Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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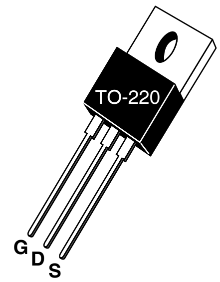
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

APT1204R7KFLL

1200V 3.5A 4.700Ω

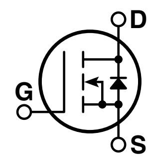
POWER PRODUCTS GROUP

POWER MOS 7® FREDFET



Power MOS 7® is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7® by significantly lowering $R_{DS(ON)}$ and Q_g. Power MOS 7® combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with Microsemi's patented metal gate structure.

- **Lower Input Capacitance**
- **Lower Miller Capacitance**
- **Lower Gate Charge, Qg**
- **Increased Power Dissipation**
- **Easier To Drive**
- **TO-220 Package**



MAXIMUM RATINGS

All Ratings: T_C = 25°C unless otherwise specified.

Symbol	Parameter	APT1204R7KFLL	UNIT
V_{DSS}	Drain-Source Voltage	1200	Volts
I_D	Continuous Drain Current @ T_C = 25°C	3.5	Amps
I_{DM}	Pulsed Drain Current ①	14	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ T_C = 25°C	135	Watts
	Linear Derating Factor	1.08	W/°C
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	300	
I_{AR}	Avalanche Current ① (Repetitive and Non-Repetitive)	3.5	Amps
E_{AR}	Repetitive Avalanche Energy ①	10	mJ
E_{AS}	Single Pulse Avalanche Energy ④	425	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250μA)	1200			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 1.75A)			4.70	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 1200V, V_{GS} = 0V)			250	μA
	Zero Gate Voltage Drain Current (V_{DS} = 960V, V_{GS} = 0V, T_C = 125°C)			1000	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±30V, V_{DS} = 0V)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1mA)	3		5	Volts

CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		715		pF
C_{oss}	Output Capacitance			130		
C_{rss}	Reverse Transfer Capacitance			36		
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 600V I_D = 3.5A @ 25°C		31		nC
Q_{gs}	Gate-Source Charge			4		
Q_{gd}	Gate-Drain ("Miller") Charge			21		
$t_{d(on)}$	Turn-on Delay Time	**RESISTIVE SWITCHING** V_{GS} = 15V V_{DD} = 600V I_D = 3.5A @ 25°C R_G = 1.6Ω		7		ns
t_r	Rise Time			2		
$t_{d(off)}$	Turn-off Delay Time			20		
t_f	Fall Time			24		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 25°C** V_{DD} = 800V, V_{GS} = 15V I_D = 3.5A, R_G = 5Ω		115		µJ
E_{off}	Turn-off Switching Energy			23		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 125°C** V_{DD} = 800V, V_{GS} = 15V I_D = 3.5A, R_G = 4.3Ω		135		
E_{off}	Turn-off Switching Energy			25		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				3.5	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				14	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = $-I_D$ 3.5A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time (I_S = $-I_D$ 3.5A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C			250	ns
		T_j = 125°C			515	
Q_{rr}	Reverse Recovery Charge (I_S = $-I_D$ 3.5A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		0.5		µC
		T_j = 125°C		1.1		
I_{RRM}	Peak Recovery Current (I_S = $-I_D$ 3.5A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		8.3		Amps
		T_j = 125°C		11.5		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.90	°C/W
$R_{\theta JA}$	Junction to Ambient			40	

① Repetitive Rating: Pulse width limited by maximum junction temperature
② Pulse Test: Pulse width < 380 µs, Duty Cycle < 2%
③ See MIL-STD-750 Method 3471
④ Starting T_j = +25°C, L = 69.39mH, R_G = 25Ω, Peak I_L = 3.5A
⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \le -I_D$3.5A $^{di}/_{dt} \le$ 700A/µs $V_R \le$ 1200 $T_J \le$ 150°C
⑥ Eon includes diode reverse recovery. See figures 18, 20.

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

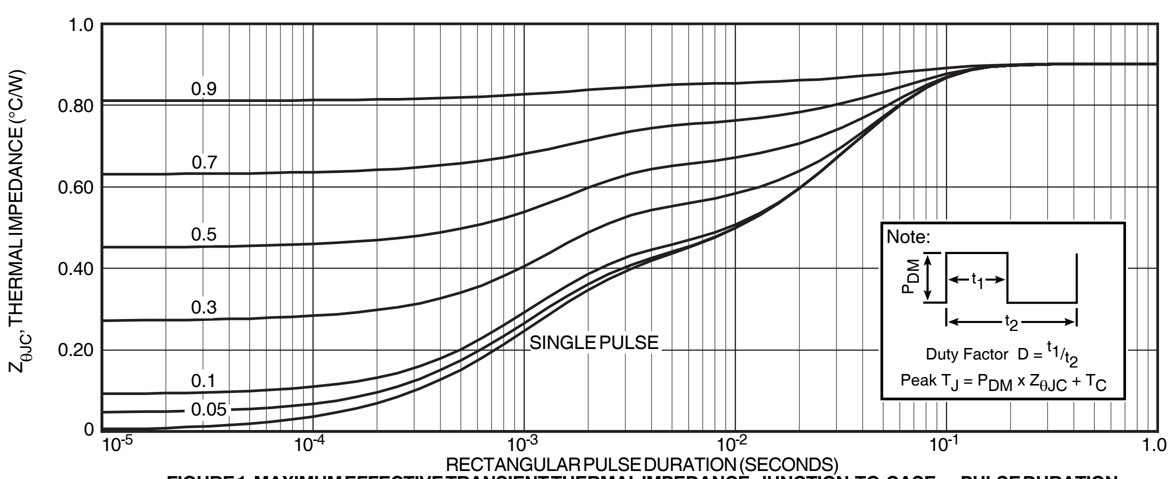


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

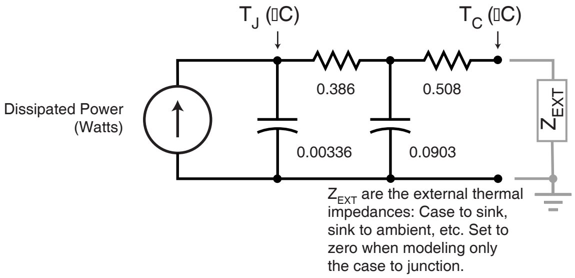


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

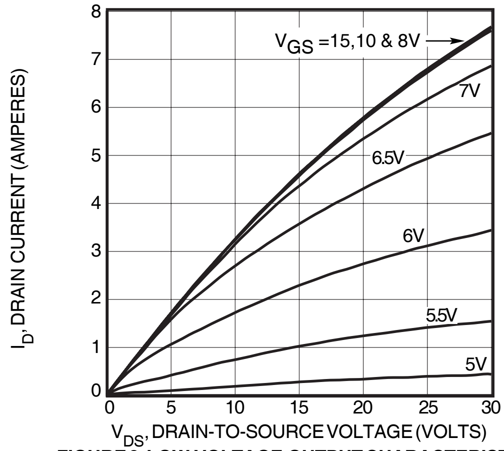


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

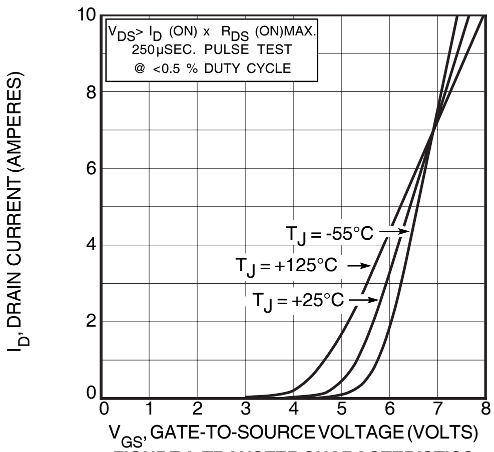


FIGURE 4, TRANSFER CHARACTERISTICS

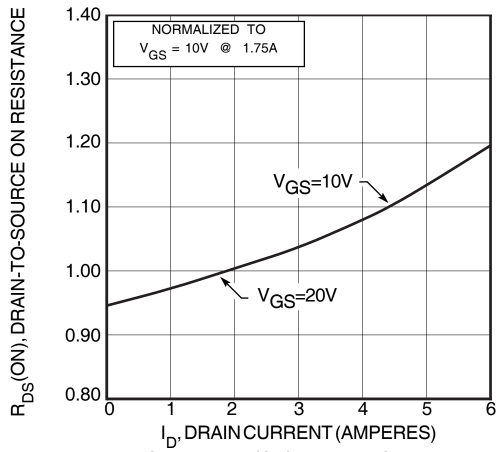


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

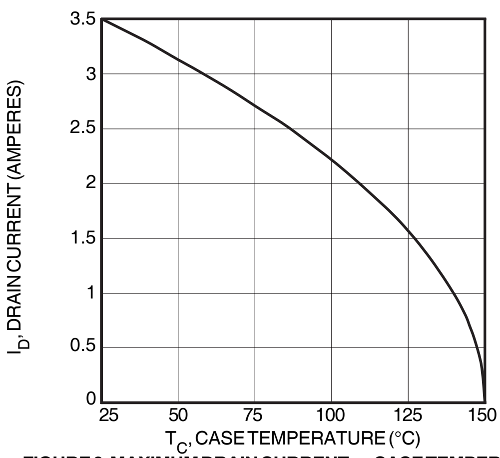


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

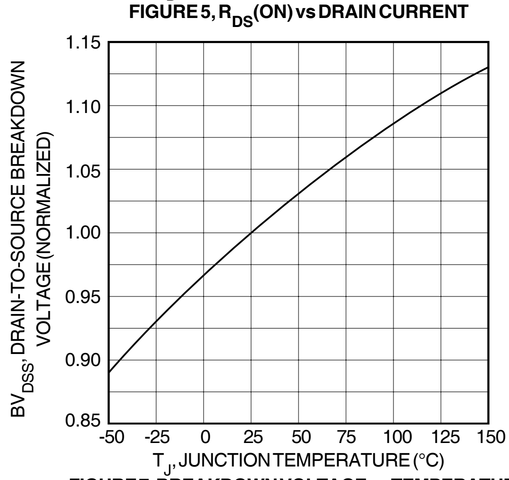


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

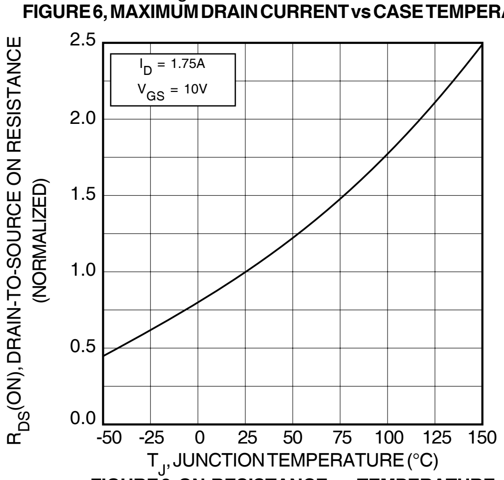


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

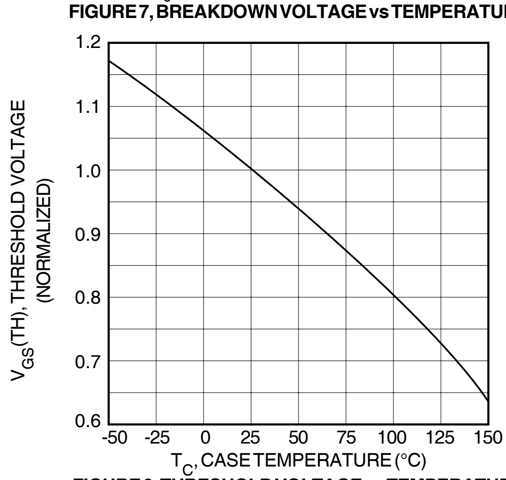


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

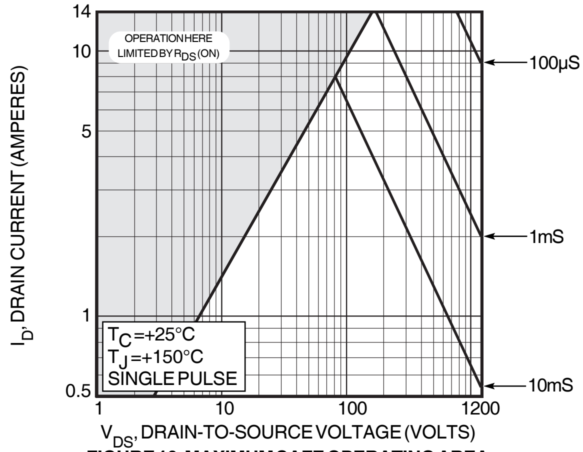


FIGURE 10, MAXIMUM SAFE OPERATING AREA

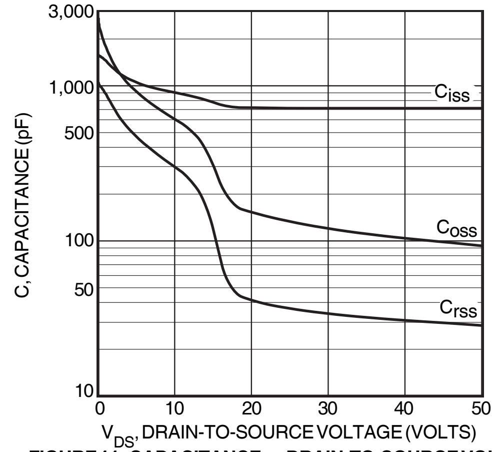


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

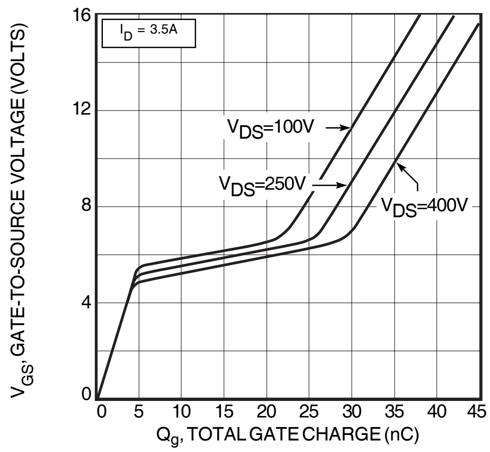


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

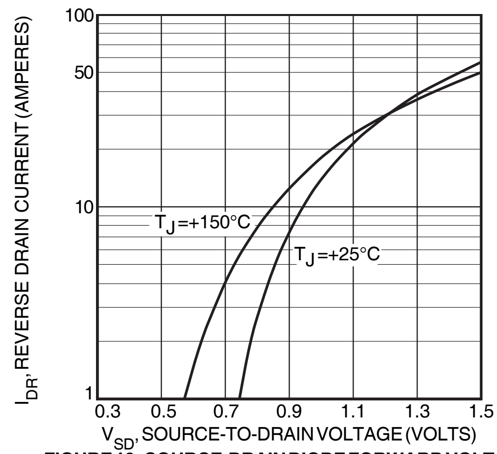


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

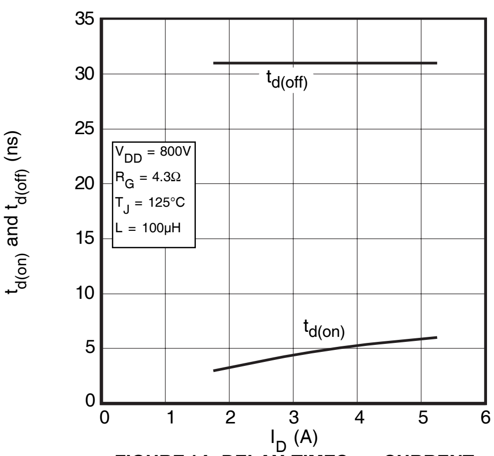


FIGURE 14, DELAY TIMES vs CURRENT

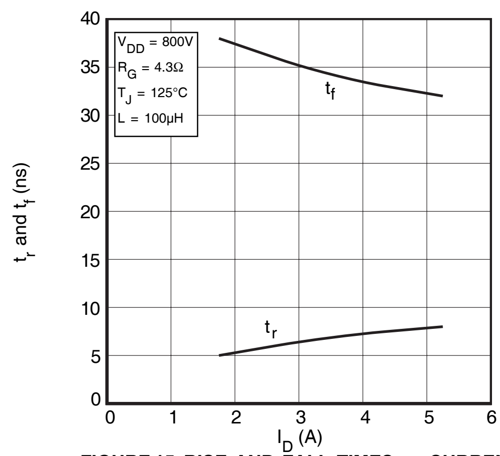


FIGURE 15, RISE AND FALL TIMES vs CURRENT

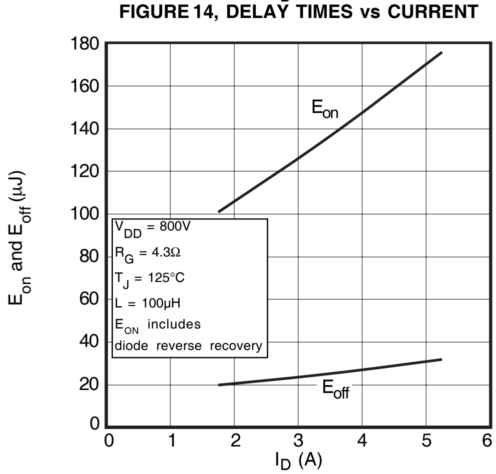


FIGURE 16, SWITCHING ENERGY vs CURRENT

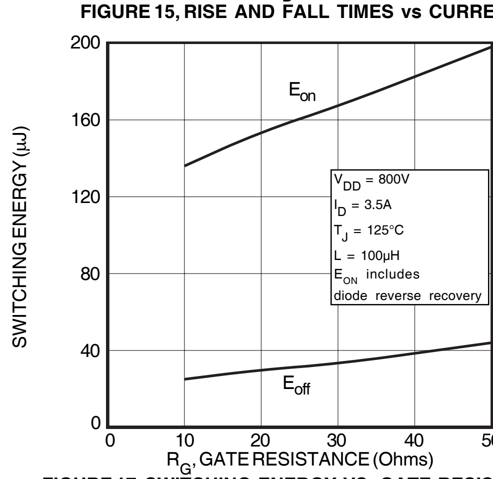


FIGURE 17, SWITCHING ENERGY VS. GATE RESISTANCE

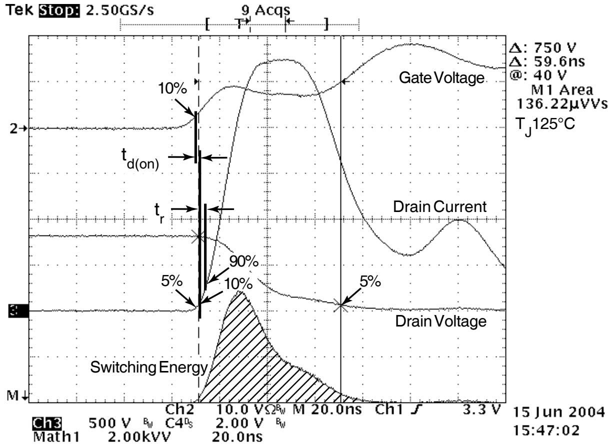


Figure 18, Turn-on Switching Waveforms and Definitions

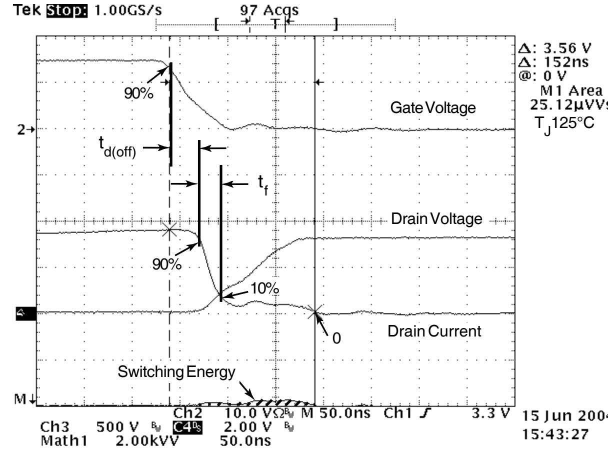


Figure 19, Turn-off Switching Waveforms and Definitions

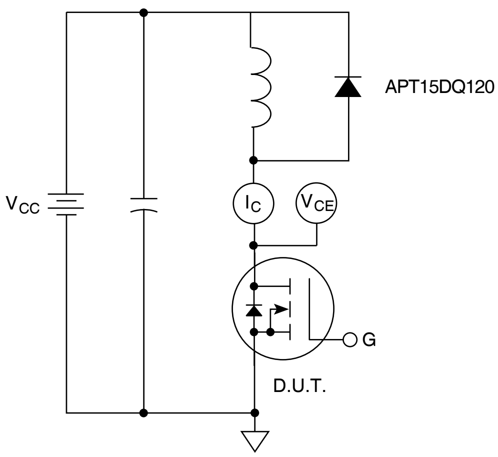
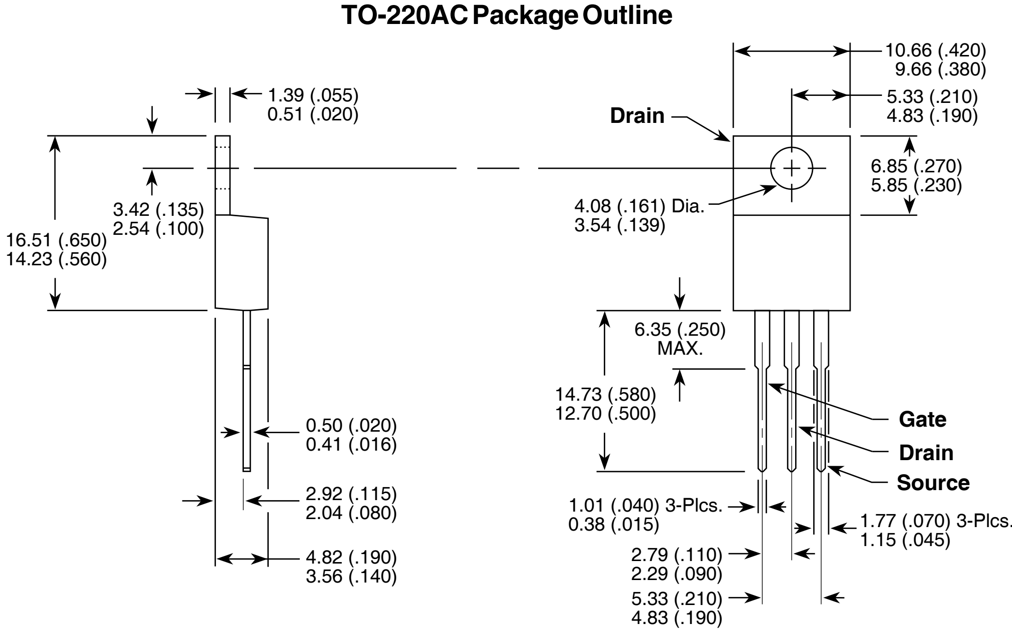


Figure 20, Inductive Switching Test Circuit

TO-220AC Package Outline



Dimensions in Millimeters and (Inches)