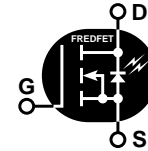


POWER MOS V®



Power MOS V® is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimizes the JFET effect, increases packing density and reduces the on-resistance. Power MOS V® also achieves faster switching speeds through optimized gate layout.

- Fast Recovery Body Diode
- Lower Leakage
- Faster Switching
- 100% Avalanche Tested
- Popular SOT-227 Package



MAXIMUM RATINGS

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

Symbol	Parameter	APT10050JVFR	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	19	Amps
I_{DM}	Pulsed Drain Current ^①	76	
V_{GS}	Gate-Source Voltage Continuous	± 30	Volts
V_{GSM}	Gate-Source Voltage Transient	± 40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	450	Watts
	Linear Derating Factor	3.6	W/°C
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	300	
I_{AR}	Avalanche Current ^① (Repetitive and Non-Repetitive)	19	Amps
E_{AR}	Repetitive Avalanche Energy ^①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ^④	2500	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu\text{A}$)	1000			Volts
$I_{D(on)}$	On State Drain Current ^② ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$)	19			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_{D[Cont.]}$)			0.500	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 2.5\text{mA}$)	2		4	Volts

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

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DYNAMIC CHARACTERISTICS

APT10050JVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$		6600	7900	pF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		595	830	
C_{rss}	Reverse Transfer Capacitance	$f = 1\text{ MHz}$		290	430	
Q_g	Total Gate Charge ^③	$V_{GS} = 10V$		335	500	nC
Q_{gs}	Gate-Source Charge	$V_{DD} = 0.5 V_{DSS}$		29	45	
Q_{gd}	Gate-Drain ("Miller") Charge	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		165	250	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		16	32	ns
t_r	Rise Time	$V_{DD} = 0.5 V_{DSS}$		13	26	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		59	90	
t_f	Fall Time	$R_G = 0.6\Omega$		8	16	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			19	Amps
I_{SM}	Pulsed Source Current ^① (Body Diode)			76	
V_{SD}	Diode Forward Voltage ^② ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ^⑤			5	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$)	$T_j = 25^\circ\text{C}$		300	ns
		$T_j = 125^\circ\text{C}$		600	
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$)	$T_j = 25^\circ\text{C}$	1.7		μC
		$T_j = 125^\circ\text{C}$	4.8		
I_{RRM}	Peak Recovery Current ($I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$)	$T_j = 25^\circ\text{C}$	12		Amps
		$T_j = 125^\circ\text{C}$	19		

THERMAL/PACKAGE CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.28	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	
$V_{isolation}$	RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.)	2500			Volts
Torque	Maximum Torque for Device Mounting Screws and Electrical Terminations.			13	lb•in

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 $T_j = +25^\circ\text{C}$, $L = 13.85\text{mH}$, $R_G = 25\Omega$, Peak $I_L = 19\text{A}$

⑤ $I_S \leq -I_D [\text{Cont.}], di/dt = 100A/\mu s, V_{DD} \leq V_{DSS}, T_j \leq 150^\circ\text{C}, R_G = 2.0\Omega, V_R = 200\text{V}$

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

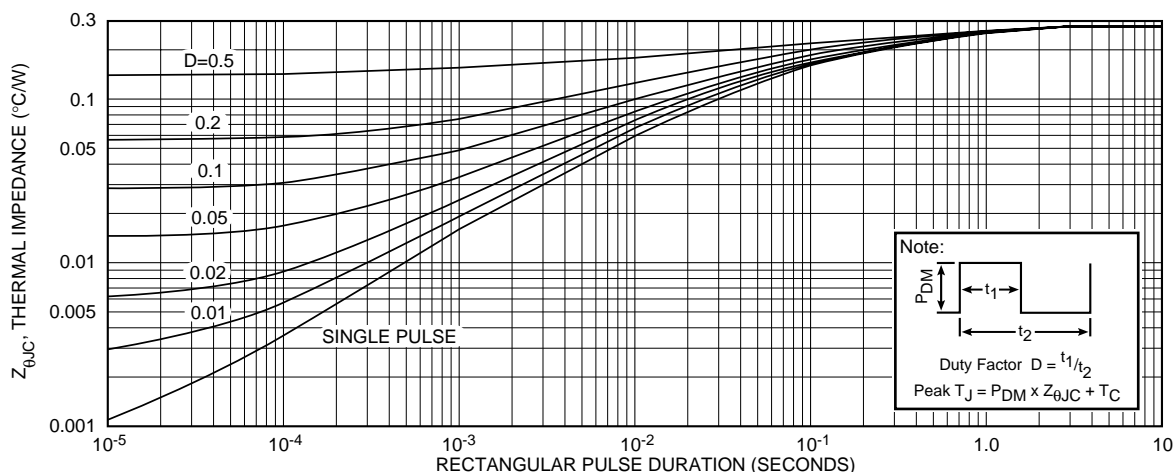


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT10050JVFR

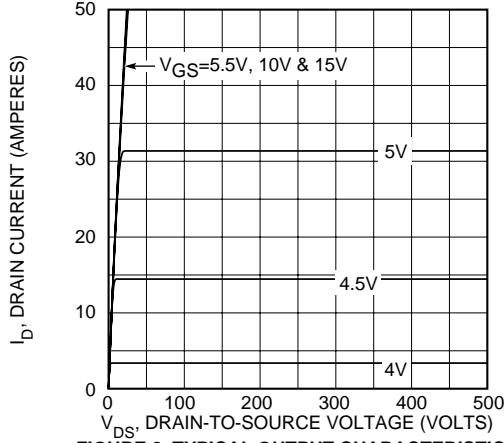


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

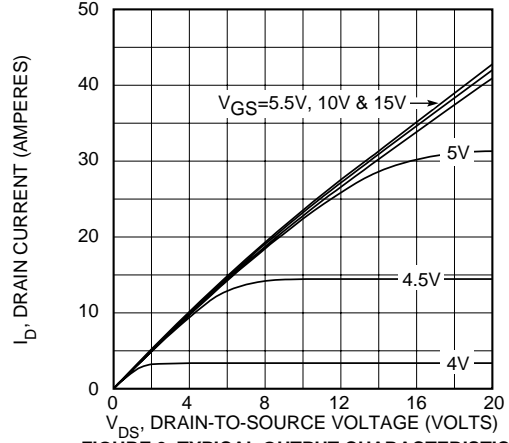


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

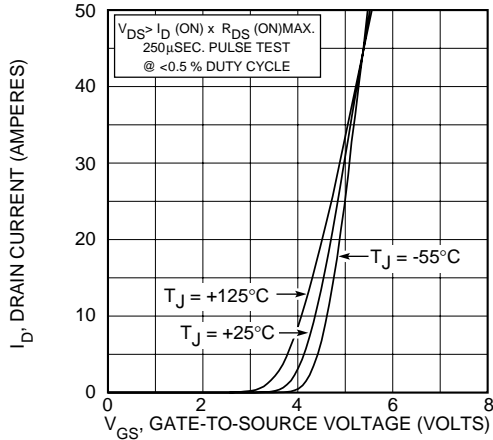


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

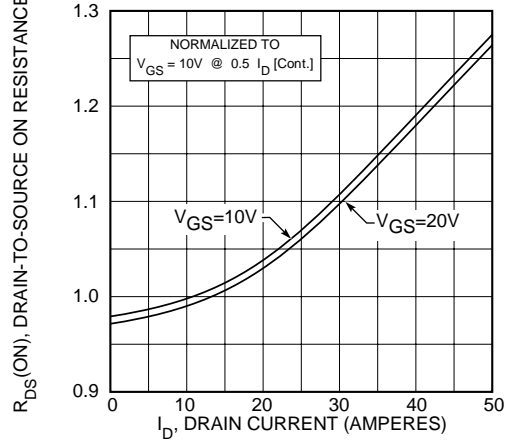


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

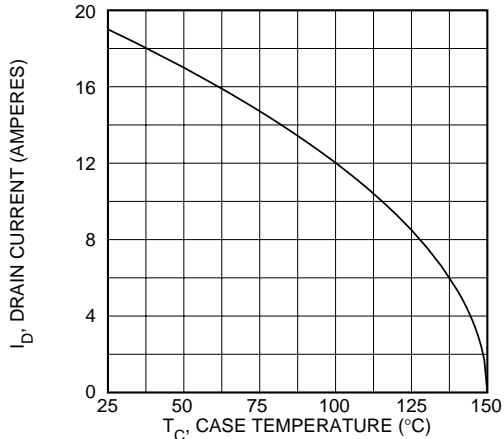


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

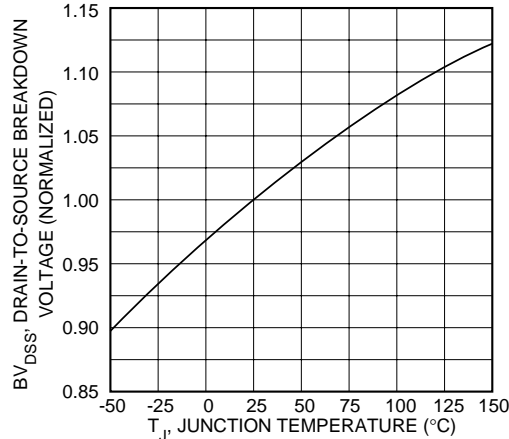


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

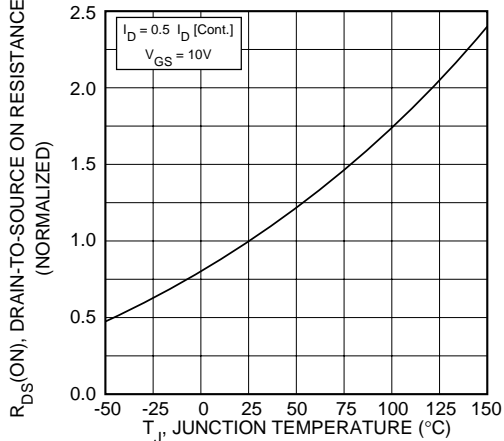


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

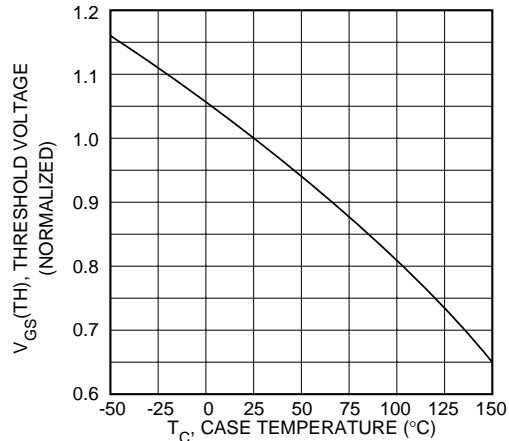


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

APT10050JVFR

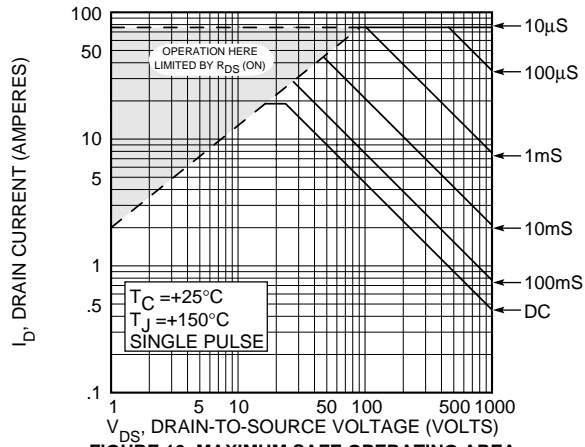


FIGURE 10, MAXIMUM SAFE OPERATING AREA

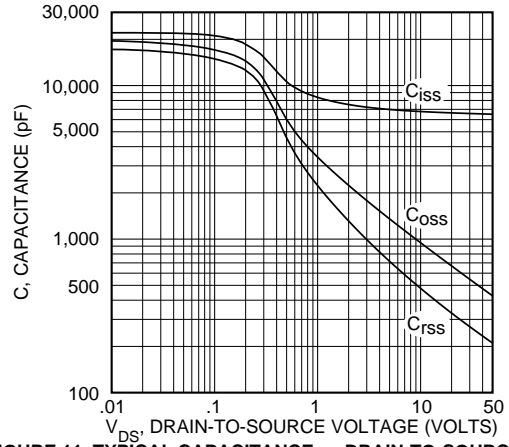


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

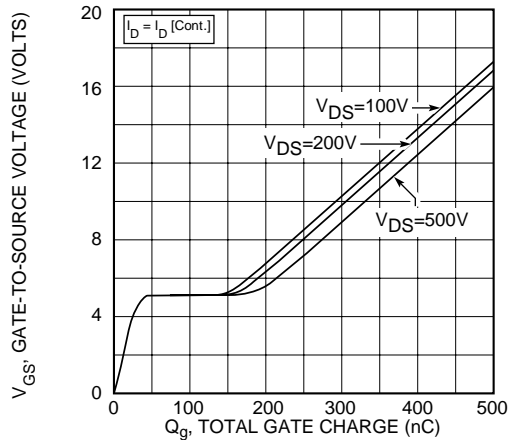


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

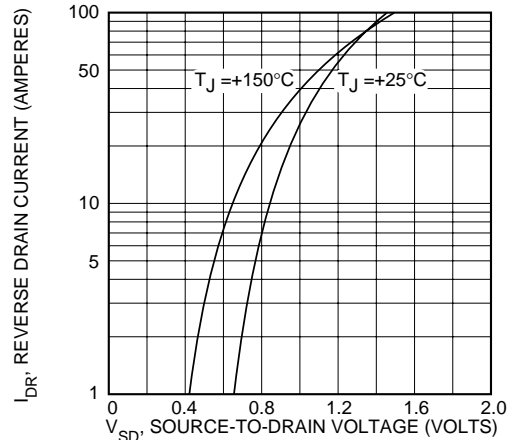
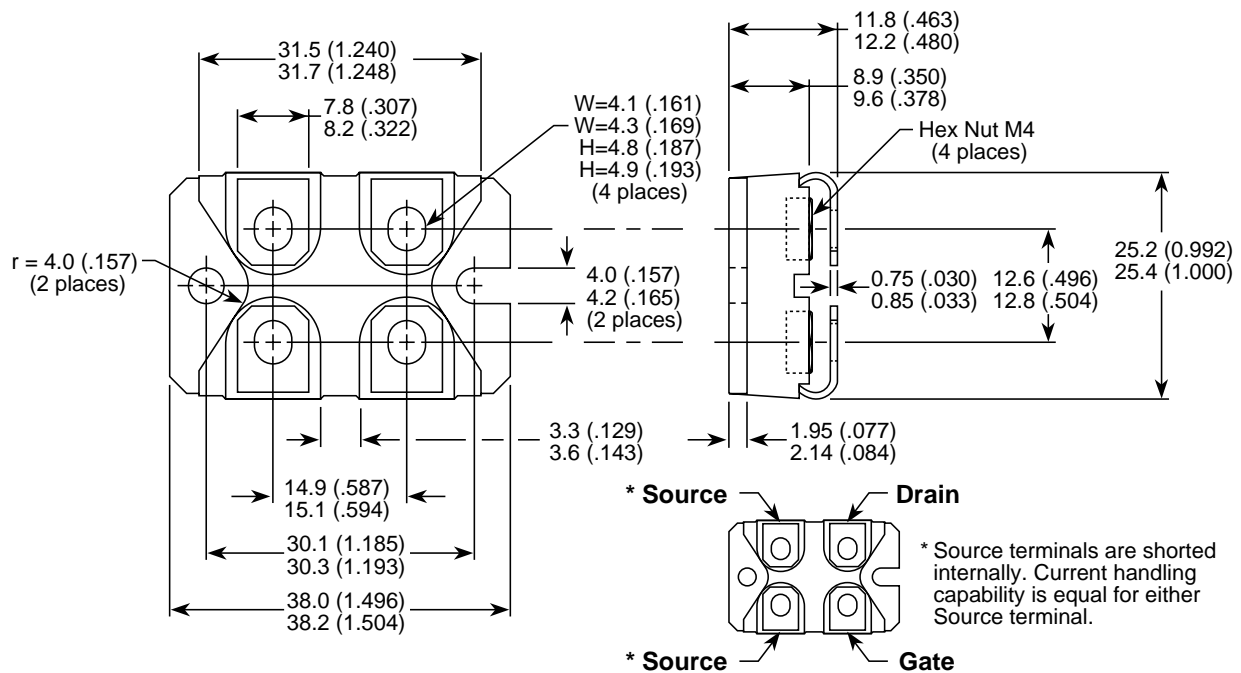


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)

ISOTOP® is a Registered Trademark of SGS Thomson.

UL Recognized File No. E145592

APT's devices are covered by one or more of the following U.S. patents: 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336
5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058