DYNAMIC CHARACTERISTICS

APT10078BFLL_SFLL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		2525		pF
C_{oss}	Output Capacitance			430		
C_{rss}	Reverse Transfer Capacitance			75		
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 500V I_D = 14A @ 25°C		95		nC
Q_{gs}	Gate-Source Charge			12		
Q_{gd}	Gate-Drain ("Miller") Charge			60		
$t_{d(on)}$	Turn-on Delay Time	**RESISTIVE SWITCHING** V_{GS} = 15V V_{DD} = 500V I_D = 14A @ 25°C R_G = 1.6Ω		9		ns
t_r	Rise Time			8		
$t_{d(off)}$	Turn-off Delay Time			30		
t_f	Fall Time			9		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 25°C** V_{DD} = 667V V_{GS} = 15V I_D = 14A, R_G = 3Ω		355		µJ
E_{off}	Turn-off Switching Energy			75		
E_{on}	Turn-on Switching Energy ⑥	**INDUCTIVE SWITCHING @ 125°C** V_{DD} = 667V V_{GS} = 15V I_D = 14A, R_G = 3Ω		740		
E_{off}	Turn-off Switching Energy			95		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				14	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				56	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = I_D -14A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time (I_S = I_D -14A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C			210	ns
		T_j = 125°C			710	
Q_{rr}	Reverse Recovery Charge (I_S = I_D -14A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		1.0		µC
		T_j = 125°C		3.6		
I_{RRM}	Peak Recovery Current (I_S = I_D -14A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		9.8		Amps
		T_j = 125°C		14		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.31	°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 = 13.27mH, R_G = 25Ω, Peak I_L = 14A

⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \le I_D$-14A $^{di}/_{dt} \le$ 700A/µs $V_R \le$ 1000 $T_J \le$ 150°C

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

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

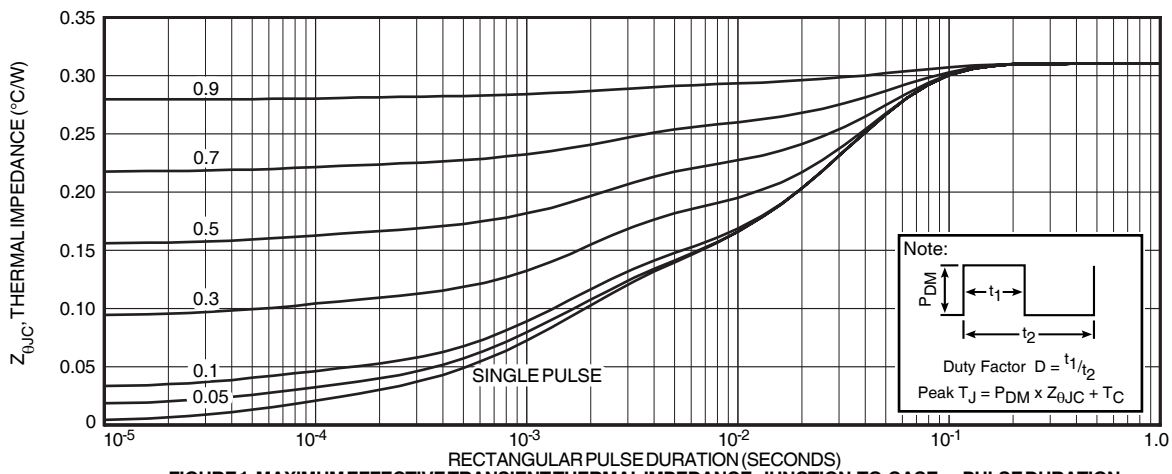


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

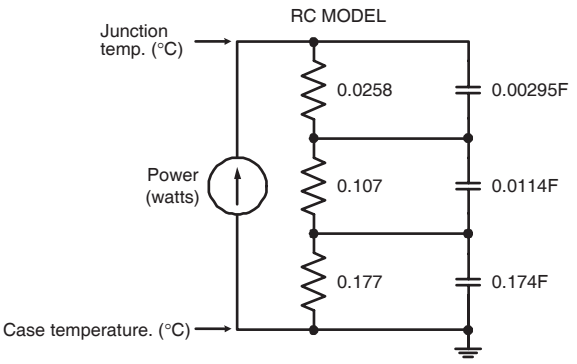


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

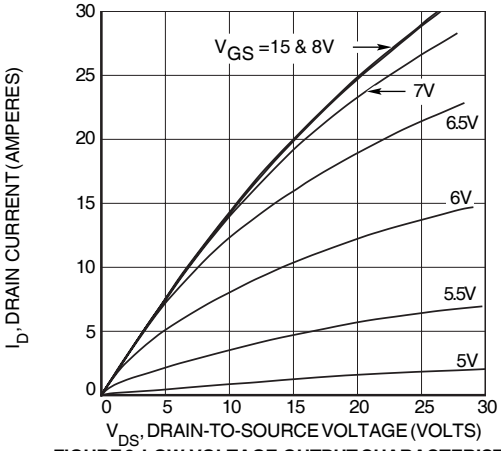


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

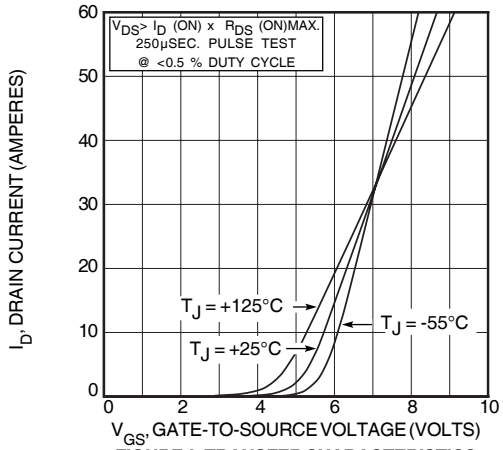


FIGURE 4, TRANSFER CHARACTERISTICS

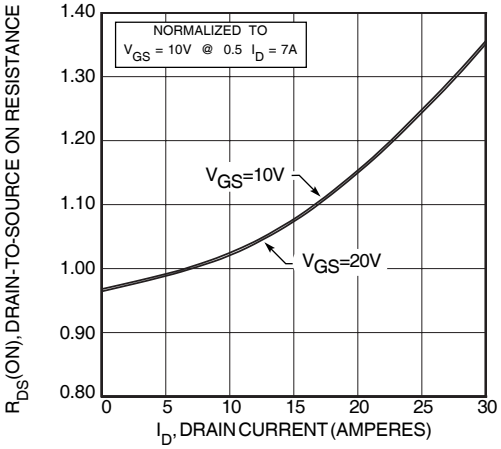


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

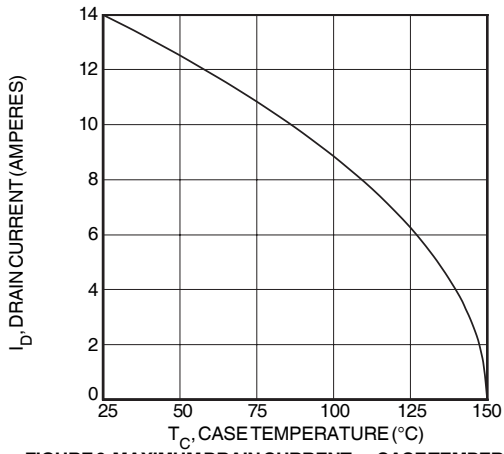


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

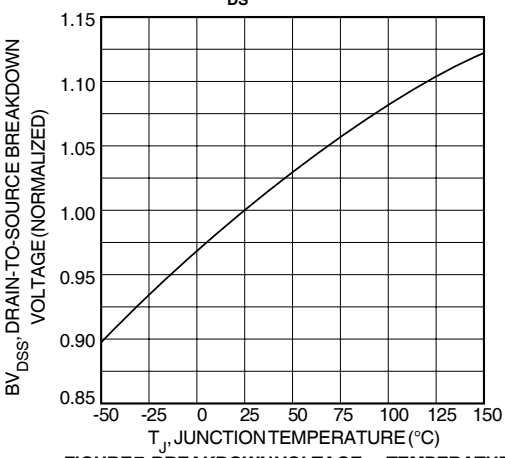


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

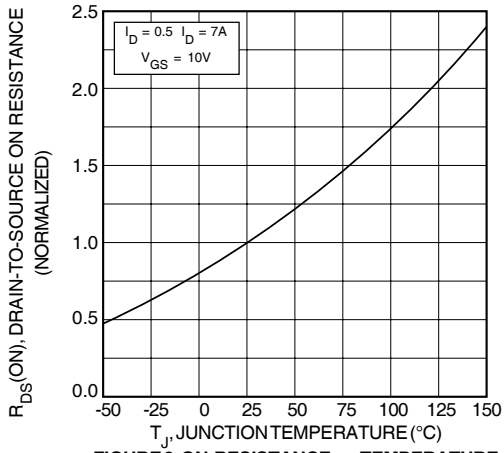


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

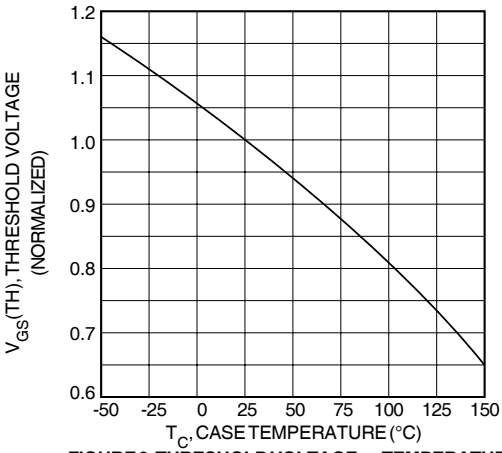


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

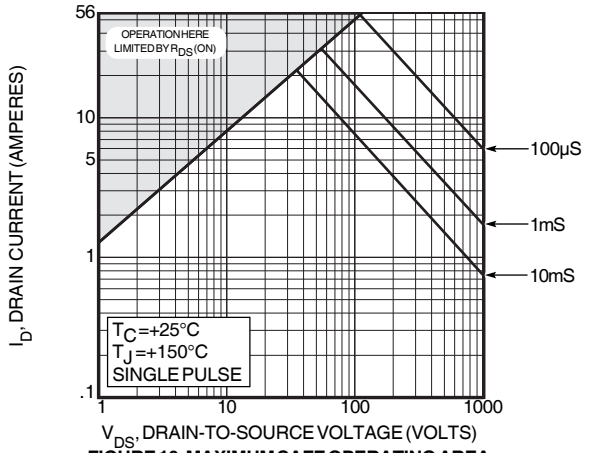


FIGURE 10, MAXIMUM SAFE OPERATING AREA

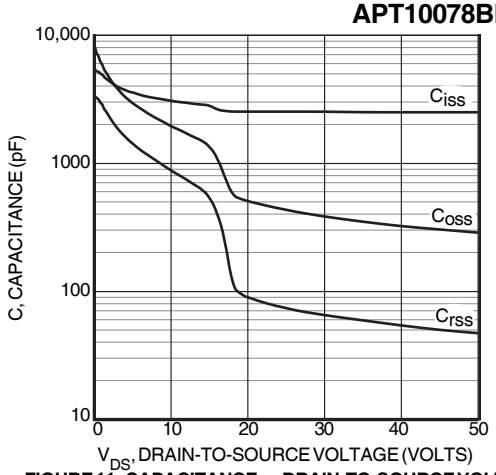


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

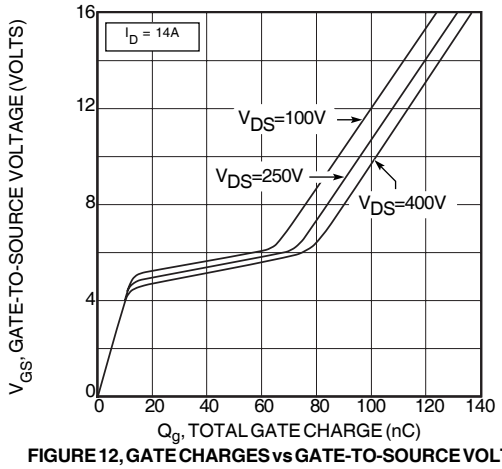


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

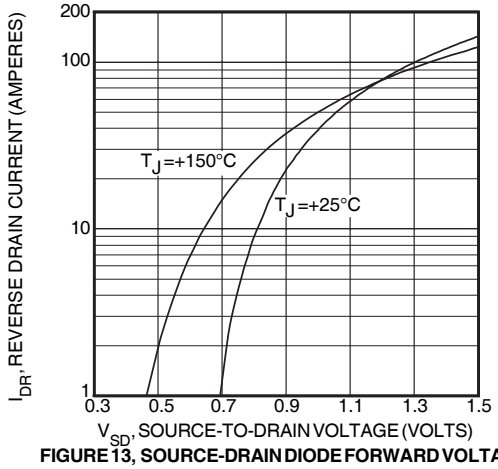


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

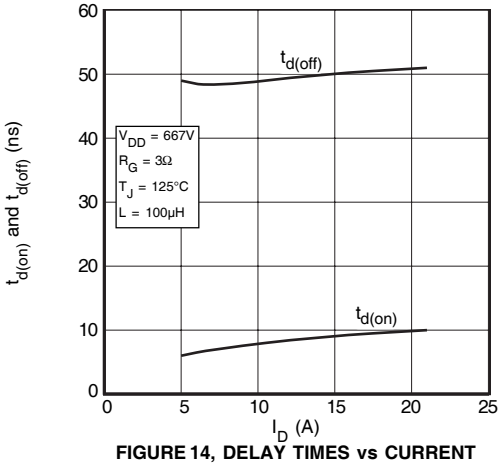


FIGURE 14, DELAY TIMES vs CURRENT

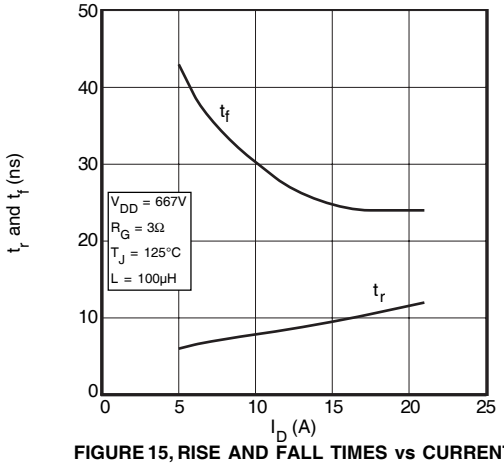


FIGURE 15, RISE AND FALL TIMES vs CURRENT

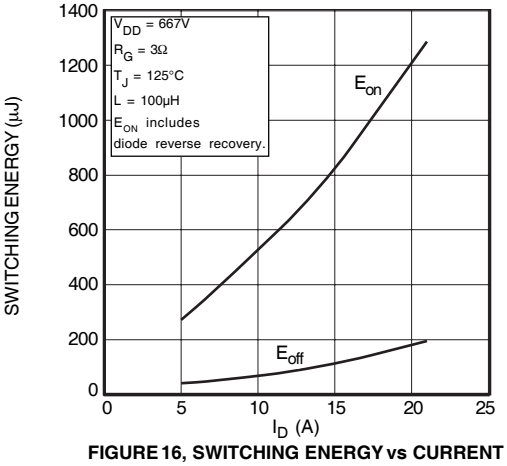


FIGURE 16, SWITCHING ENERGY vs CURRENT

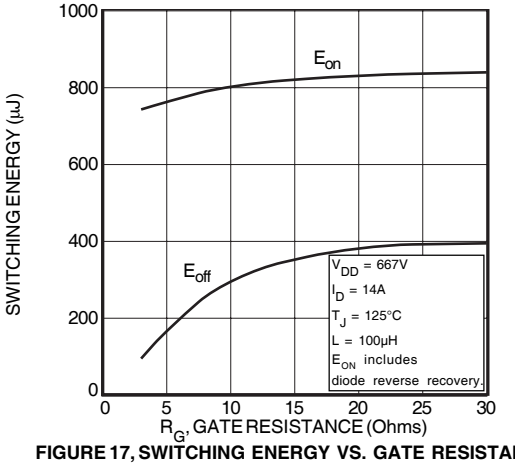


FIGURE 17, SWITCHING ENERGY VS. GATE RESISTANCE

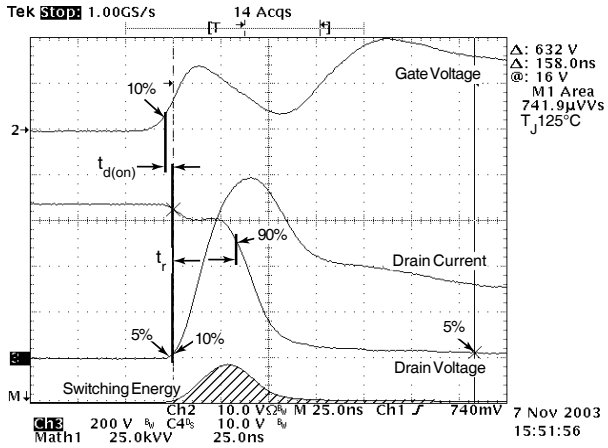


Figure 18, Turn-on Switching Waveforms and Definitions

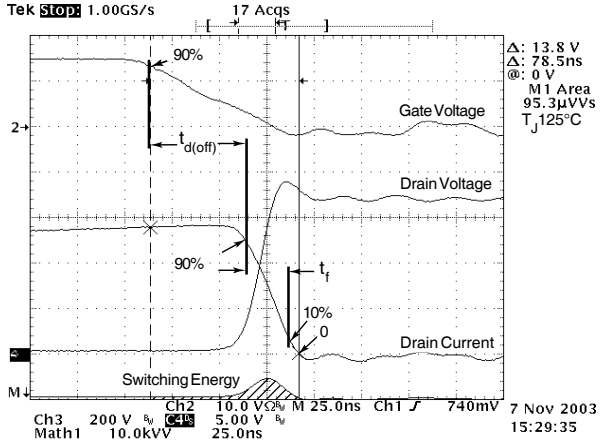


Figure 19, Turn-off Switching Waveforms and Definitions

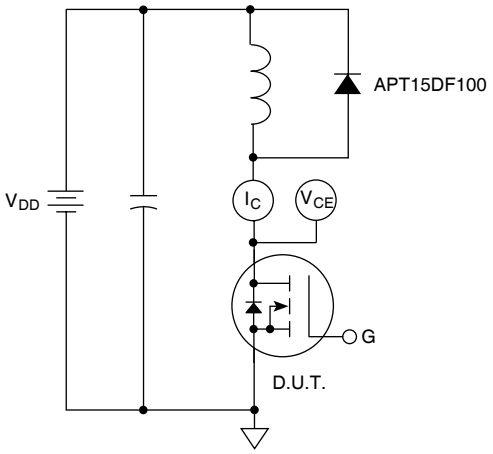
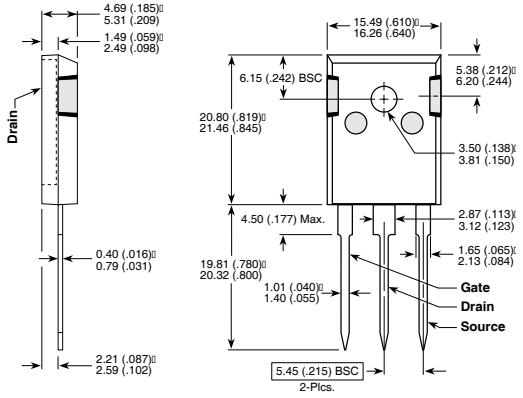


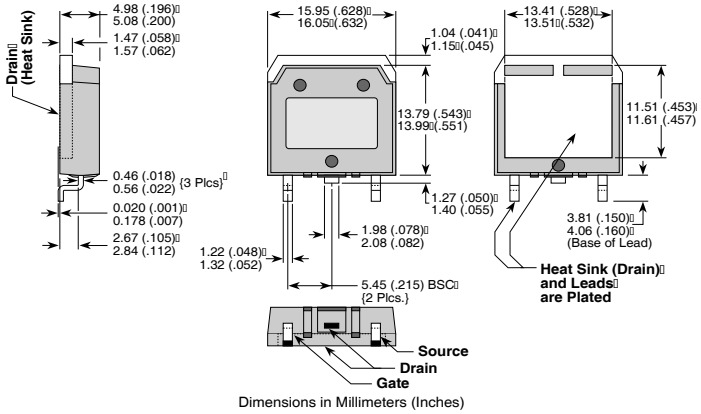
Figure 20, Inductive Switching Test Circuit

TO-247 Package Outline



Dimensions in Millimeters and (Inches)

D³PAK Package Outline



Dimensions in Millimeters (Inches)

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