

DYNAMIC CHARACTERISTICS

APT5010JFLL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		4360		pF
C_{oss}	Output Capacitance			895		
C_{rss}	Reverse Transfer Capacitance			60		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 300V$ $I_D = 41A @ 25^\circ C$		95		nC
Q_{gs}	Gate-Source Charge			24		
Q_{gd}	Gate-Drain ("Miller") Charge			50		
$t_{d(on)}$	Turn-on Delay Time	RESISTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 300V$ $I_D = 41A @ 25^\circ C$ $R_G = 0.6\Omega$		11		ns
t_r	Rise Time			13		
$t_{d(off)}$	Turn-off Delay Time			25		
t_f	Fall Time			3		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 333V, V_{GS} = 15V$ $I_D = 41A, R_G = 5\Omega$		485		μJ
E_{off}	Turn-off Switching Energy			455		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 333V, V_{GS} = 15V$ $I_D = 41A, R_G = 5\Omega$		755		
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)			41	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			164	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -41A$)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⑤			15	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -41A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$		280	ns
		$T_J = 125^\circ C$		600	
Q_{rr}	Reverse Recovery Charge ($I_S = -41A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	2.28		μC
		$T_J = 125^\circ C$	6.41		
I_{RRM}	Peak Recovery Current ($I_S = -41A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	15.7		Amps
		$T_J = 125^\circ C$	23.6		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.33	$^\circ C/W$
$R_{\theta JA}$	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 $T_J = +25^\circ C$, $L = 1.65mH$, $R_G = 25\Omega$, Peak $I_L = 41A$

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_{D41A}$ $di/dt \leq 700A/\mu s$ $V_R \leq V_{DSS}$ $T_J \leq 150^\circ C$

⑥ E_{on} includes diode reverse recovery. See figures 18, 20.

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

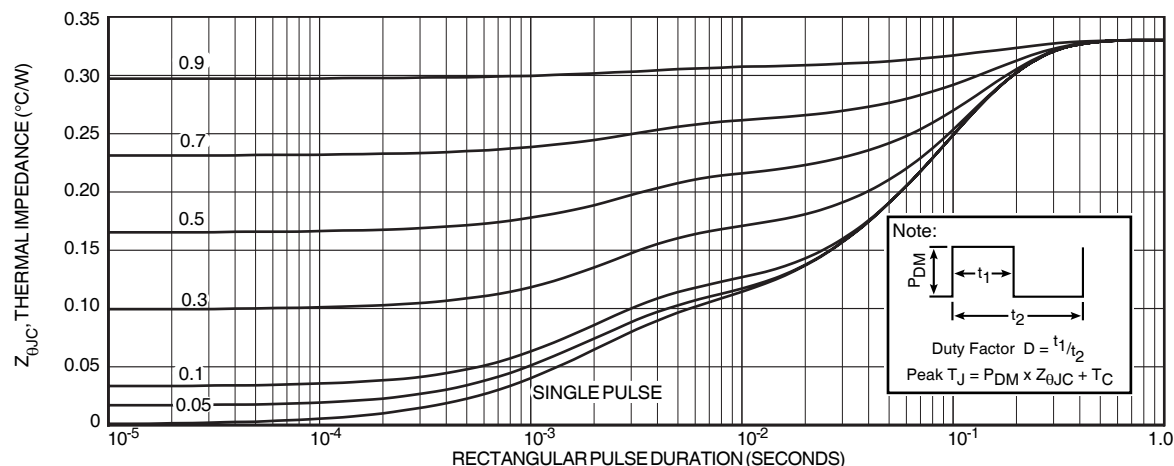


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

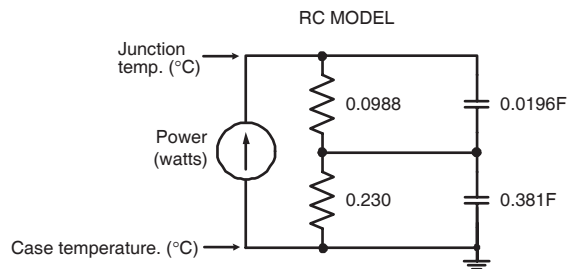


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

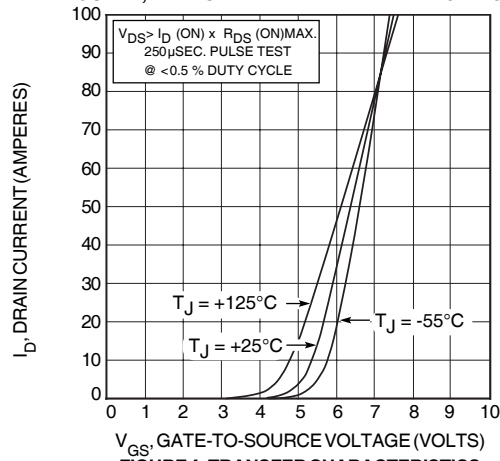


FIGURE 4, TRANSFER CHARACTERISTICS

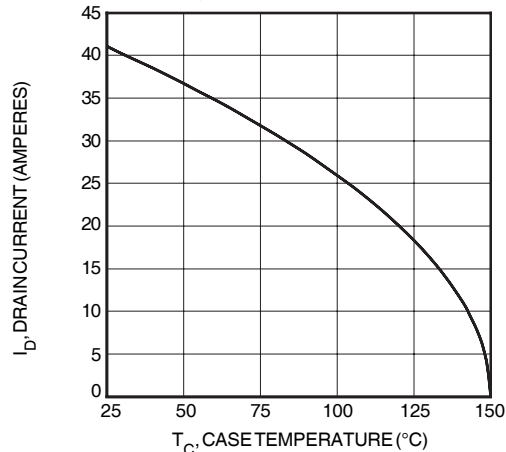


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

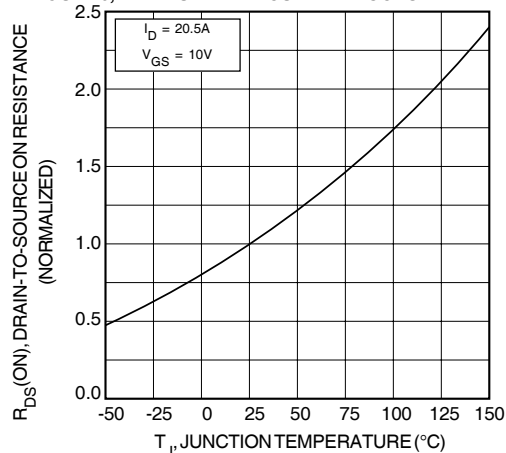


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

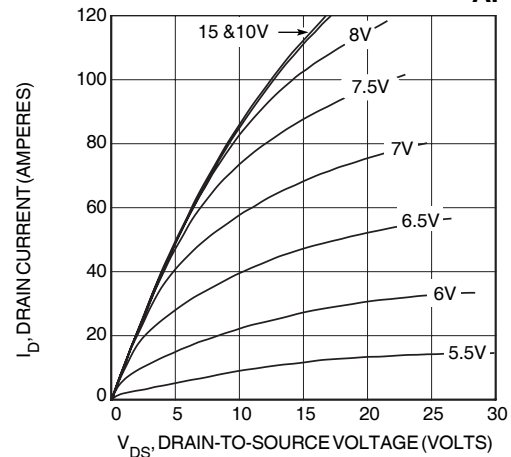


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

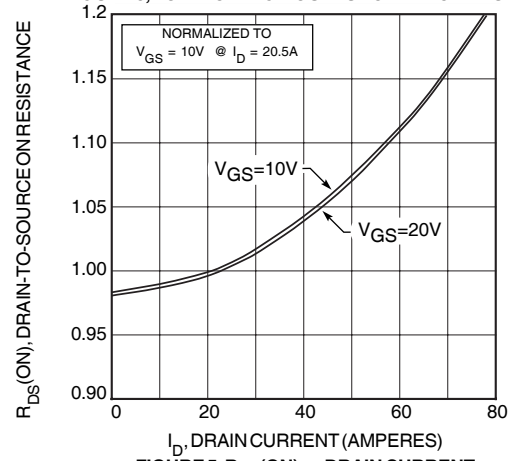


FIGURE 5, $R_{DS}(\text{ON})$ vs DRAIN CURRENT

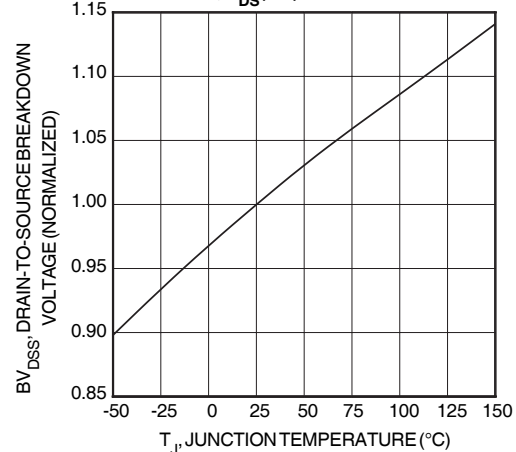


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

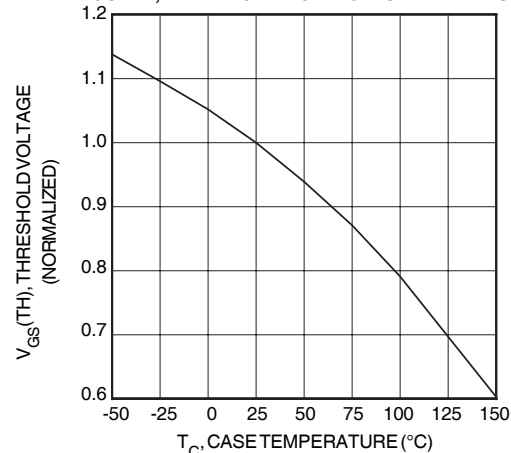


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

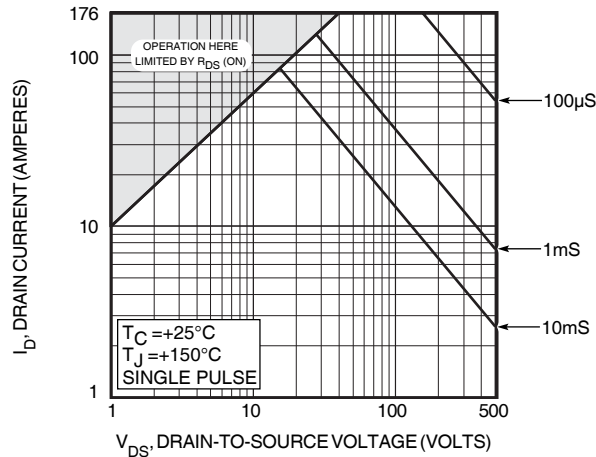


FIGURE 10, MAXIMUM SAFE OPERATING AREA

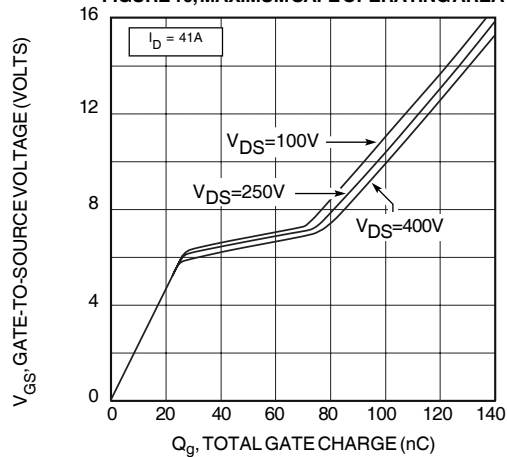


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

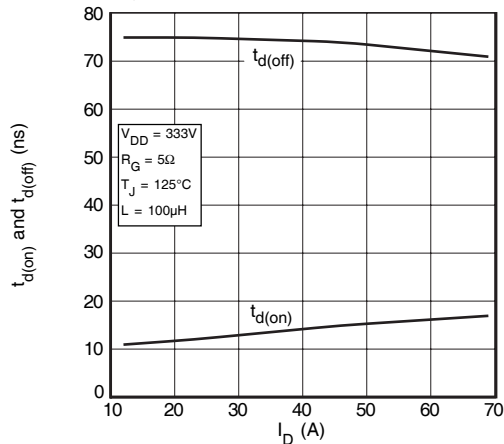


FIGURE 14, DELAY TIMES vs CURRENT

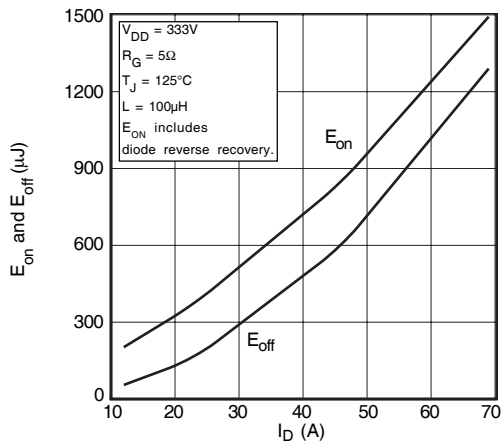


FIGURE 16, SWITCHING ENERGY vs CURRENT

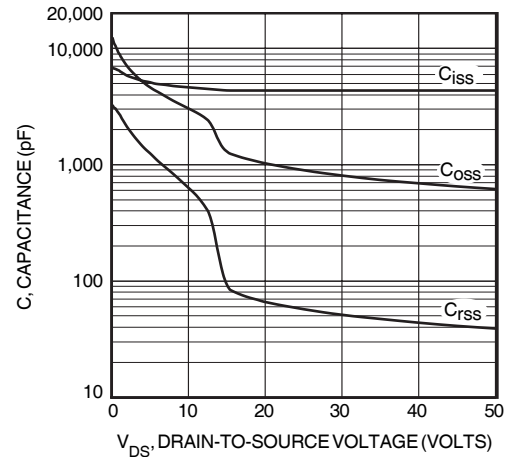


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

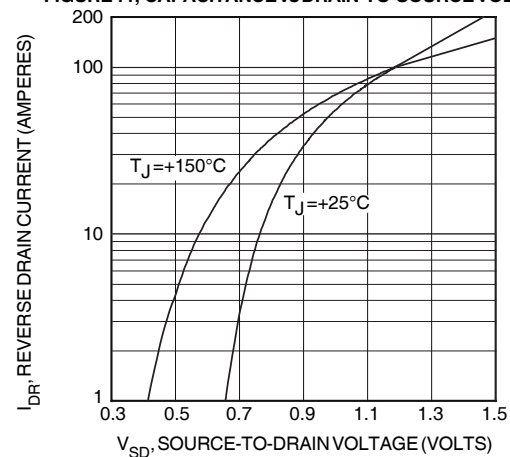


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

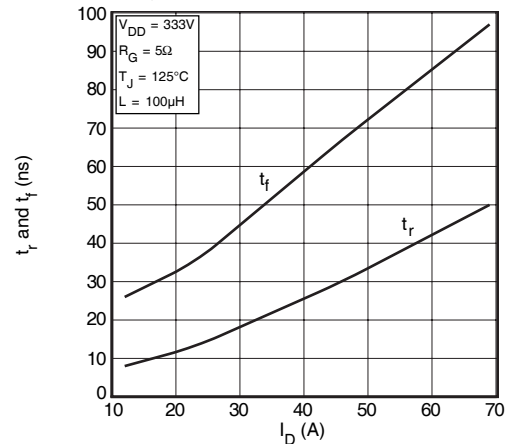


FIGURE 15, RISE AND FALL TIMES vs CURRENT

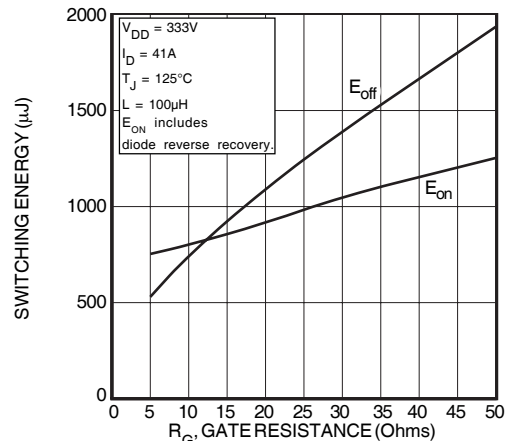


FIGURE 17, SWITCHING ENERGY VS. GATE RESISTANCE

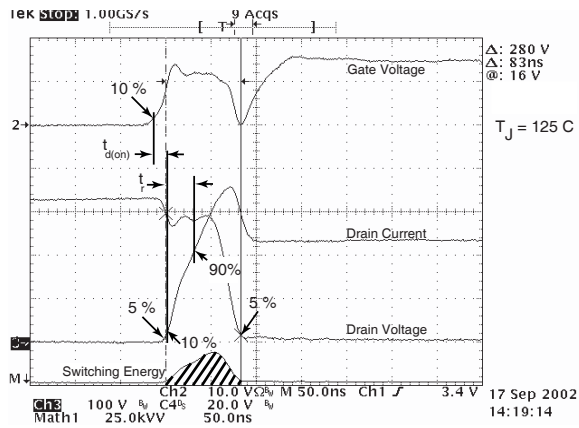


Figure 18, Turn-on Switching Waveforms and Definitions

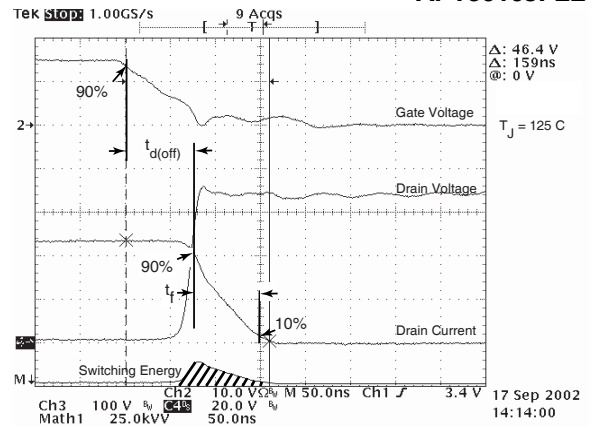


Figure 19, Turn-off Switching Waveforms and Definitions

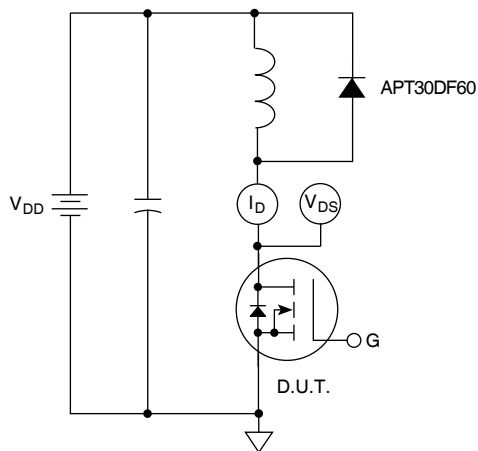
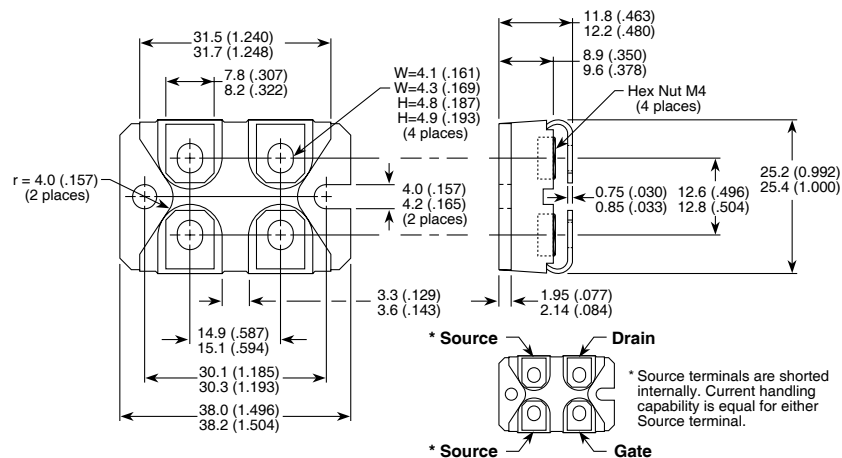


Figure 20, Inductive Switching Test Circuit

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)

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