

DYNAMIC CHARACTERISTICS

APT38N60B_SC6

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		2826		pF
C_{oss}	Output Capacitance			2428		
C_{rss}	Reverse Transfer Capacitance			261		
Q_g	Total Gate Charge ⁴	$V_{GS} = 10V$ $V_{DD} = 300V$ $I_D = 38A @ 25^\circ C$		112		nC
Q_{gs}	Gate-Source Charge			18		
Q_{gd}	Gate-Drain ("Miller") Charge			58		
$t_{d(on)}$	Turn-on Delay Time	INDUCTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 400V$ $I_D = 38A @ 25^\circ C$ $R_G = 4.3\Omega$		14		ns
t_r	Rise Time			29		
$t_{d(off)}$	Turn-off Delay Time			118		
t_f	Fall Time			69		
E_{on}	Turn-on Switching Energy ⁵	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 400V, V_{GS} = 15V$ $I_D = 38A, R_G = 4.3\Omega$		710		μJ
E_{off}	Turn-off Switching Energy			550		
E_{on}	Turn-on Switching Energy ⁵	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 400V, V_{GS} = 15V$ $I_D = 38A, R_G = 4.3\Omega$		1100		
E_{off}	Turn-off Switching Energy			625		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			33	Amps
I_{SM}	Pulsed Source Current ¹ (Body Diode)			112	
V_{SD}	Diode Forward Voltage ³ ($V_{GS} = 0V, I_S = -38A$)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⁶			8	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -38A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	667		ns
Q_{rr}	Reverse Recovery Charge ($I_S = -38A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	18		μC
I_{RRM}	Peak Recovery Current ($I_S = -38A, di/dt = 100A/\mu s$)	$T_J = 25^\circ C$	49		Amps

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.45	$^\circ C/W$
$R_{\theta JA}$	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

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

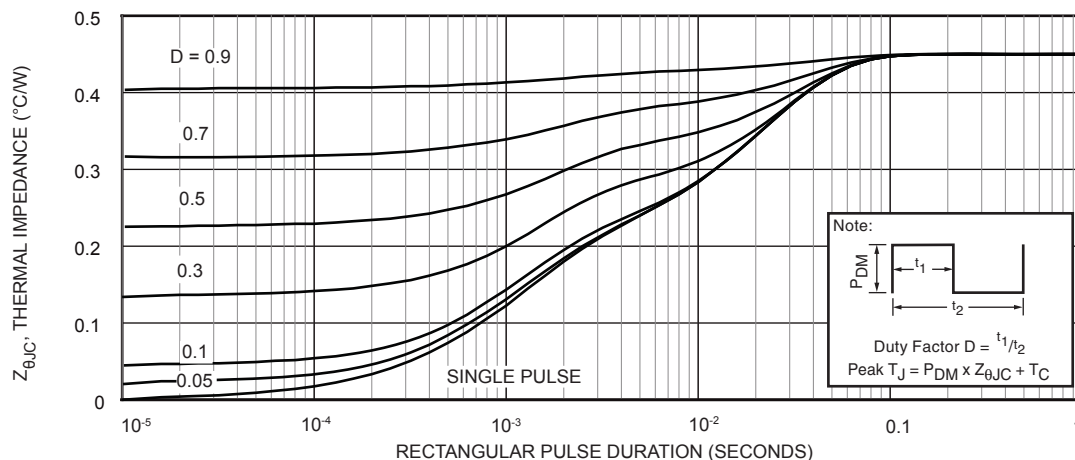
3 Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

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

4 See MIL-STD-750 Method 3471

5 E_{on} includes diode reverse recovery.

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



Typical Performance Curves

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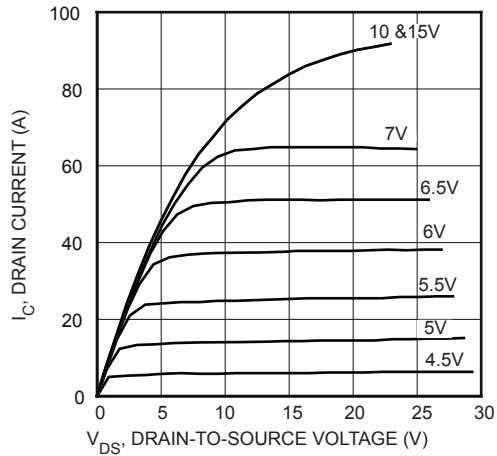


FIGURE 2, Low Voltage Output Characteristics

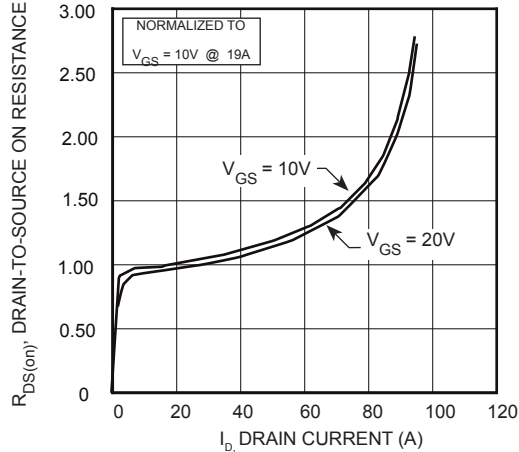


FIGURE 4, $R_{DS(ON)}$ vs Drain Current

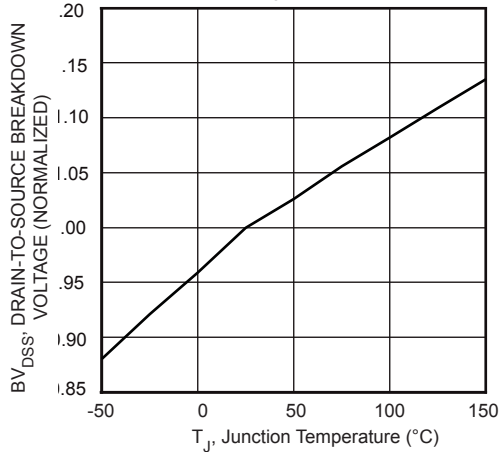


FIGURE 6, Breakdown Voltage vs Temperature

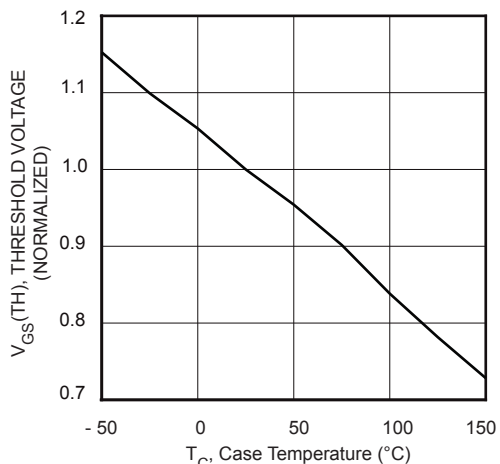


FIGURE 8, Threshold Voltage vs Temperature

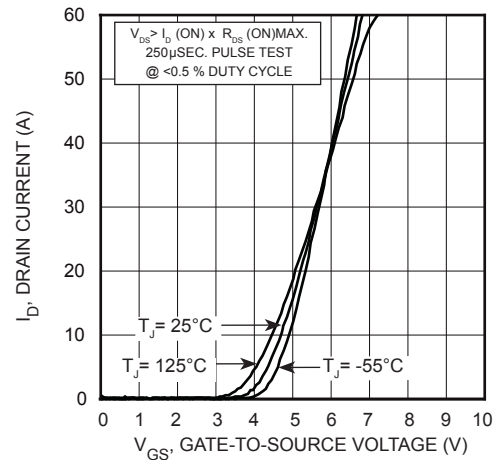


FIGURE 3, Transfer Characteristics

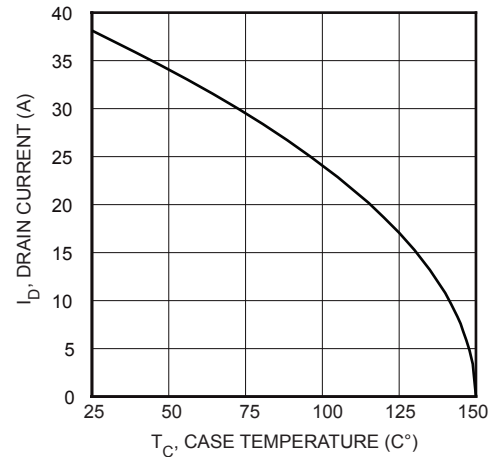


FIGURE 5, Maximum Drain Current vs Case Temperature

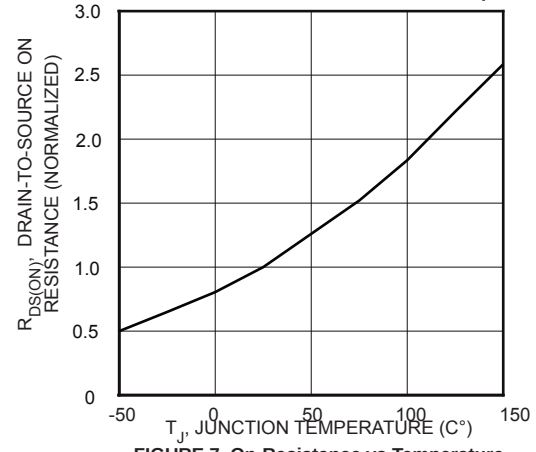


FIGURE 7, On-Resistance vs Temperature

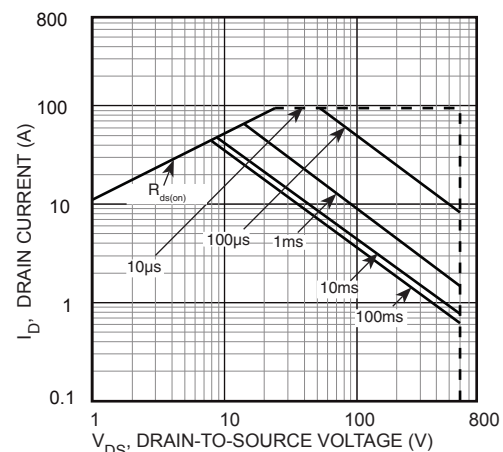


FIGURE 9, Maximum Safe Operating Area

Typical Performance Curves

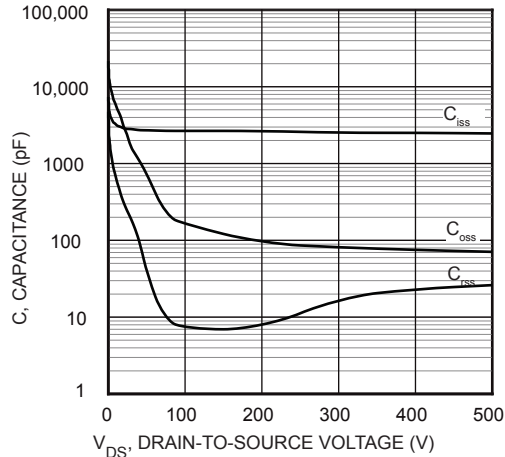


FIGURE 10, Capacitance vs Drain-To-Source Voltage

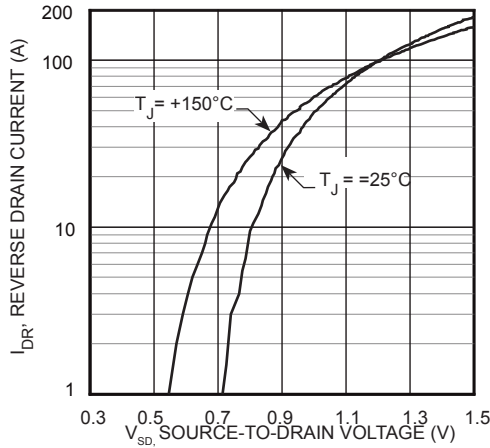


FIGURE 12, Source-Drain Diode Forward Voltage

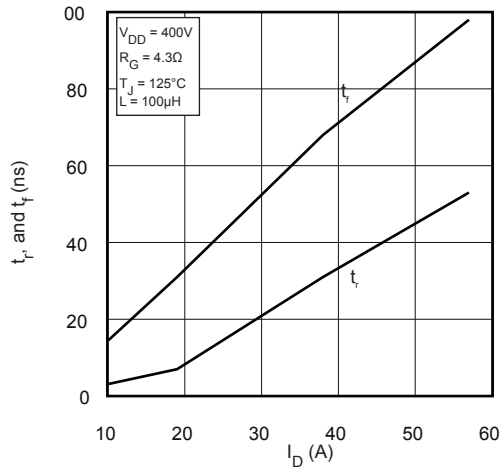


FIGURE 14, Rise and Fall Times vs Current

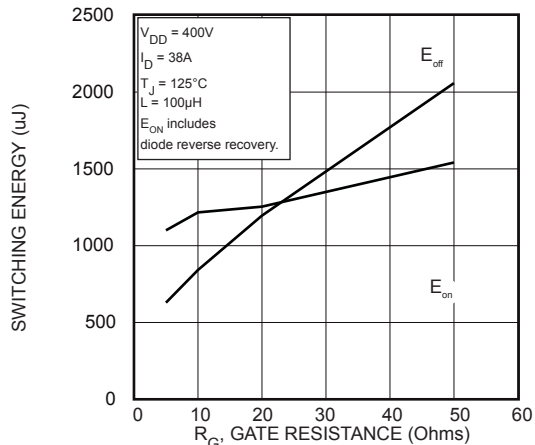


FIGURE 16, Switching Energy vs Gate Resistance

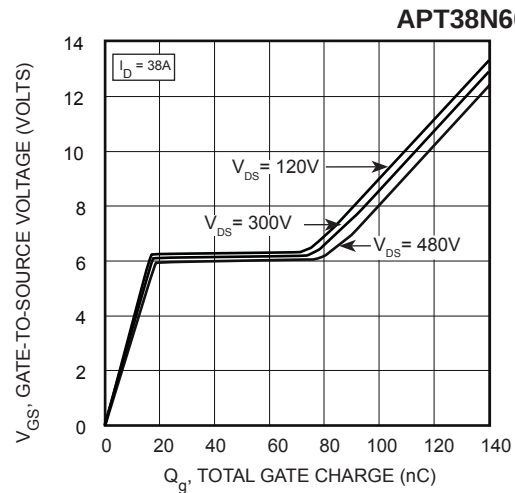


FIGURE 11, Gate Charges vs Gate-To-Source Voltage

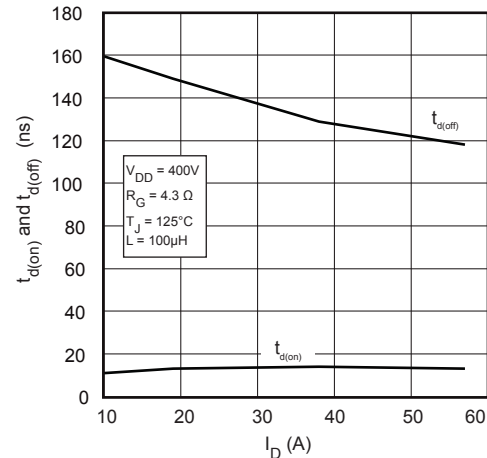


FIGURE 13, Delay Times vs Current

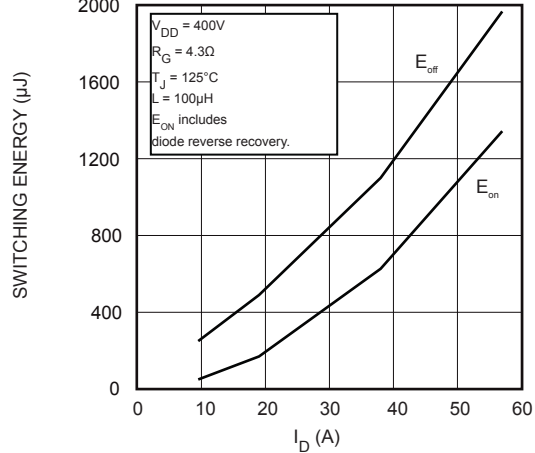
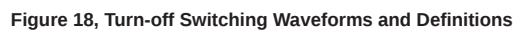
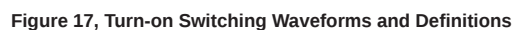


FIGURE 15, Switching Energy vs Current

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D³PAK Package Outline

