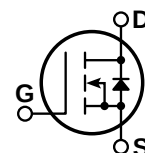
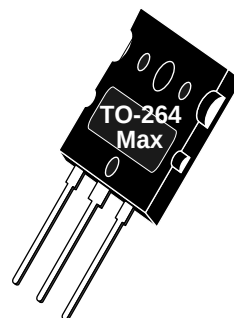


POWER MOS 7® MOSFET

Power MOS 7® is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7® by significantly lowering $R_{DS(ON)}$ and Q_g . Power MOS 7® combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with APT's patented metal gate structure.



- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge, Q_g
- Increased Power Dissipation
- Easier To Drive
- Popular TO-264 MAX Package

MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	APT10026L2LL	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	38	Amps
I_{DM}	Pulsed Drain Current ^①	152	
V_{GS}	Gate-Source Voltage Continuous	± 30	Volts
V_{GSM}	Gate-Source Voltage Transient	± 40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	893	Watts
	Linear Derating Factor	7.14	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	300	
I_{AR}	Avalanche Current ^① (Repetitive and Non-Repetitive)	38	Amps
E_{AR}	Repetitive Avalanche Energy ^①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ^④	3200	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu A$)	1000			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, I_D = 19A$)			0.260	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 1000V, V_{GS} = 0V$)			100	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 800V, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			500	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 5mA$)	3		5	Volts



CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

APT Website - <http://www.advancedpower.com>

DYNAMIC CHARACTERISTICS

APT10026L2LL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		7114		pF
C_{oss}	Output Capacitance			1268		
C_{rss}	Reverse Transfer Capacitance			224		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 500V$ $I_D = 38A @ 25^\circ C$		267		nC
Q_{gs}	Gate-Source Charge			34		
Q_{gd}	Gate-Drain ("Miller") Charge			173		
$t_{d(on)}$	Turn-on Delay Time	RESISTIVE SWITCHING $V_{GS} = 15V$ $V_{DD} = 500V$ $I_D = 38A @ 25^\circ C$ $R_G = 0.6\Omega$		17		ns
t_r	Rise Time			8		
$t_{d(off)}$	Turn-off Delay Time			39		
t_f	Fall Time			9		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 25°C $V_{DD} = 667V, V_{GS} = 15V$ $I_D = 38A, R_G = 3\Omega$		1196		μJ
E_{off}	Turn-off Switching Energy			713		
E_{on}	Turn-on Switching Energy ⑥	INDUCTIVE SWITCHING @ 125°C $V_{DD} = 667V, V_{GS} = 15V$ $I_D = 38A, R_G = 3\Omega$		2014		
E_{off}	Turn-off Switching Energy			971		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			38	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			152	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -38A$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -38A, di_S/dt = 100A/\mu s$)		1182		ns
Q_{rr}	Reverse Recovery Charge ($I_S = -38A, di_S/dt = 100A/\mu s$)		31.9		μC
dv/dt	Peak Diode Recovery dv/dt ⑤			10	V/ns

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.14	$^\circ C/W$
$R_{\theta JA}$	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 $T_j = +25^\circ C$, $L = 4.43mH$, $R_G = 25\Omega$, Peak $I_L = 38A$

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -38A$ $di/dt \leq 700A/\mu s$ $V_R \leq 1000V$ $T_j \leq 150^\circ C$

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.

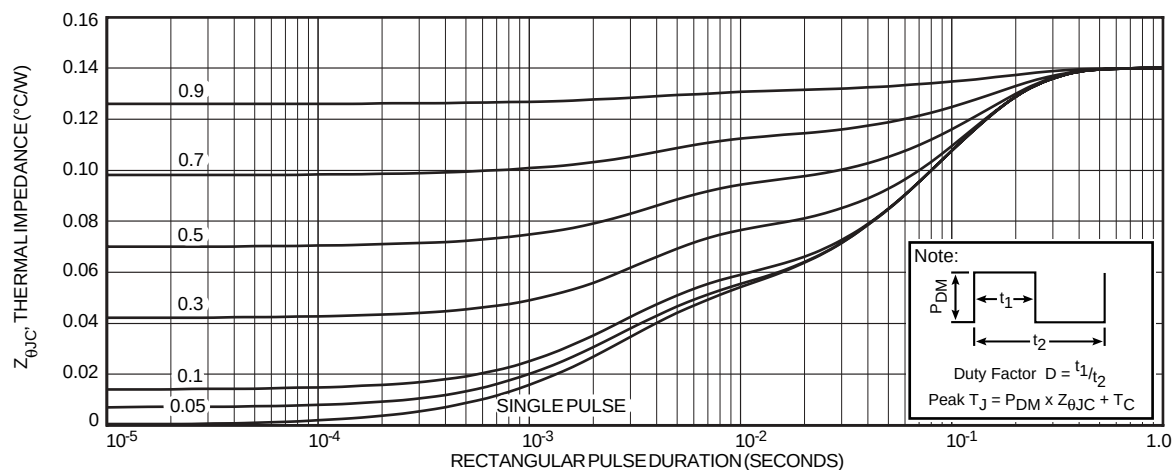


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT10026L2LL

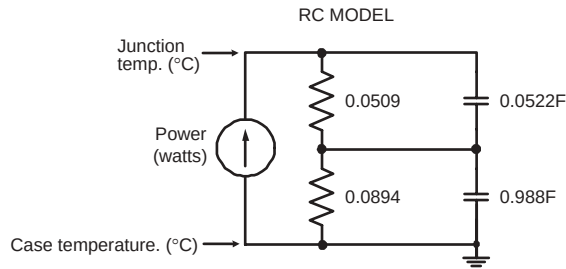


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

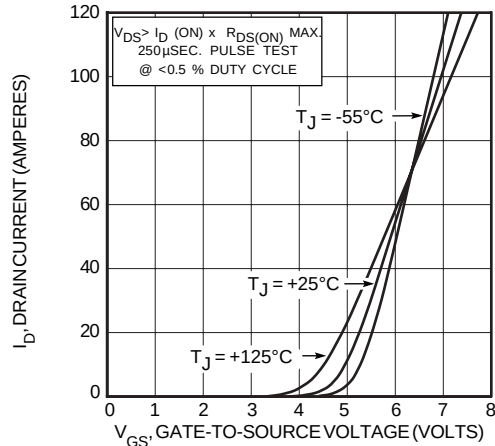


FIGURE 4, TRANSFER CHARACTERISTICS

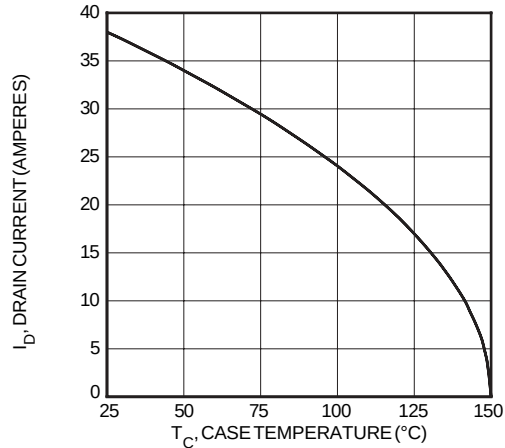


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

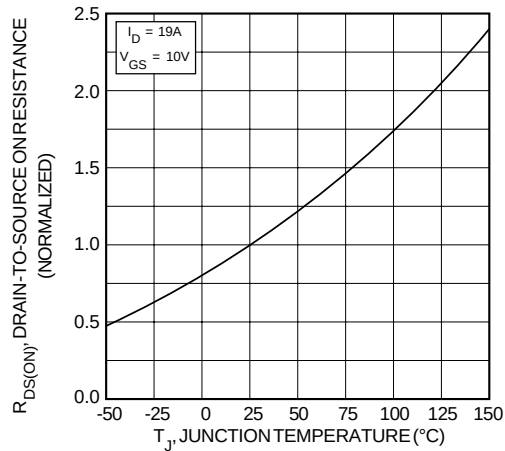


FIGURE 8, $R_{DS(ON)}$ vs. TEMPERATURE

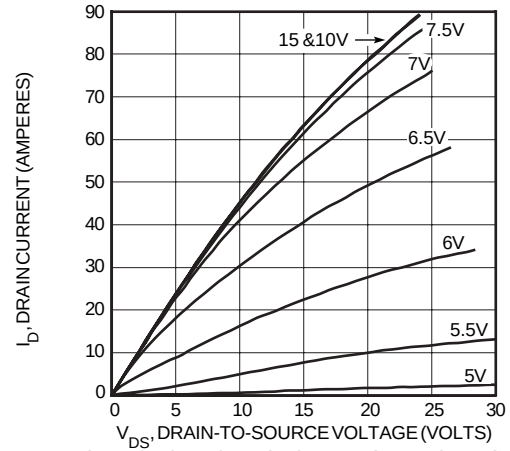


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

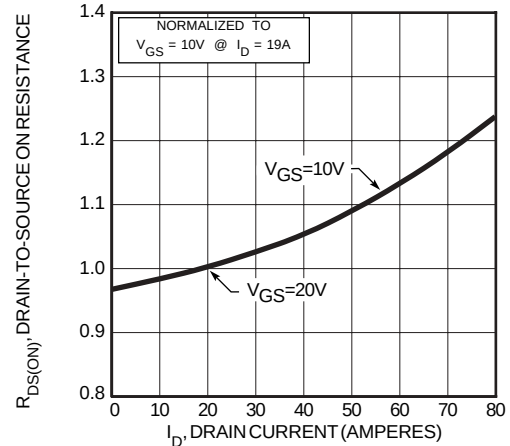


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

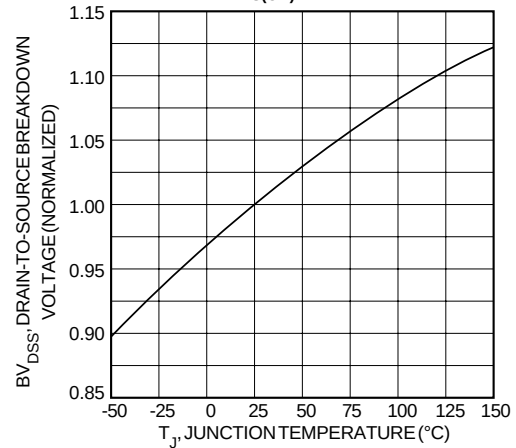


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

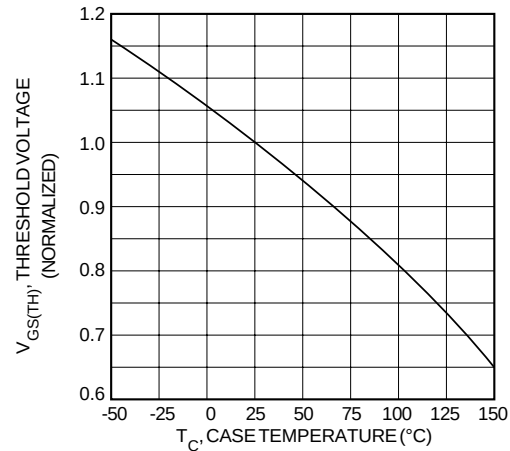


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

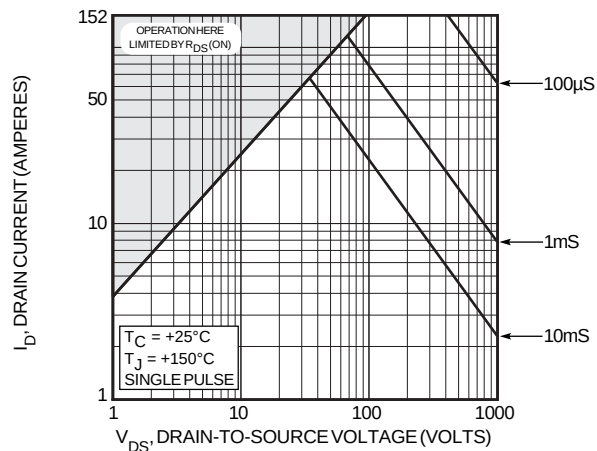


FIGURE 10, MAXIMUM SAFE OPERATING AREA

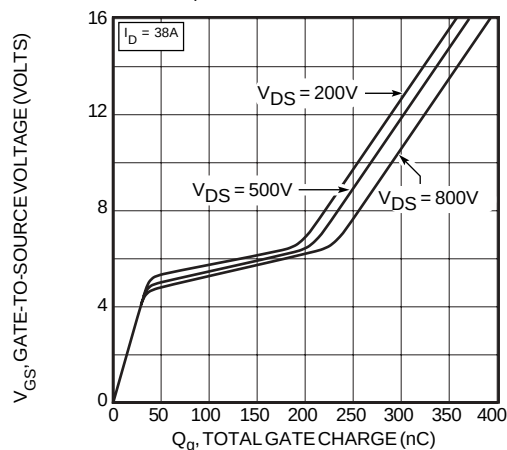


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

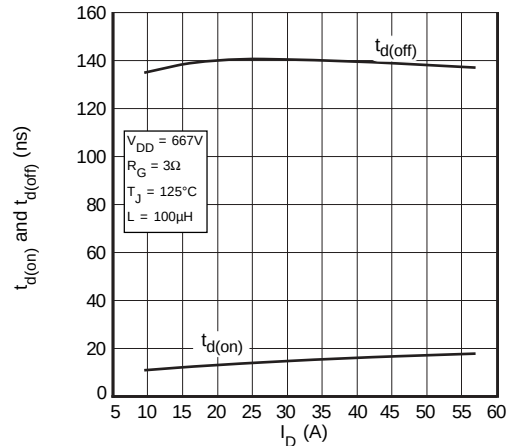


FIGURE 14, DELAY TIMES vs CURRENT

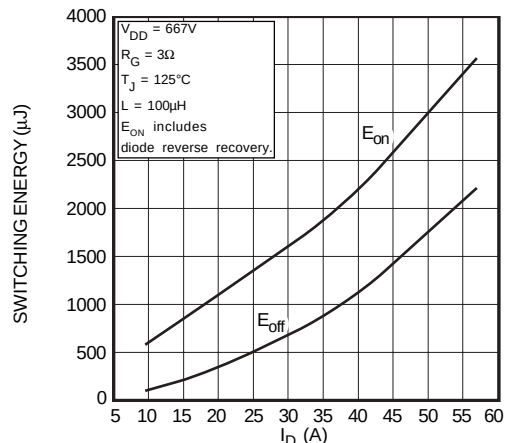


FIGURE 16, SWITCHING ENERGY vs CURRENT

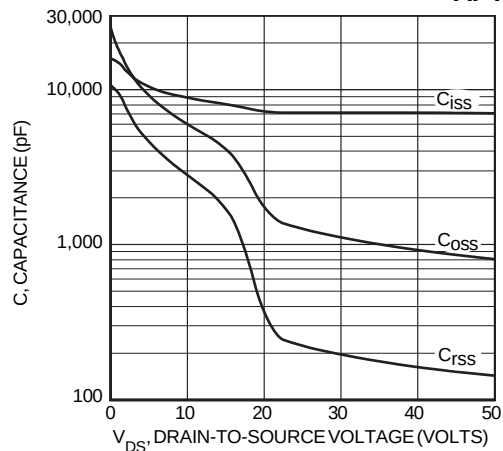


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

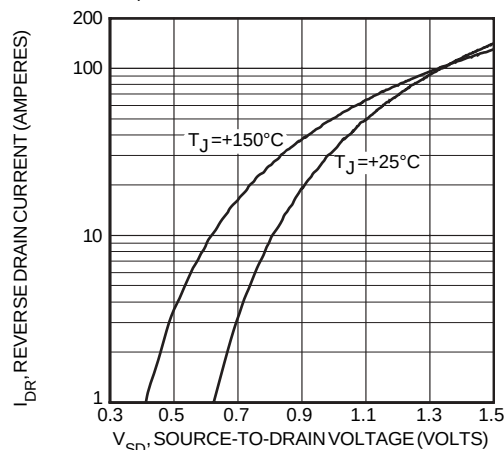


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

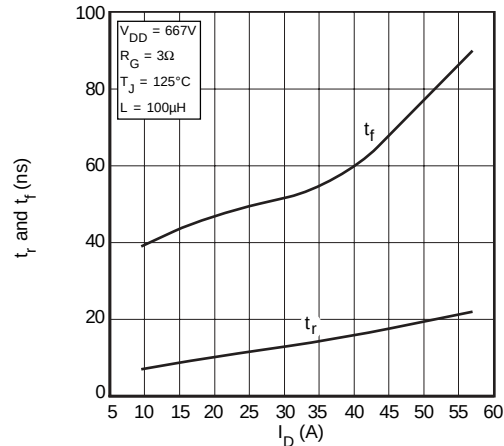


FIGURE 15, RISE AND FALL TIMES vs CURRENT

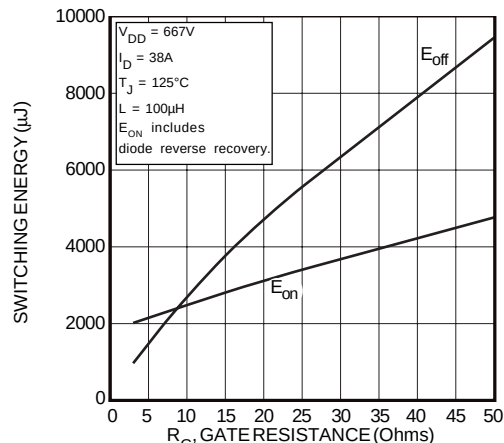


FIGURE 17, SWITCHING ENERGY vs. GATE RESISTANCE

Tek 5100 1.00GS/s 12 Acqs

90%

2+

$t_{d(off)}$

90%

t_f

10%

0

Switching Energy

25.0kV

200 V 50.0ns 7.0 V

Ch3 Math1 200 V 50.0ns 7.0 V

Ch2 25.0kV 50.0ns 7.0 V

Delta: 37.6 V
Delta: 217ns
@: 0 V
M1 Area: 971.1uVVs
 $T_j = 125^\circ\text{C}$

19 Dec 2003 14:40:59

The drawing shows the mechanical specifications for the BSC package. The top view includes dimensions for the overall width (4.60 (181), 5.21 (205), 1.80 (.071), 2.01 (.079)), the central area (19.51 (.768), 20.50 (.807)), and the central features (5.79 (.228), 6.20 (.244)). The side view shows the package height (25.48 (1.003), 26.49 (1.043)) and the lead dimensions (2.29 (.090), 2.69 (.106), 19.81 (.780), 21.39 (.842)). The bottom view shows the lead pitch (0.48 (.019), 0.84 (.033), 2.59 (.102), 3.00 (.118)) and the lead width (0.76 (.030), 1.30 (.051), 2.79 (.110), 3.18 (.125)). The package is labeled as 5.45 (.215) BSC and 2-Pics.

050-7024 Rev B 12-2003