

DYNAMIC CHARACTERISTICS

APT1201R4B_SFL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		2030		pF
C_{oss}	Output Capacitance			310		
C_{rss}	Reverse Transfer Capacitance			60		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 600V$ $I_D = 9A @ 25^\circ C$		75		nC
Q_{gs}	Gate-Source Charge			10		
Q_{gd}	Gate-Drain ("Miller") Charge			50		
$t_{d(on)}$	Turn-on Delay Time	RESISTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 600V$ $I_D = 9A @ 25^\circ C$ $R_G = 1.6\Omega$		8		ns
t_r	Rise Time			5		
$t_{d(off)}$	Turn-off Delay Time			27		
t_f	Fall Time			11		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 800V, V_{GS} = 15V$ $I_D = 9A, R_G = 5\Omega$		500		μJ
E_{off}	Turn-off Switching Energy			XX		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 800V, V_{GS} = 15V$ $I_D = 9A, R_G = 4.3\Omega$		545		
E_{off}	Turn-off Switching Energy			18		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			9	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			36	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_D 9A$)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⑤			18	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -I_D 9A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$		210	ns
		$T_J = 125^\circ C$		710	
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D 9A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	0.7		μC
		$T_J = 125^\circ C$	2.0		
I_{RRM}	Peak Recovery Current ($I_S = -I_D 9A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	10		Amps
		$T_J = 125^\circ C$	15		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.42	°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 $T_J = +25^\circ C$, $L = 29.9mH$, $R_G = 25\Omega$, Peak $I_L = 9A$

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_D 9A$ $di/dt \leq 700A/\mu s$ $V_R \leq 1200$ $T_J \leq 150^\circ C$

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

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

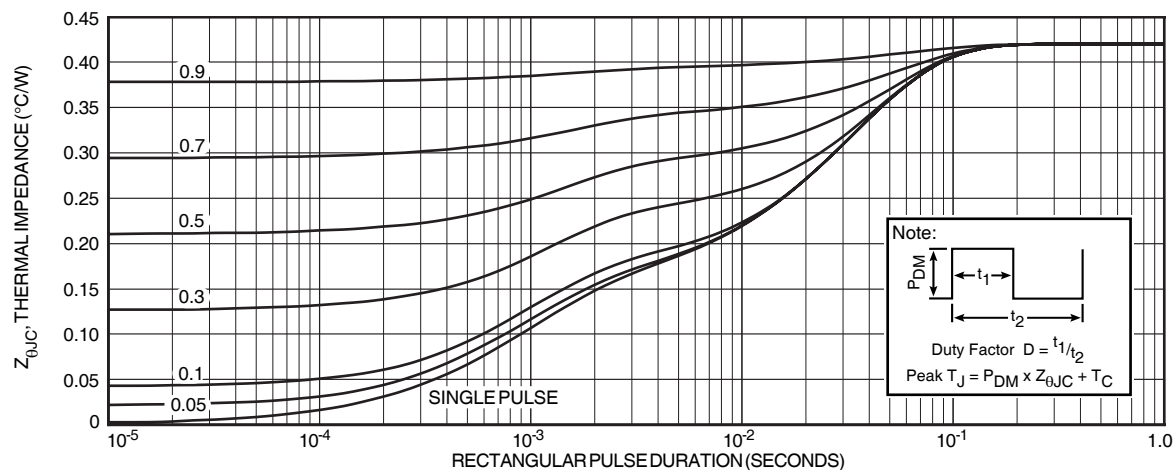


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT1201R4B_SFL

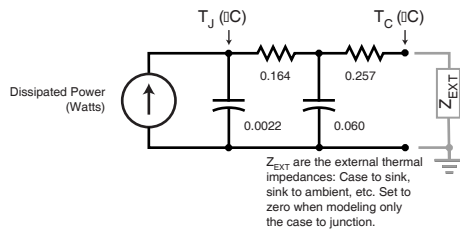


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

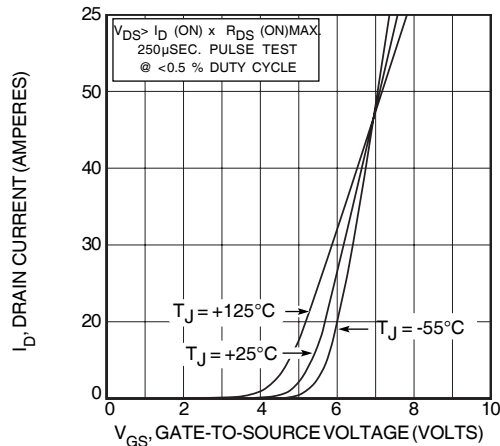


FIGURE 4, TRANSFER CHARACTERISTICS

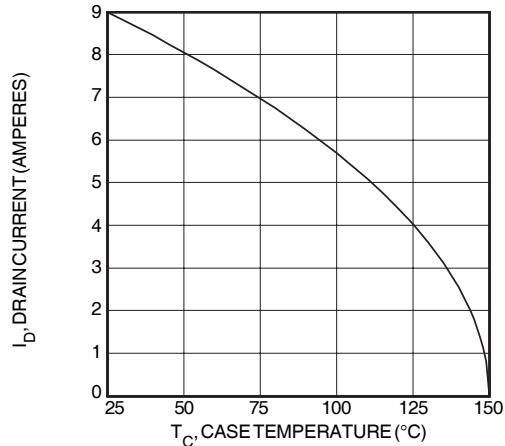


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

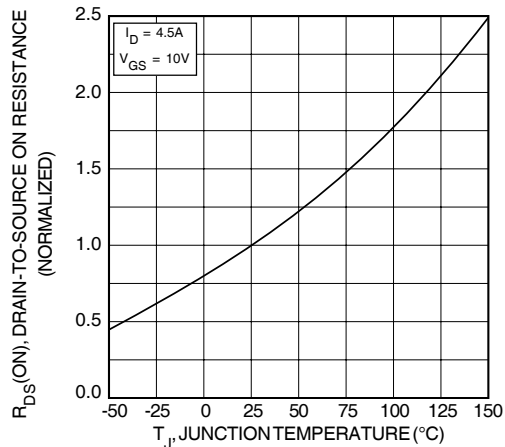


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

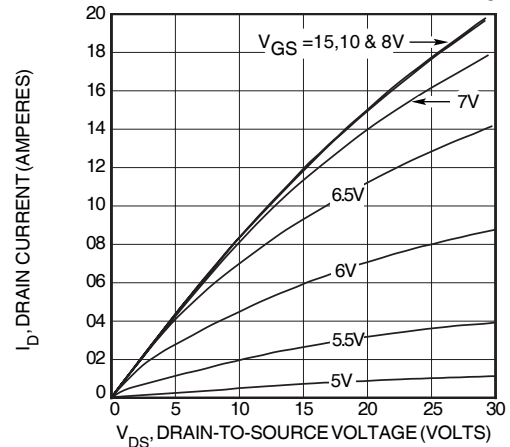


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

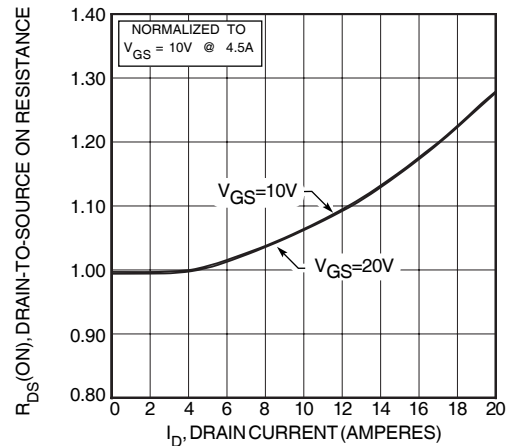


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

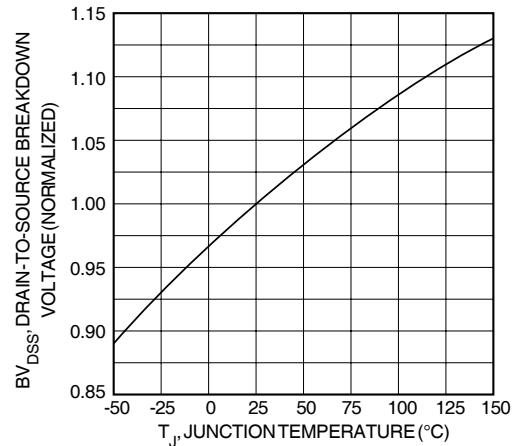


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

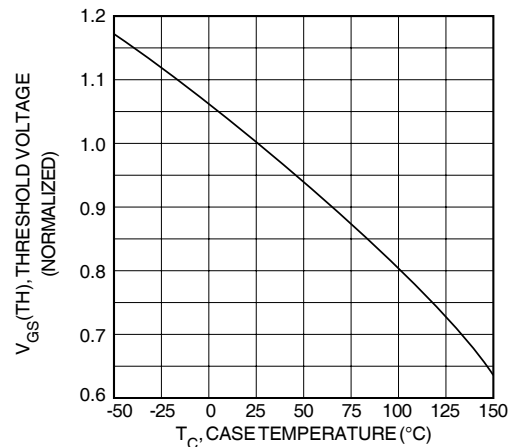


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

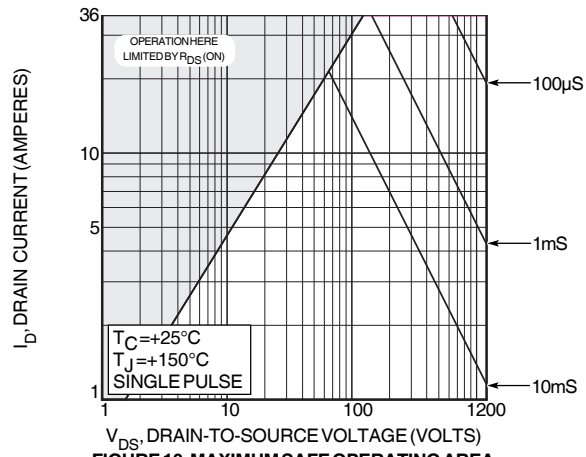


FIGURE 10, MAXIMUM SAFE OPERATING AREA

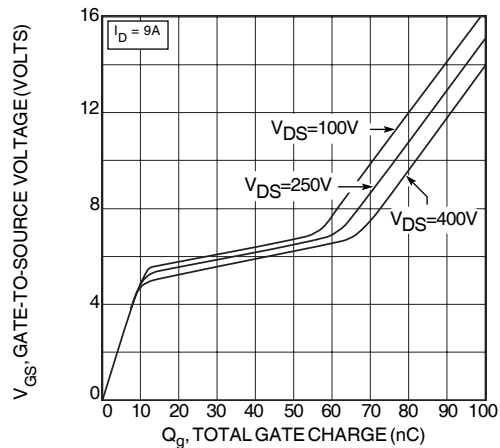


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

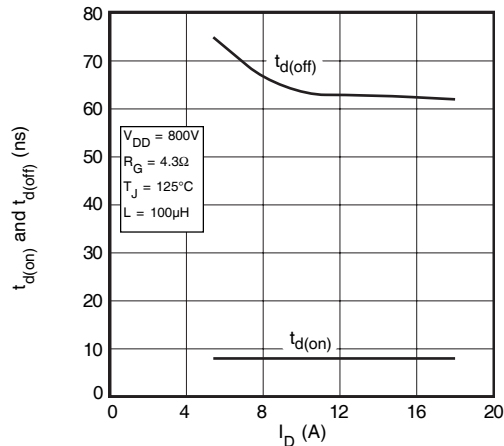


FIGURE 14, DELAY TIMES vs CURRENT

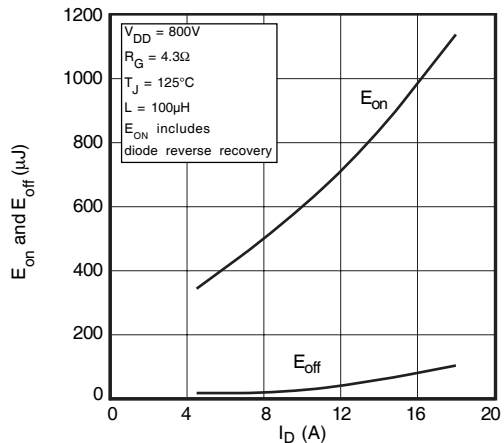


FIGURE 16, SWITCHING ENERGY vs CURRENT

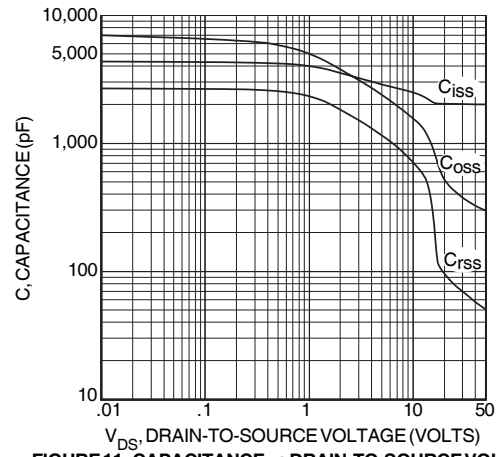


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

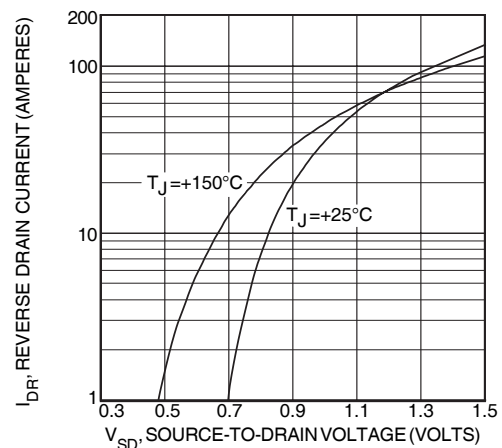


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

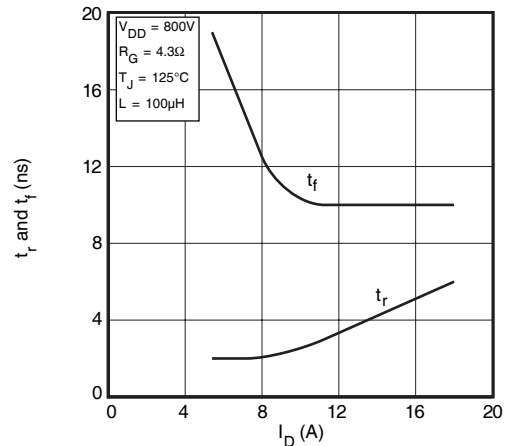


FIGURE 15, RISE AND FALL TIMES vs CURRENT

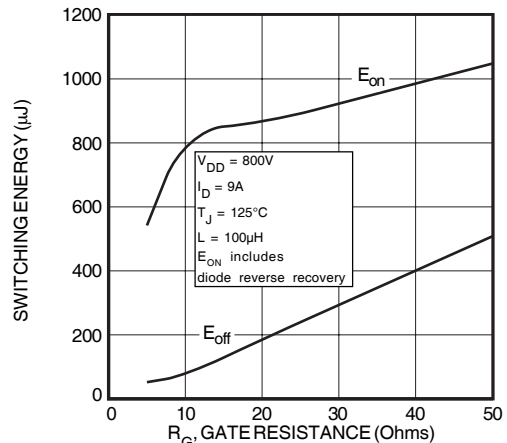


FIGURE 17, SWITCHING ENERGY vs. GATE RESISTANCE

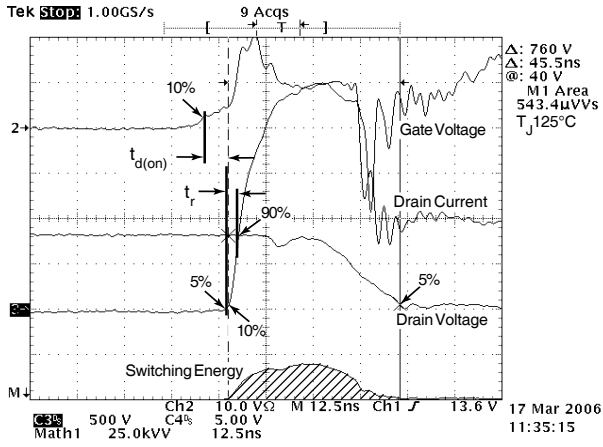


Figure 18, Turn-on Switching Waveforms and Definitions

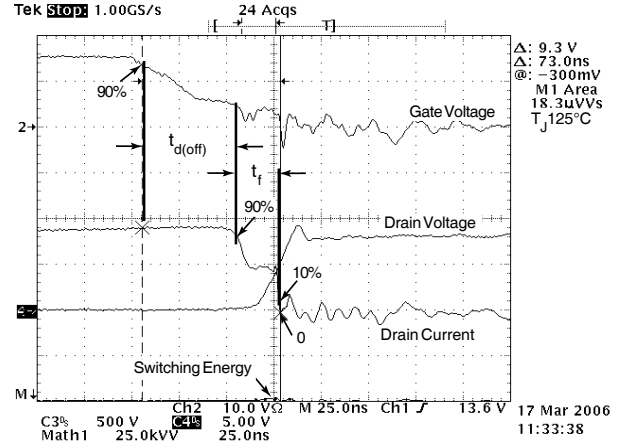


Figure 19, Turn-off Switching Waveforms and Definitions

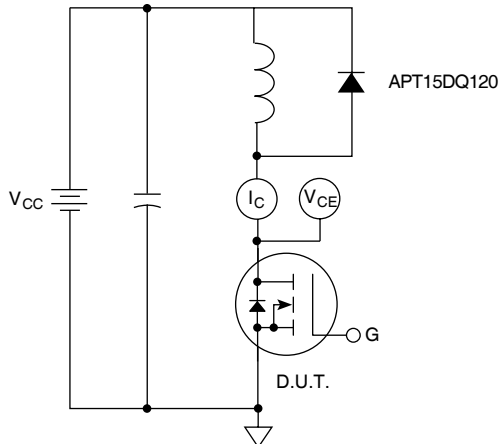
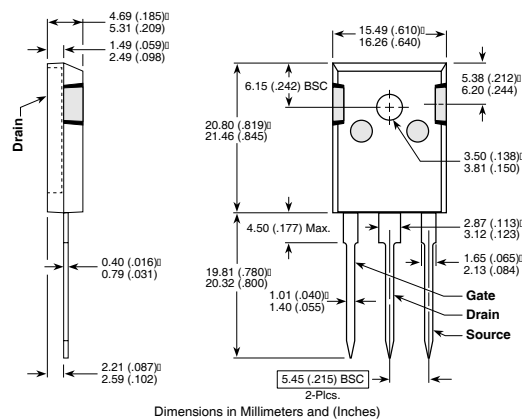


Figure 20, Inductive Switching Test Circuit

TO-247 Package Outline



D³PAK Package Outline

