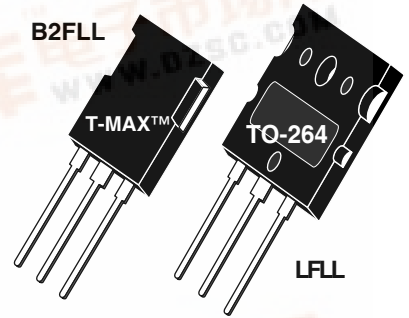




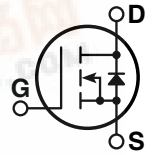
APT12057B2FLL
APT12057LFLL
1200V 22A 0.570Ω

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 APT's patented metal gate structure.



- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge, Q_g
- Increased Power Dissipation
- Easier To Drive
- Popular T-MAX[™] or TO-264 Package
- **FAST RECOVERY BODY DIODE**



MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	APT12057B2FLL_LFLL	UNIT
V_{DSS}	Drain-Source Voltage	1200	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	22	Amps
I_{DM}	Pulsed Drain Current ^①	88	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	690	Watts
	Linear Derating Factor	5.52	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)	22	Amps
E_{AR}	Repetitive Avalanche Energy ^①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ^④	3000	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu A$)	1200			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, I_D = 11A$)			0.570	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 1200V, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 960V, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 2.5mA$)	3		5	Volts

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

DYNAMIC CHARACTERISTICS

APT12057 B2FLL_LFLL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1 MHz		5155		pF
C _{oss}	Output Capacitance			770		
C _{rss}	Reverse Transfer Capacitance			130		
Q _g	Total Gate Charge ③	V _{GS} = 10V V _{DD} = 600V I _D = 22A @ 25°C		185		nC
Q _{gs}	Gate-Source Charge			24		
Q _{gd}	Gate-Drain ("Miller") Charge			120		
t _{d(on)}	Turn-on Delay Time	RESISTIVE SWITCHING V _{GS} = 15V V _{DD} = 600V I _D = 22A @ 25°C R _G = 0.6Ω		11		ns
t _r	Rise Time			20		
t _{d(off)}	Turn-off Delay Time			36		
t _f	Fall Time			21		
E _{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 25°C V _{DD} = 800V, V _{GS} = 15V I _D = 22A, R _G = 5Ω		865		μJ
E _{off}	Turn-off Switching Energy			420		
E _{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 125°C V _{DD} = 800V, V _{GS} = 15V I _D = 22A, R _G = 5Ω		1390		
E _{off}	Turn-off Switching Energy			530		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

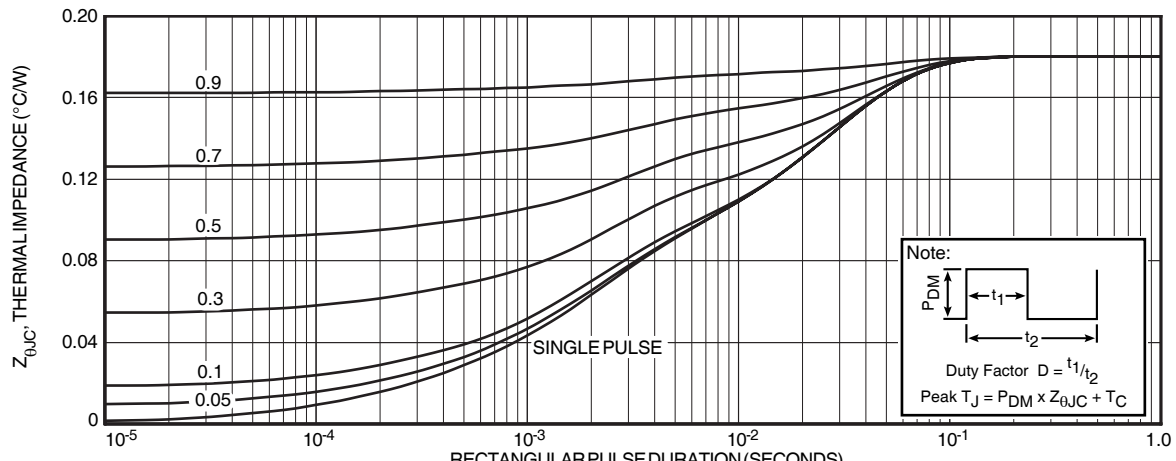
Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I _S	Continuous Source Current (Body Diode)			22	Amps
I _{SM}	Pulsed Source Current ① (Body Diode)			88	
V _{SD}	Diode Forward Voltage ② (V _{GS} = 0V, I _S = -22A)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⑤			18	V/ns
t _{rr}	Reverse Recovery Time (I _S = -22A, di/dt = 100A/μs)	T _J = 25°C		320	ns
		T _J = 125°C		650	
Q _{rr}	Reverse Recovery Charge (I _S = -22A, di/dt = 100A/μs)	T _J = 25°C		18	μC
		T _J = 125°C		7	
I _{RRM}	Peak Recovery Current (I _S = -22A, di/dt = 100A/μs)	T _J = 25°C		28	Amps
		T _J = 125°C		220	

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
R _{θJC}	Junction to Case			0.18	°C/W
R _{θJA}	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 = 12.39mH, R_G = 25Ω, Peak I_L = 22A
- ⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. I_S ≤ -22A di/dt ≤ 700A/μs V_R ≤ 1200 T_J ≤ 150°C
- ⑥ Eon includes diode reverse recovery. See figures 18, 20.

APT Reserves the right to change, without notice, the specifications and information contained herein.



Typical Performance Curves

APT12057 B2FLL_LFLL

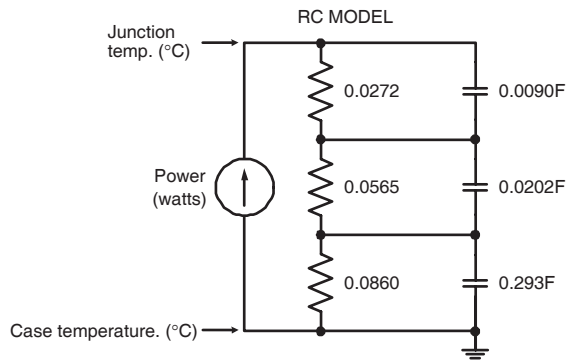


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

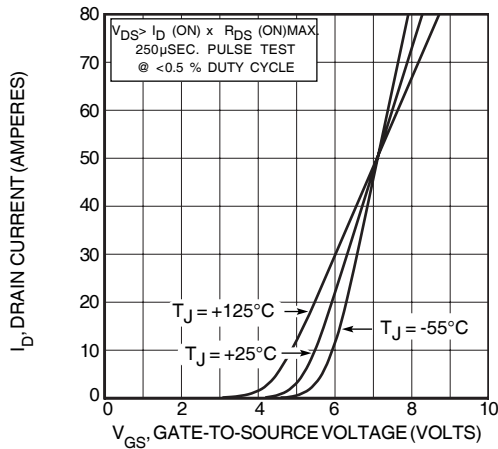


FIGURE 4, TRANSFER CHARACTERISTICS

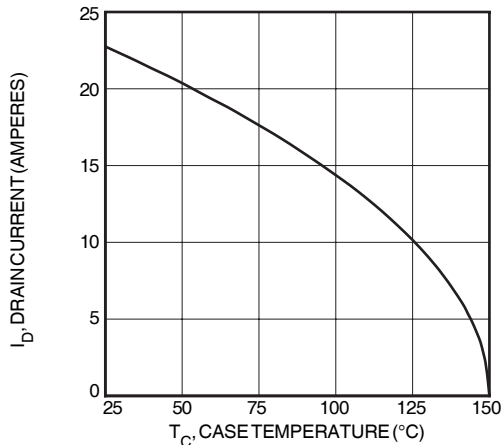


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

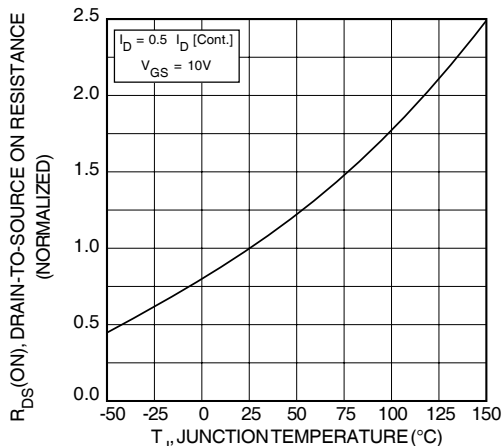


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

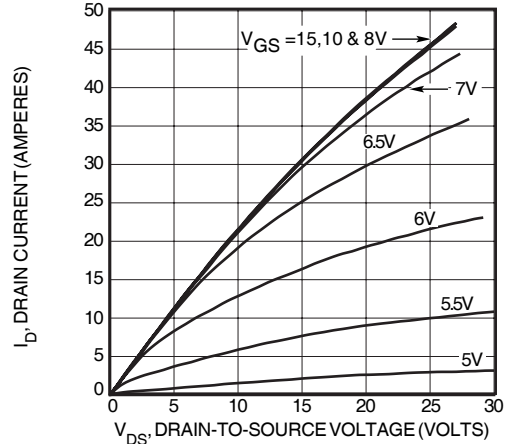


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

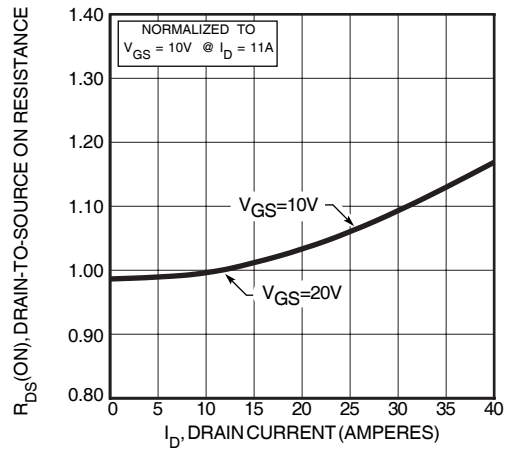


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

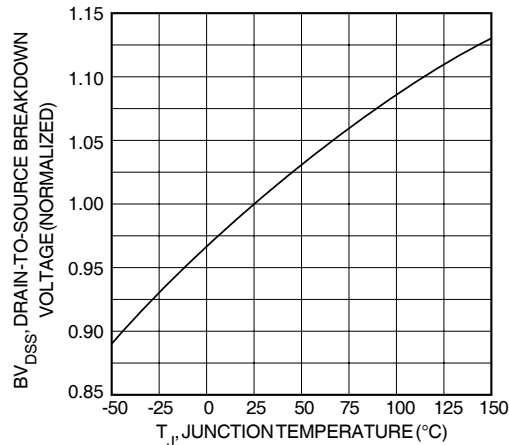


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

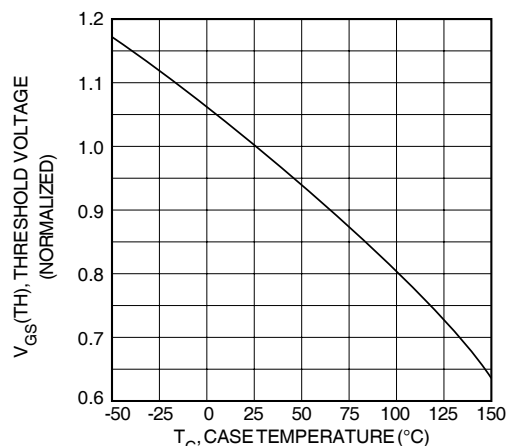


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

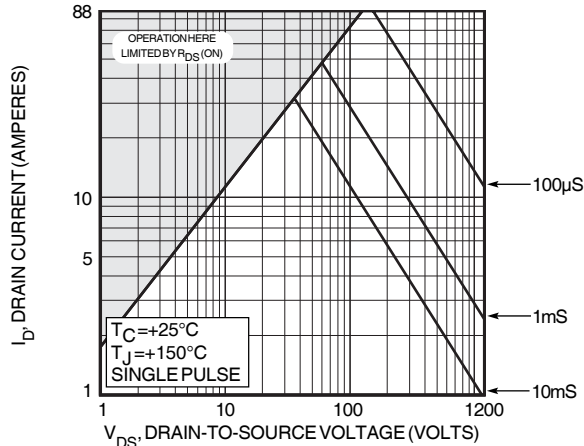


FIGURE 10, MAXIMUM SAFE OPERATING AREA

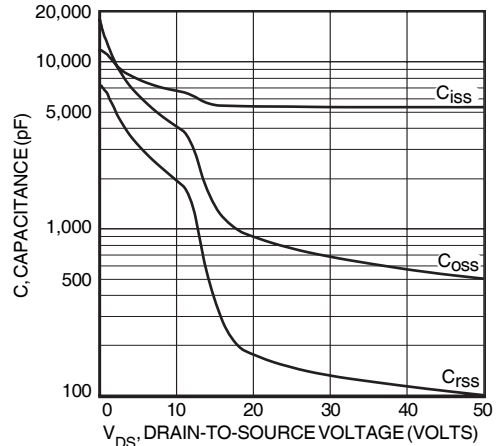


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

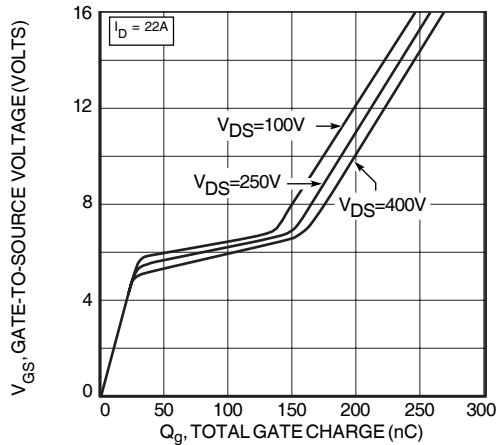


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

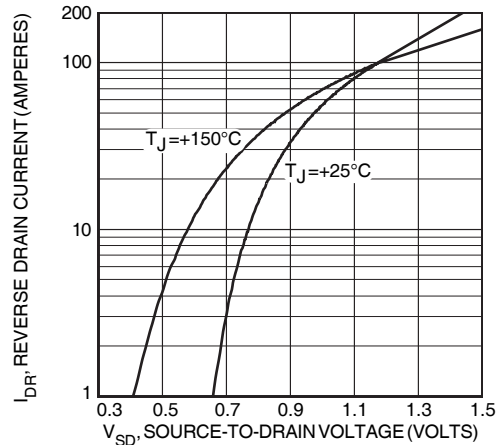


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

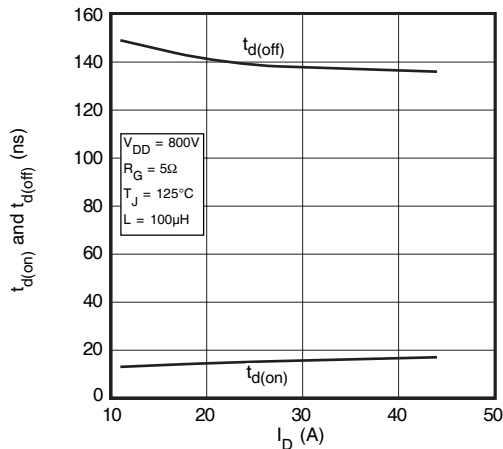


FIGURE 14, DELAY TIMES vs CURRENT

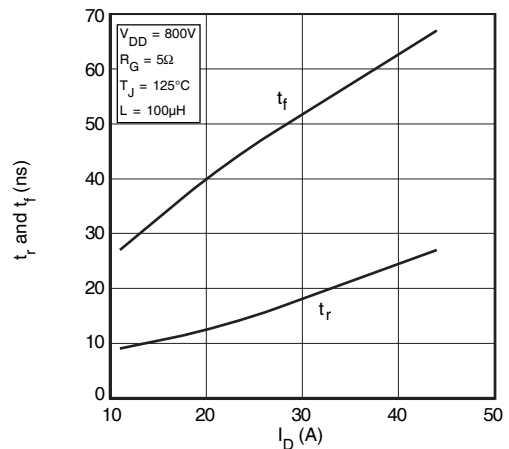


FIGURE 15, RISE AND FALL TIMES vs CURRENT

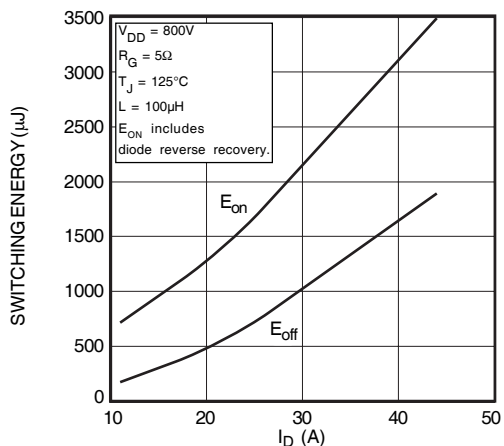


FIGURE 16, SWITCHING ENERGY vs CURRENT

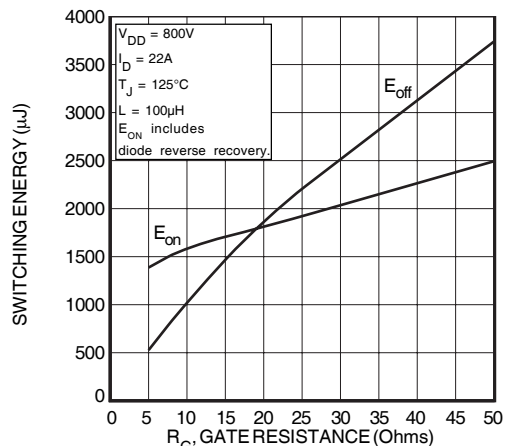


FIGURE 17, SWITCHING ENERGY vs. GATE RESISTANCE

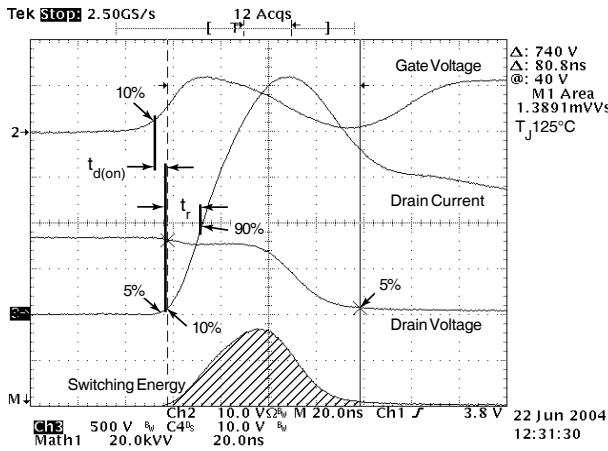


Figure 18, Turn-on Switching Waveforms and Definitions

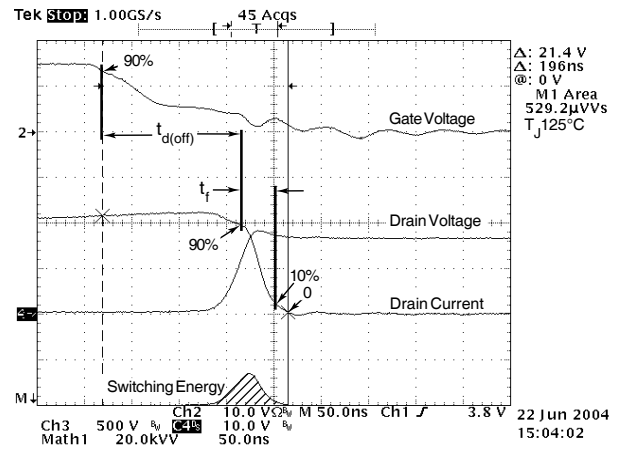


Figure 19, Turn-off Switching Waveforms and Definitions

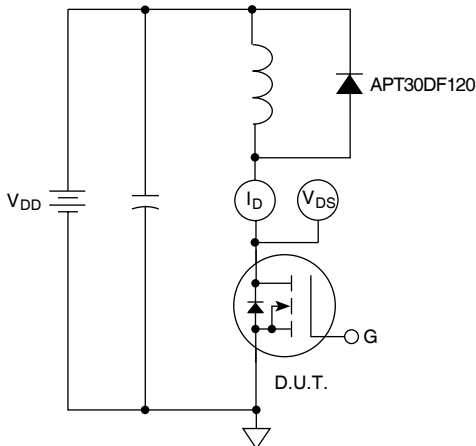
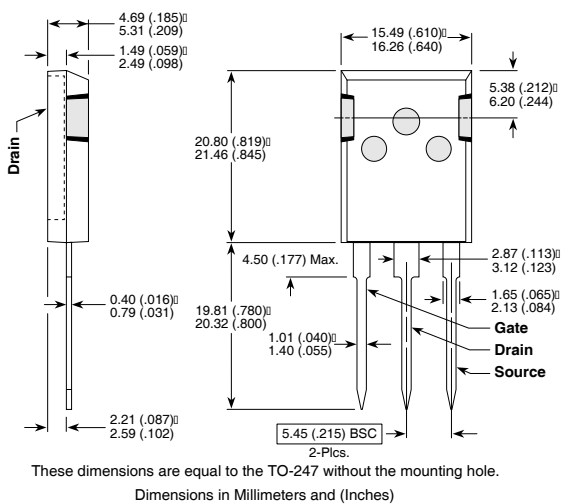


Figure 20, Inductive Switching Test Circuit

T-MAX™ (B2) Package Outline



TO-264 (L) Package Outline

