

DYNAMIC CHARACTERISTICS

APT53N60B_SC6

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		4020		pF
C_{oss}	Output Capacitance			3545		
C_{rss}	Reverse Transfer Capacitance			330		
Q_g	Total Gate Charge ⁴	$V_{GS} = 10V$ $V_{DD} = 300V$ $I_D = 53A @ 25^\circ C$		154		nC
Q_{gs}	Gate-Source Charge			26		
Q_{gd}	Gate-Drain ("Miller") Charge			82		
$t_{d(on)}$	Turn-on Delay Time	INDUCTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 400V$ $I_D = 53A @ 125^\circ C$ $R_G = 4.3\Omega$		14		ns
t_r	Rise Time			36		
$t_{d(off)}$	Turn-off Delay Time			151		
t_f	Fall Time			74		
E_{on}	Turn-on Switching Energy ⁵	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 400V, V_{GS} = 15V$ $I_D = 53A, R_G = 4.3\Omega$		960		μJ
E_{off}	Turn-off Switching Energy			873		
E_{on}	Turn-on Switching Energy ⁵	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 400V, V_{GS} = 15V$ $I_D = 53A, R_G = 4.3\Omega$		1478		
E_{off}	Turn-off Switching Energy			995		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			46	Amps
I_{SM}	Pulsed Source Current ¹ (Body Diode)			159	
V_{SD}	Diode Forward Voltage ³ ($V_{GS} = 0V, I_S = -53A$)		0.9	1.2	Volts
dv/dt	Peak Diode Recovery dv/dt ⁶			15	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -53A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	795		ns
Q_{rr}	Reverse Recovery Charge ($I_S = -53A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	25		μC
I_{RRM}	Peak Recovery Current ($I_S = -53A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	58		Amps

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.30	$^\circ C/W$
$R_{\theta JA}$	Junction to Ambient			40	

1 Repetitive Rating: Pulse width limited by maximum junction temperature

2 Repetitive avalanche causes additional power losses that can be calculated as

$$P_{AV} = E_{AR} \cdot f \cdot \text{Pulse width } tp \text{ limited by } T_J \text{ max.}$$

3 Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

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

4 See MIL-STD-750 Method 3471

5 Eon includes diode reverse recovery.

6 Maximum 125°C diode commutation speed = di/dt 600A/ μs

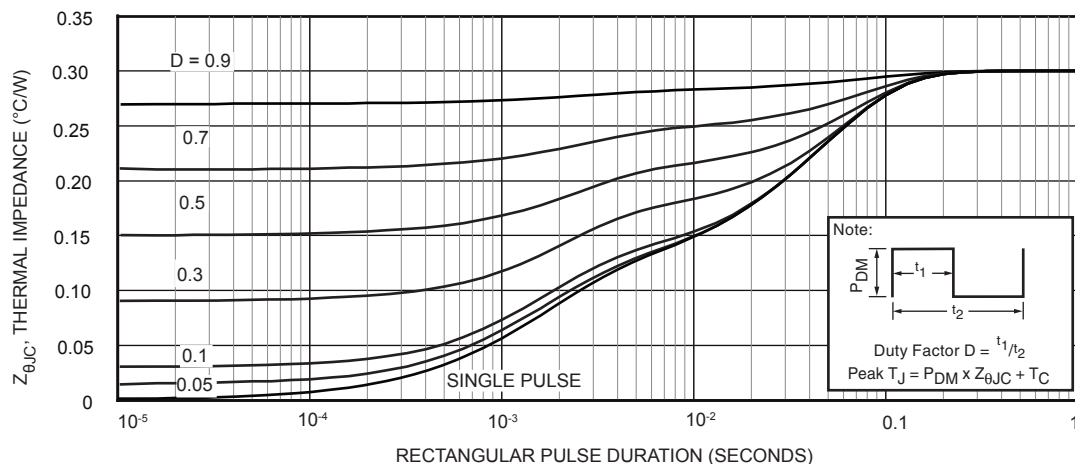


Figure 1, Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

Typical Performance Curves

APT53N60B_SC6

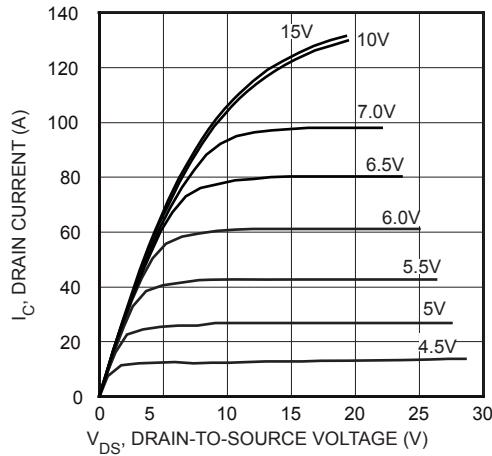


FIGURE 2, Low Voltage Output Characteristics

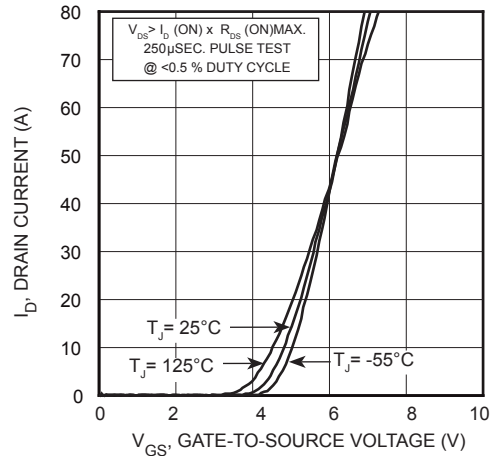


FIGURE 3, Transfer Characteristics

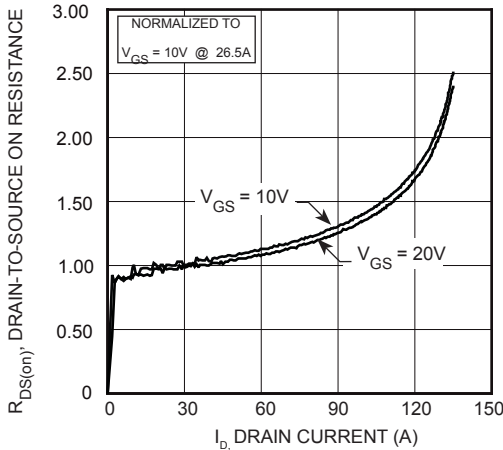


FIGURE 4, $R_{DS(ON)}$ vs Drain Current

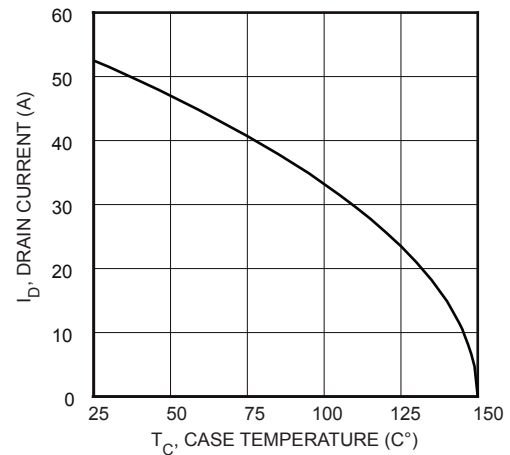


FIGURE 5, Maximum Drain Current vs Case Temperature

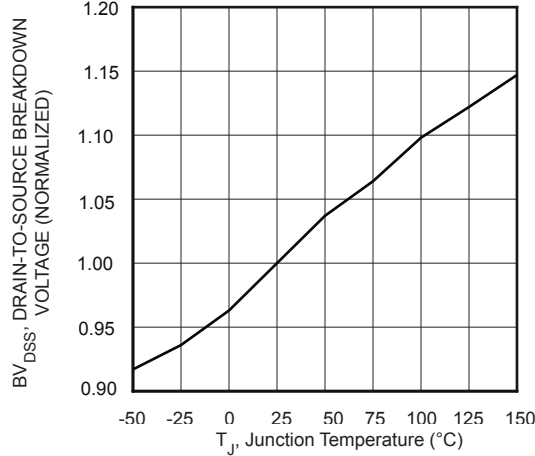


FIGURE 6, Breakdown Voltage vs Temperature

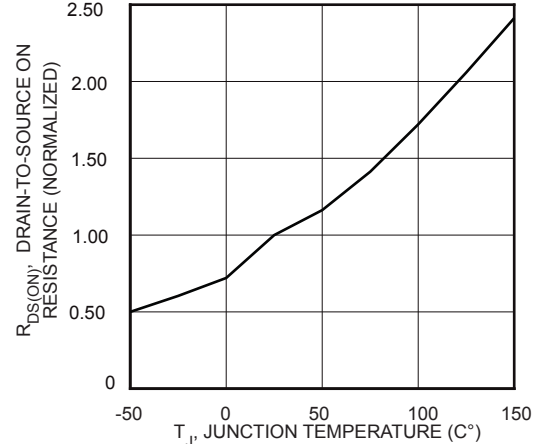


FIGURE 7, On-Resistance vs Temperature

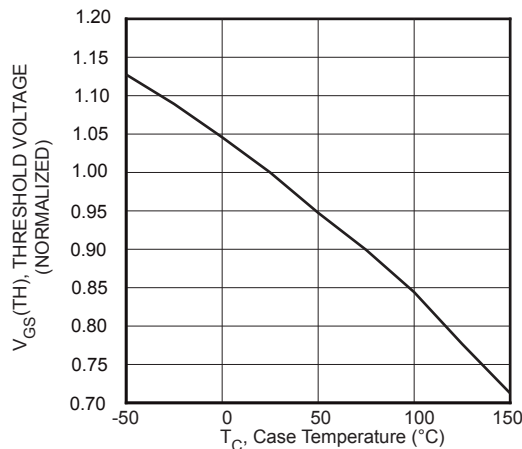


FIGURE 8, Threshold Voltage vs Temperature

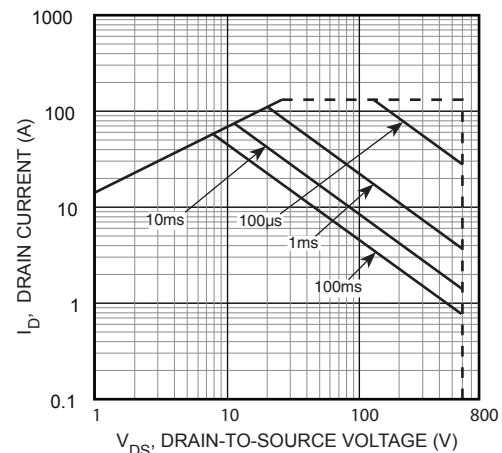


FIGURE 9, Maximum Safe Operating Area

Typical Performance Curves

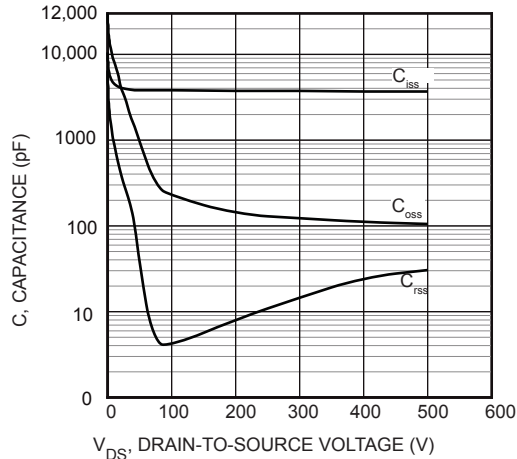


FIGURE 10, Capacitance vs Drain-To-Source Voltage

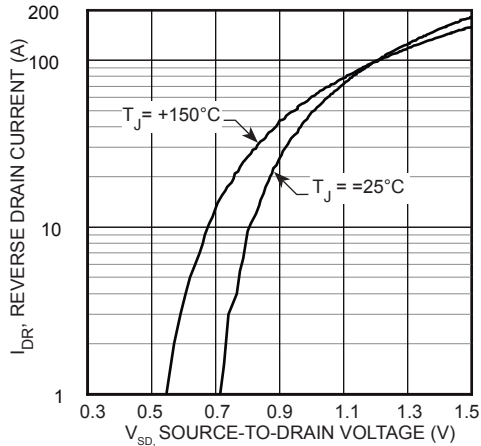


FIGURE 12, Source-Drain Diode Forward Voltage

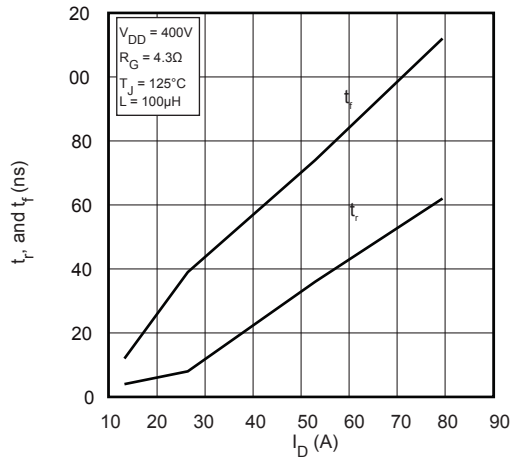


FIGURE 14, Rise and Fall Times vs Current

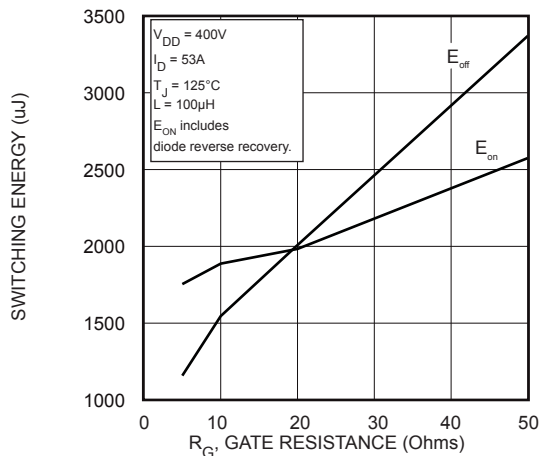


FIGURE 16, Switching Energy vs Gate Resistance

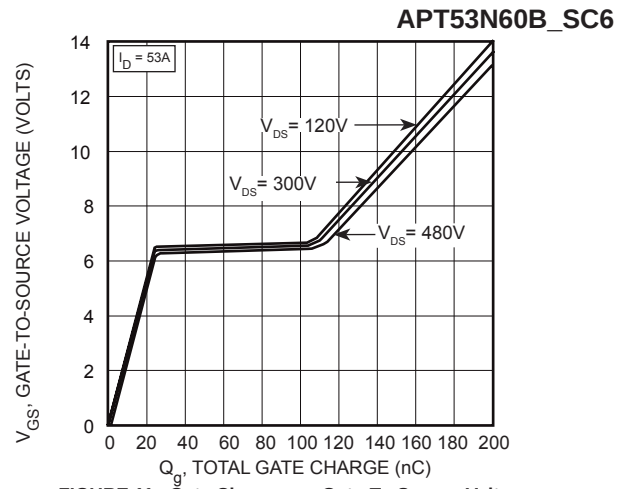


FIGURE 11, Gate Charges vs Gate-To-Source Voltage

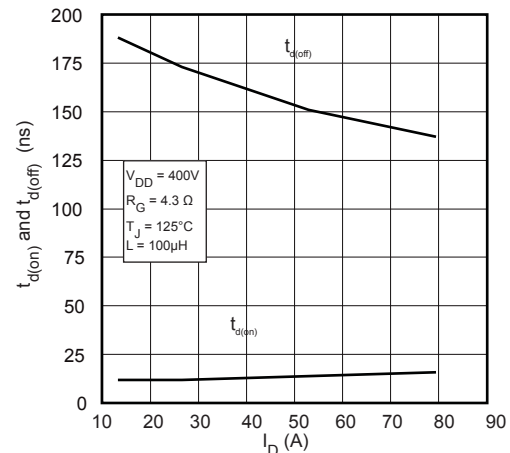


FIGURE 13, Delay Times vs Current

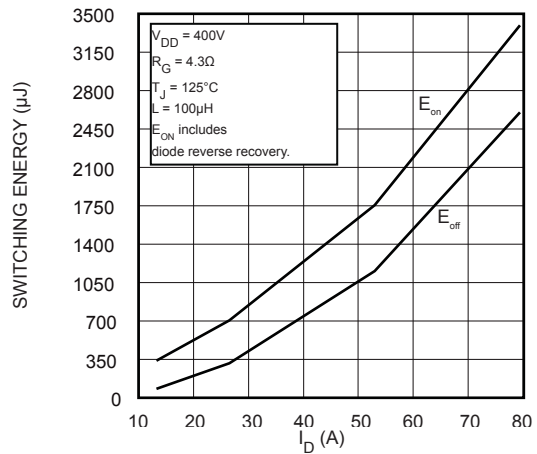
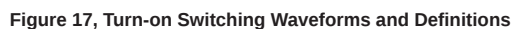


FIGURE 15, Switching Energy vs Current



D³PAK Package Outline



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