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.

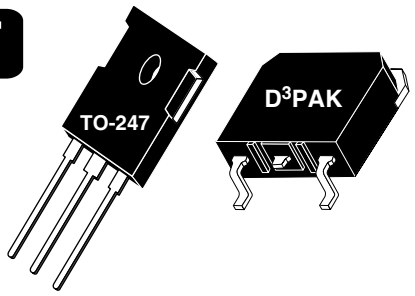
We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

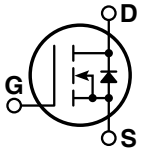
APT20N60BC3
APT20N60SC3
600V 20.7A 0.190Ω

Super Junction MOSFET



COOLMOS™ Power Semiconductors

- Ultra low $R_{DS(ON)}$
- Low Miller Capacitance
- Ultra Low Gate Charge, Q_g
- Avalanche Energy Rated
- TO-247 or Surface Mount D³PAK Package



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

Symbol	Parameter	APT17N80BC3_SC3	UNIT
V_{DSS}	Drain-Source Voltage	600	Volts
I_D	Continuous Drain Current @ T_C = 25°C	20.7	Amps
I_{DM}	Pulsed Drain Current ①	62	
V_{GS}	Gate-Source Voltage Continuous	±20	Volts
V_{GSM}	Gate-Source Voltage Transient	±30	
P_D	Total Power Dissipation @ T_C = 25°C	208	Watts
	Linear Derating Factor	1.67	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.	260	
dv/dt	Drain-Source Voltage slope (V_{DS} = 480V, I_D = 20.7A, T_J = 125°C)	50	V/ns
I_{AR}	Repetitive Avalanche Current ⑦	20	Amps
E_{AR}	Repetitive Avalanche Energy ⑦	1	mJ
E_{AS}	Single Pulse Avalanche Energy ④	690	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250µA)	600			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 13.1A)		0.16	0.19	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 600V, V_{GS} = 0V)		0.05	25	µA
	Zero Gate Voltage Drain Current (V_{DS} = 600V, V_{GS} = 0V, T_C = 150°C)			250	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1mA)	2.1	3	3.9	Volts

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

APT Website - http://www.advancedpower.com

"COOLMOS™ comprise a new family of transistors developed by Infineon Technologies AG. "COOLMOS" is a trademark of Infineon Technologies AG"

050-7145 Rev D 4-2004

DYNAMIC CHARACTERISTICS

APT20N60B_SC3

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		2440		pF
C_{oss}	Output Capacitance			860		
C_{rss}	Reverse Transfer Capacitance			50		
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 300V I_D = 20.7A @ 25°C		90	114	nC
Q_{gs}	Gate-Source Charge			13		
Q_{gd}	Gate-Drain ("Miller") Charge			45		
$t_{d(on)}$	Turn-on Delay Time	**RESISTIVE SWITCHING** V_{GS} = 15V V_{DD} = 380V I_D = 20.7A @ 25°C R_G = 3.6Ω		10		ns
t_r	Rise Time			5		
$t_{d(off)}$	Turn-off Delay Time			65		
t_f	Fall Time			5		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 25°C** V_{DD} = 400V, V_{GS} = 15V I_D = 20.7A, R_G = 5Ω		180		µJ
E_{off}	Turn-off Switching Energy			120		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 125°C** V_{DD} = 400V V_{GS} = 15V I_D = 20.7A, R_G = 5Ω		320		
E_{off}	Turn-off Switching Energy			135		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			20.7	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			62	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -20.7A)		1	1.2	Volts
t_{rr}	Reverse Recovery Time (I_S = -20.7A, dI_S/dt = 100A/µs, V_R = 480V)		500	800	ns
Q_{rr}	Reverse Recovery Charge (I_S = -20.7A, dI_S/dt = 100A/µs, V_R = 480V)		11		µC
dv/dt	Peak Diode Recovery dv/dt ⑤			6	V/ns

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.60	°C/W
$R_{\theta JA}$	Junction to Ambient			62	

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 = 13.80mH, R_G = 25Ω, Peak I_L = 10A

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_D 20.7A$ $di/dt \leq 700A/\mu s$ $V_R \leq V_{DSS}$ $T_J \leq 150°C$

⑥ Eon includes diode reverse recovery. See figures 18, 20.

⑦ Repetitve avalanche causes additional power losses that can be calculated as $P_{AV}=E_{AR}*f$

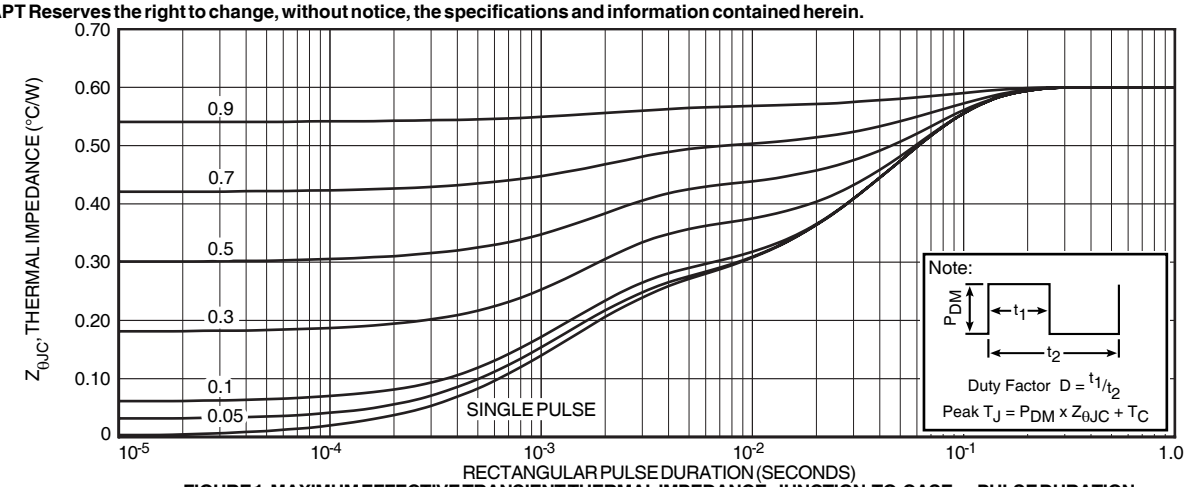


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

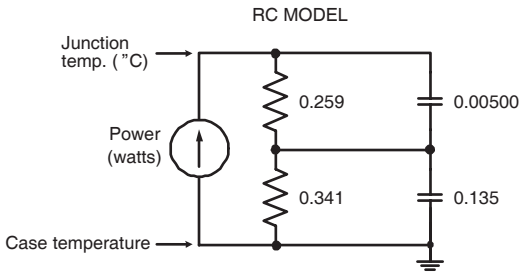


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

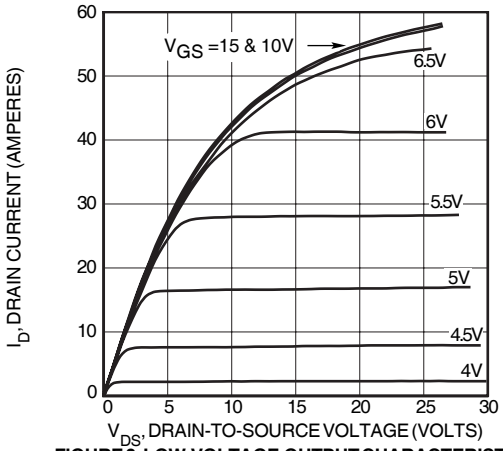


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

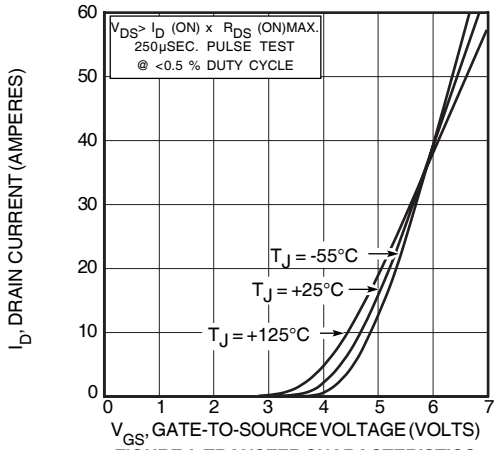


FIGURE 4, TRANSFER CHARACTERISTICS

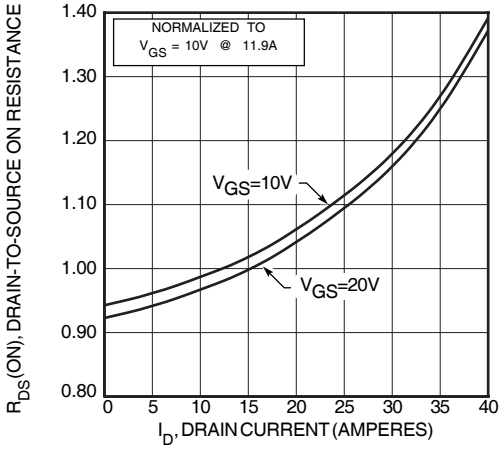


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

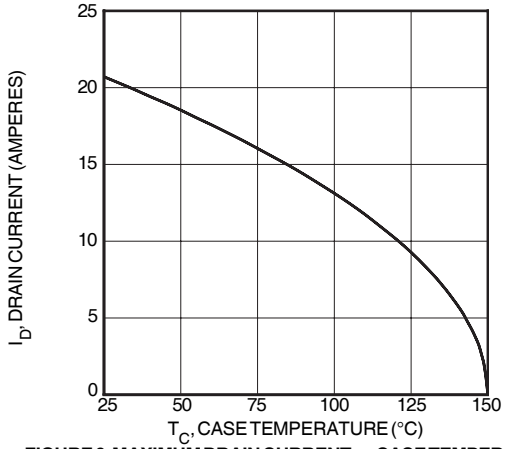


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

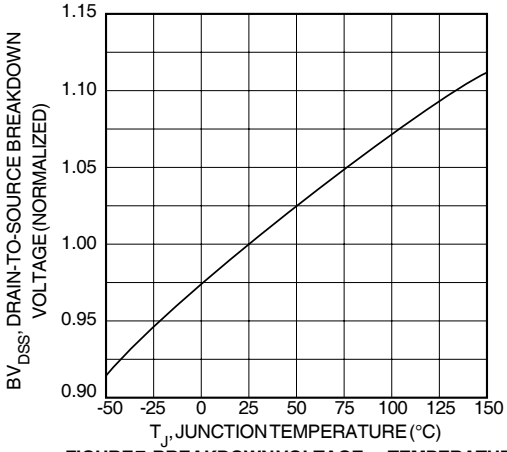


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

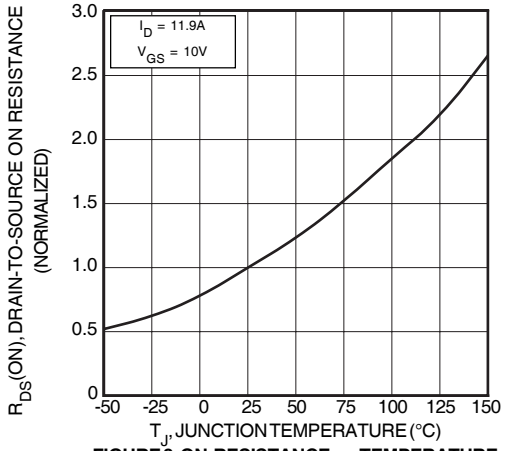


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

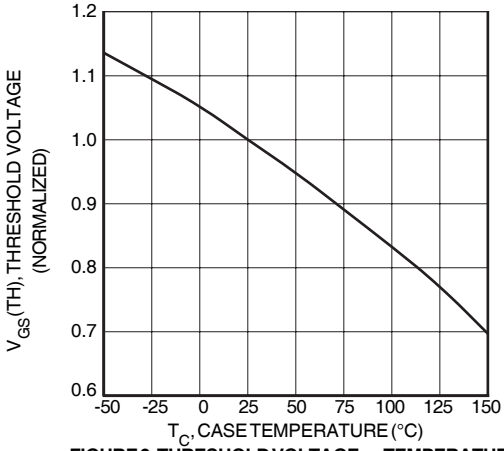


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

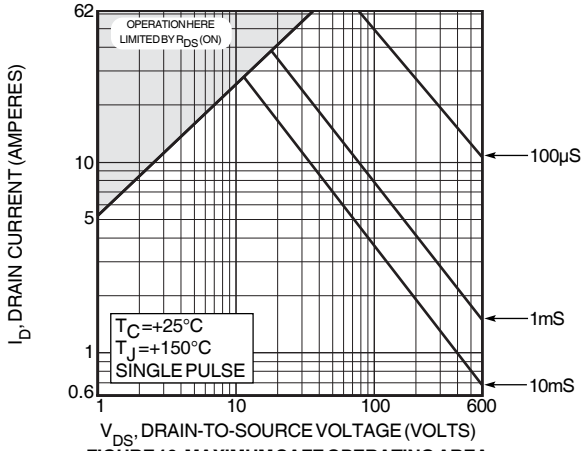


FIGURE 10, MAXIMUM SAFE OPERATING AREA

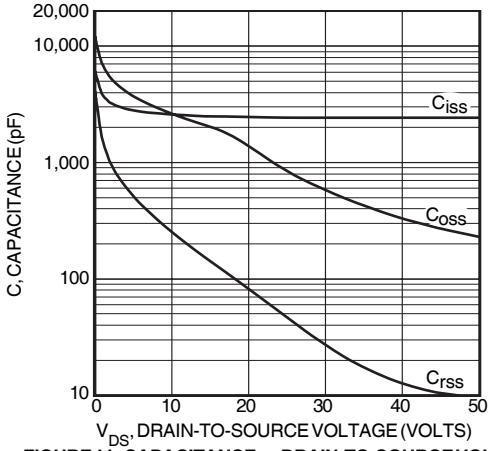


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

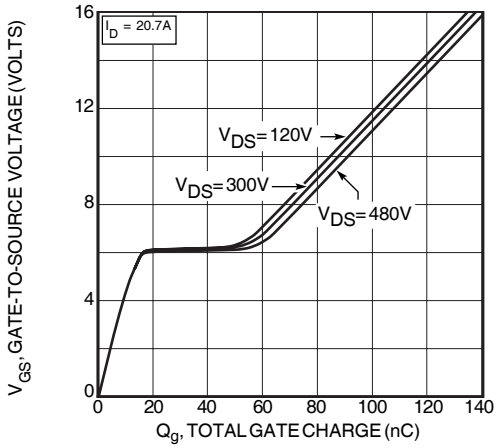


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

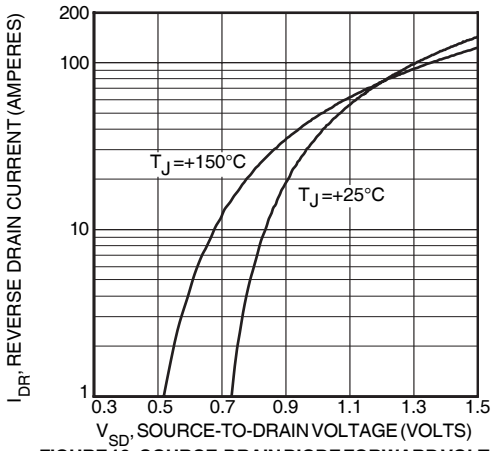


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

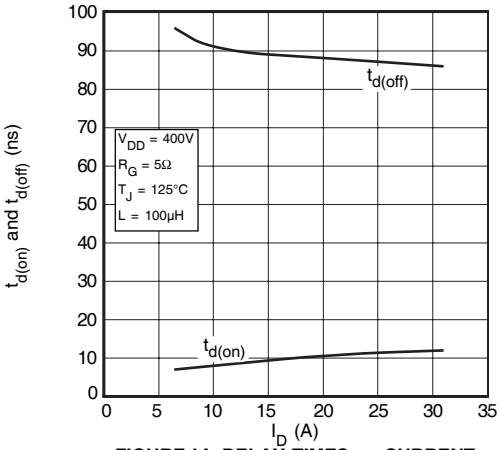


FIGURE 14, DELAY TIMES vs CURRENT

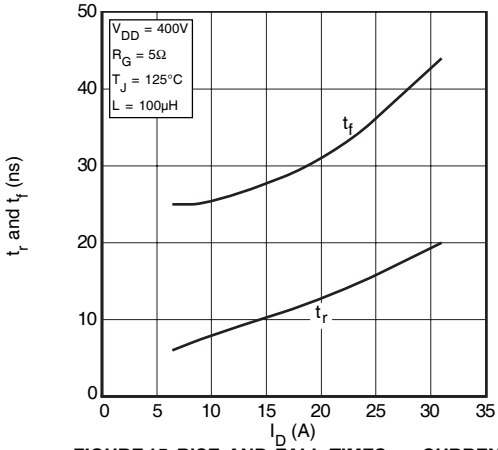


FIGURE 15, RISE AND FALL TIMES vs CURRENT

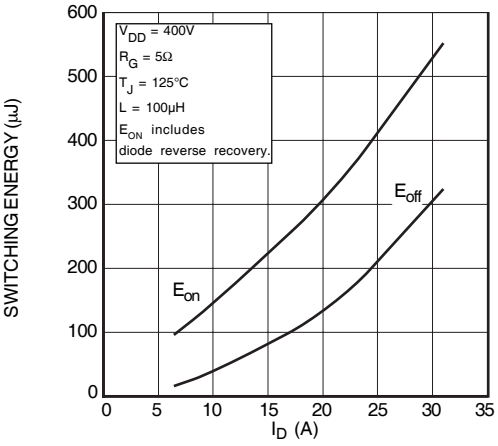


FIGURE 16, SWITCHING ENERGY vs CURRENT

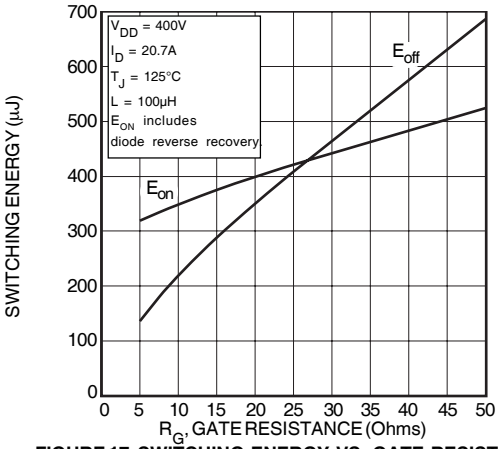


FIGURE 17, SWITCHING ENERGY VS. GATE RESISTANCE

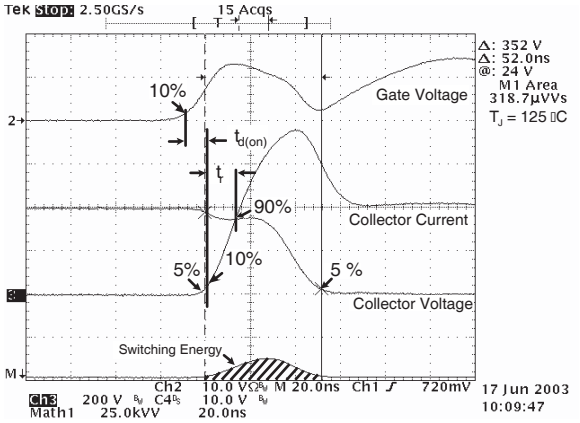


Figure 18, Turn-on Switching Waveforms and Definitions

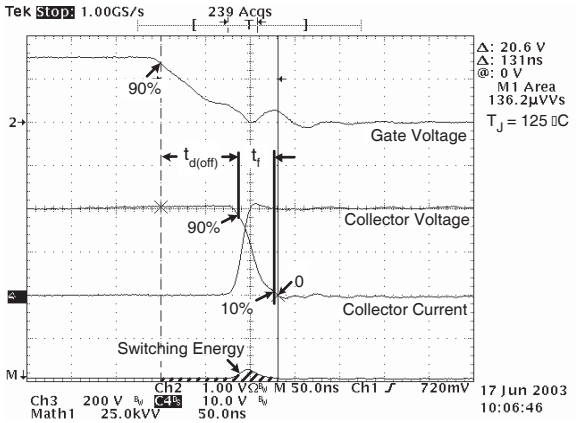


Figure 19, Turn-off Switching Waveforms and Definitions

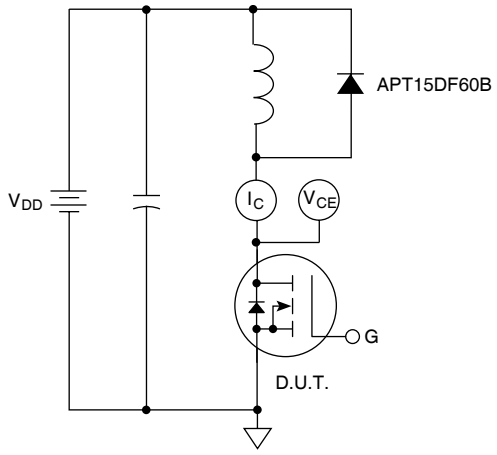
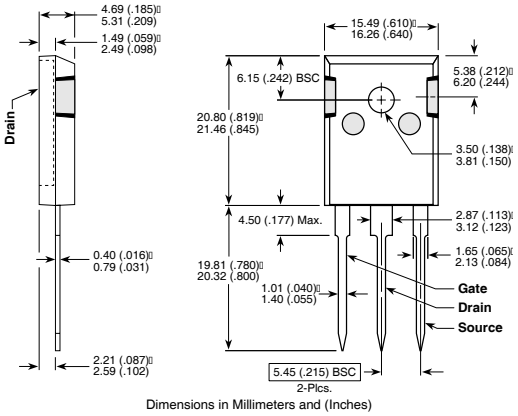


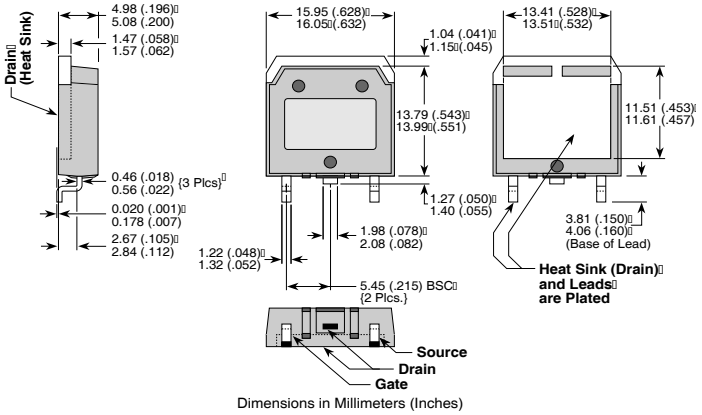
Figure 20, Inductive Switching Test Circuit

TO-247 Package Outline



Dimensions in Millimeters and (Inches)

D³PAK Package Outline



Dimensions in Millimeters (Inches)