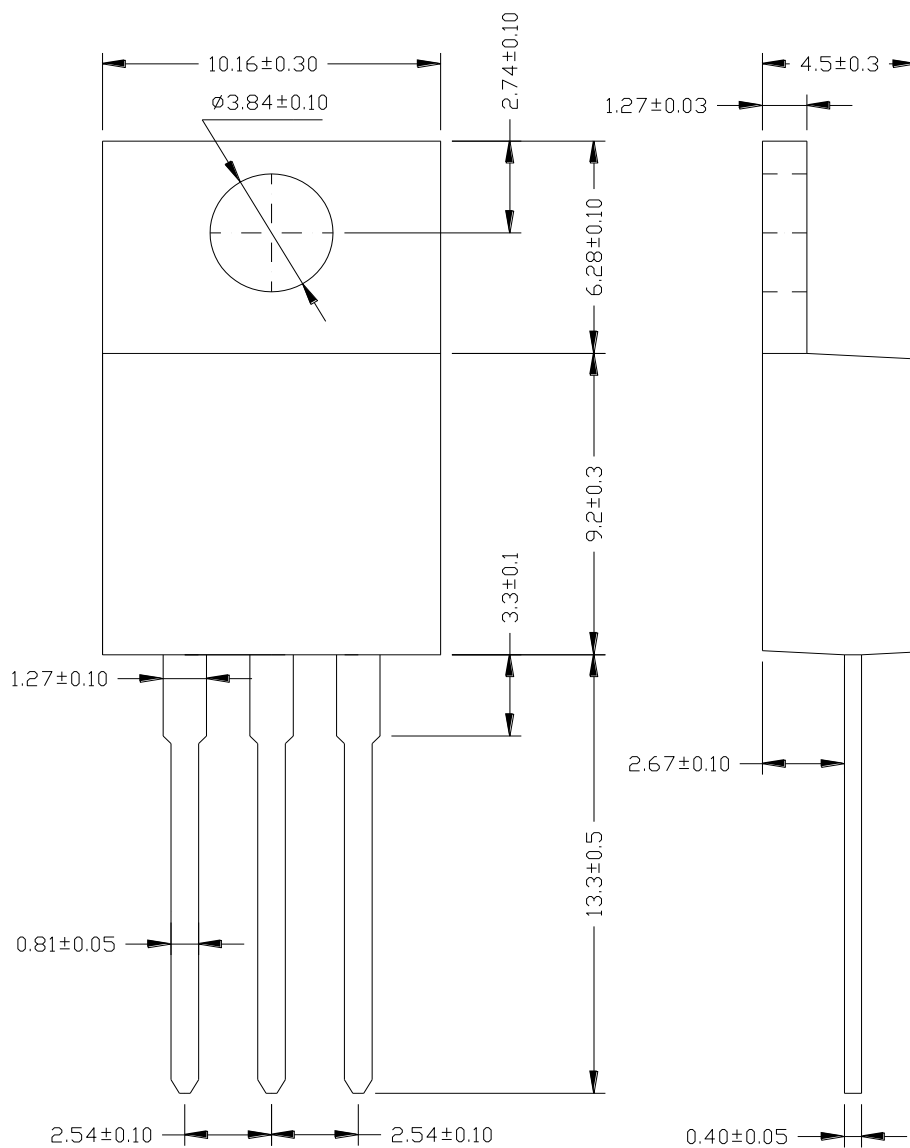
Figure21.Unclamped Inductive Switching Waveform

6. Marking(印章说明)



7. 产品外形尺寸图(单位: mm) Package Dimentions(Unit: mm)

TO-220



The name and content of poisonous and harmful material in products

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 maximum 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 maximum 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 necessary to protect the device from being damaged by the static electricity when using it.
4. This publication is made by Jingdao Electronic and subject to regular change without notice.