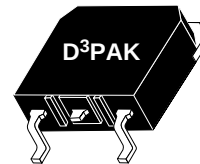
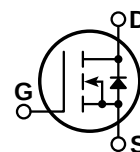


POWER MOS V®

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.



- Faster Switching
- 100% Avalanche Tested
- Lower Leakage
- Surface Mount D³PAK Package



MAXIMUM RATINGS

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

Symbol	Parameter	APT20M38SVR	UNIT
V_{DSS}	Drain-Source Voltage	200	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	67	Amps
I_{DM}	Pulsed Drain Current ^①	268	
V_{GS}	Gate-Source Voltage Continuous	± 30	Volts
V_{GSM}	Gate-Source Voltage Transient	± 40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	370	Watts
	Linear Derating Factor	2.96	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)	67	Amps
E_{AR}	Repetitive Avalanche Energy ^①	30	mJ
E_{AS}	Single Pulse Avalanche Energy ^④	1300	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu\text{A}$)	200			Volts
$I_{D(on)}$	On State Drain Current ^② ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$)	67			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_{D[Cont.]}$)			0.038	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			25	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			250	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0\text{mA}$)	2		4	Volts



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

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DYNAMIC CHARACTERISTICS

APT20M38SVR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		5100	6120	pF
C_{oss}	Output Capacitance			1145	1600	
C_{rss}	Reverse Transfer Capacitance			390	585	
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$		148	225	nC
Q_{gs}	Gate-Source Charge			47	75	
Q_{gd}	Gate-Drain ("Miller") Charge			75	110	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$ $R_G = 1.6\Omega$		14	28	ns
t_r	Rise Time			21	42	
$t_{d(off)}$	Turn-off Delay Time			48	75	
t_f	Fall Time			10	20	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			67	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)			268	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V$, $I_S = -I_{D[Cont.]}$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_{D[Cont.]}$, $di_S/dt = 100A/\mu s$)		160		ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_{D[Cont.]}$, $di_S/dt = 100A/\mu s$)		1.3		μC

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.34	$^\circ C/W$
$R_{\theta JA}$	Junction to Ambient			40	

① Repetitive Rating: Pulse width limited by maximum junction temperature.

③ See MIL-STD-750 Method 3471

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

④ Starting $T_j = +25^\circ C$, $L = 0.58mH$, $R_G = 25\Omega$, Peak $I_L = 67A$

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

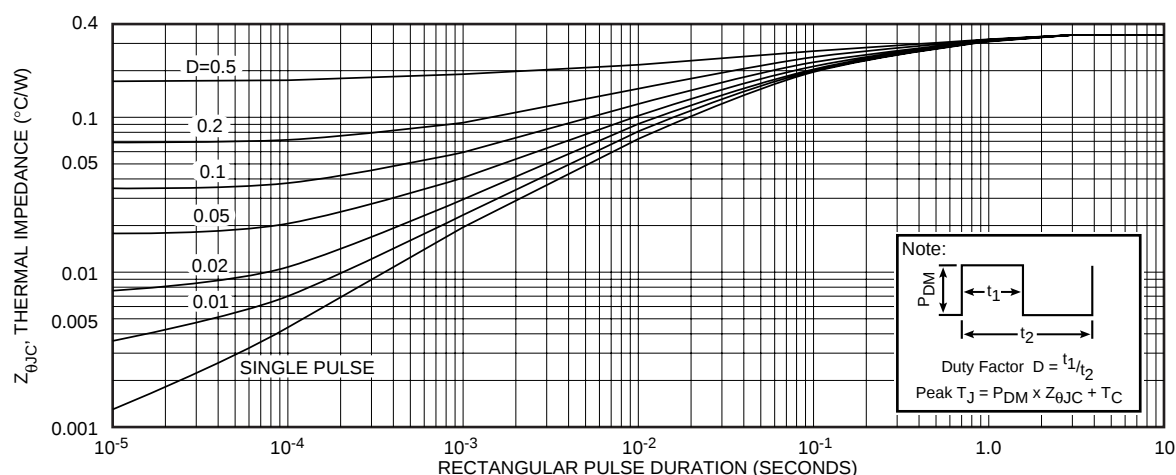


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT20M38SVR

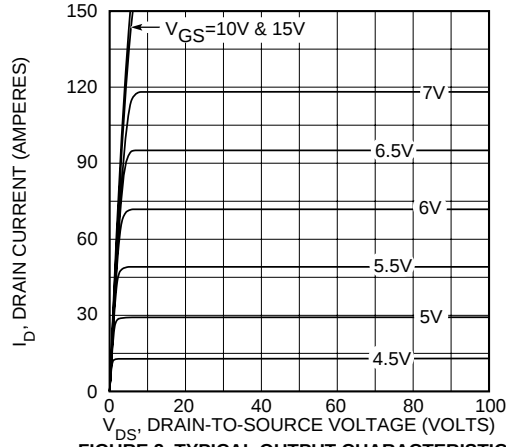


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

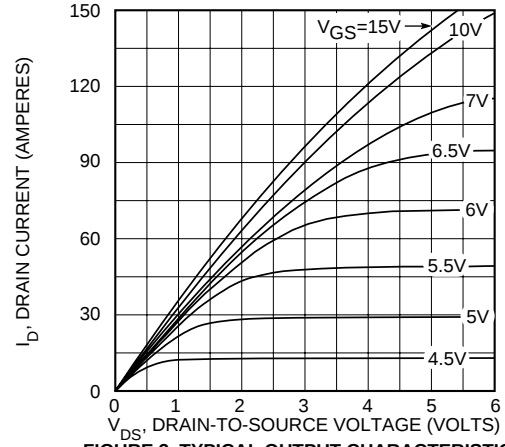


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

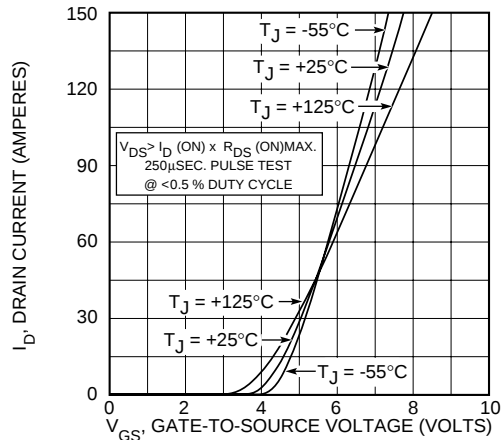


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

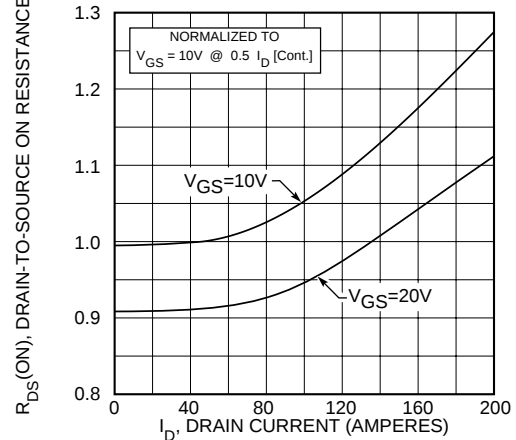


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

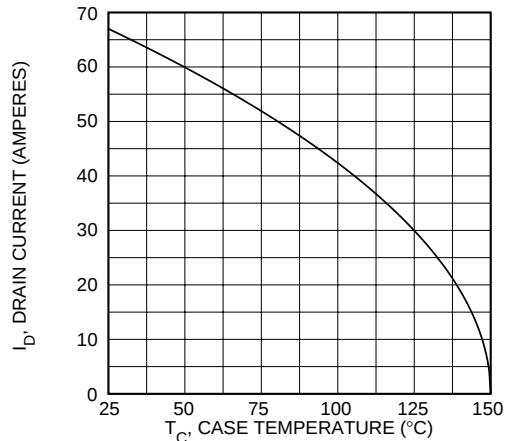


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

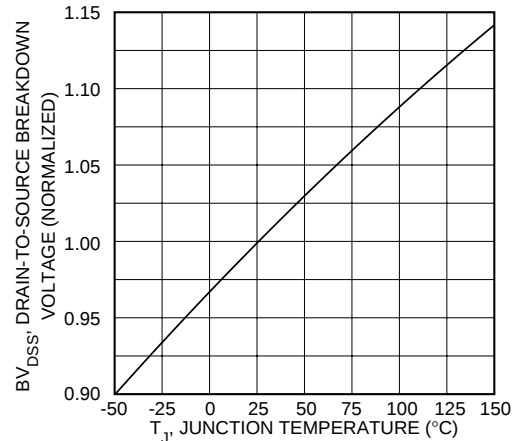


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

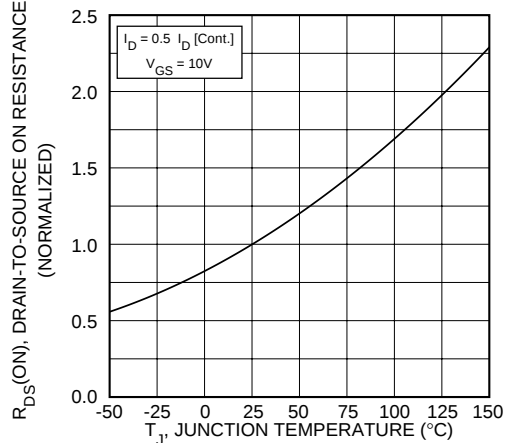


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

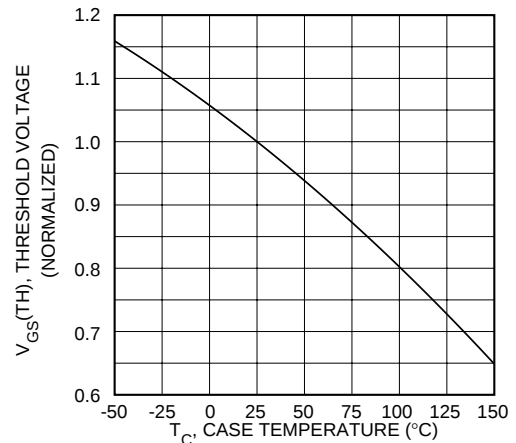
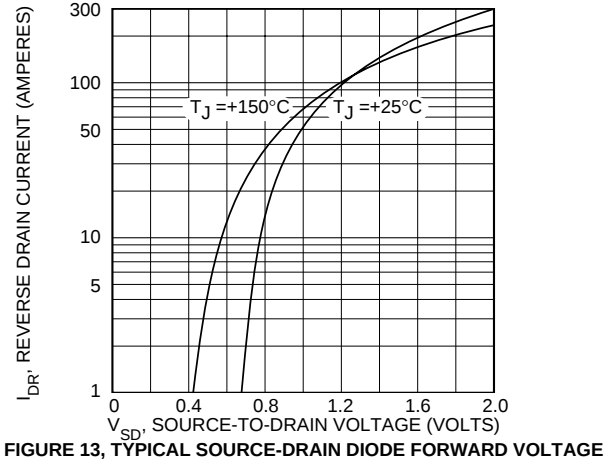
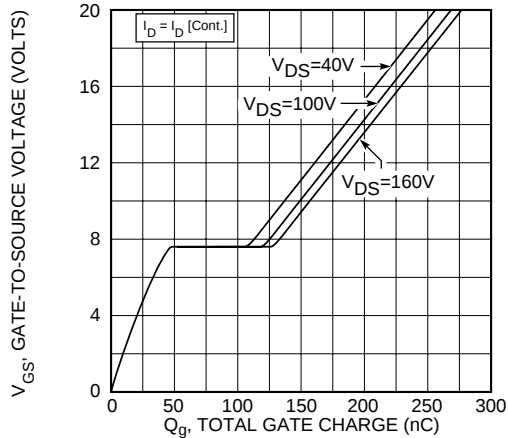
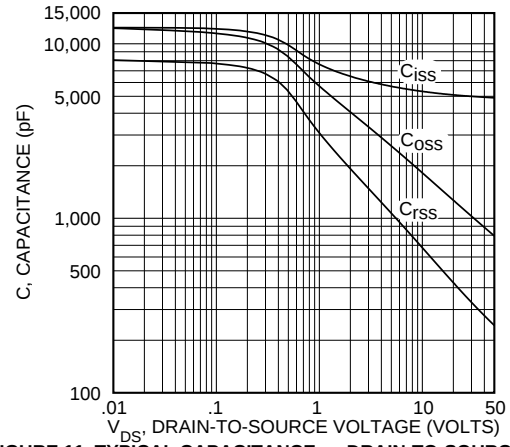


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

Figure 10 is a graph showing the Maximum Drain Current (I_D) versus Pulse Width (t) for the 2N4350 MOSFET. The Y-axis represents I_D in Amperes (logarithmic scale, 1 to 300). The X-axis represents t in seconds (logarithmic scale, 1 to 200). The graph includes curves for pulse widths of $10\mu\text{s}$, $100\mu\text{s}$, 1ms , 10ms , 100ms , and DC . A shaded region indicates "OPERATION HERE LIMITED BY $R_{DS(\text{ON})}$ ". The conditions are $T_C = +25^\circ\text{C}$, $T_J = +150^\circ\text{C}$, and SINGLE PULSE.



Technical drawing of a 100-watt power MOSFET package showing three views: side, top, and bottom. The side view shows a drain (heat sink) and a gate. The top view shows the drain, gate, and source. The bottom view shows the source, drain, and gate. Dimensions are provided in millimeters and inches.

Side View Dimensions:

- Drain (Heat Sink) width: 4.98 (.196)
- Drain (Heat Sink) height: 5.08 (.200)
- Gate width: 1.47 (.058)
- Gate height: 1.57 (.062)
- Gate to Drain distance: 0.46 (.018)
- Gate to Drain distance (3 Plcs): 0.56 (.022)
- Gate to Drain distance: 0.020 (.001)
- Gate to Drain distance: 0.178 (.007)
- Gate to Drain distance: 2.67 (.105)
- Gate to Drain distance: 2.84 (.112)

Top View Dimensions:

- Drain width: 15.95 (.628)
- Drain height: 16.05 (.632)
- Gate width: 13.79 (.543)
- Gate height: 13.99 (.551)
- Gate to Drain distance: 1.04 (.041)
- Gate to Drain distance: 1.15 (.045)
- Gate to Drain distance: 1.27 (.050)
- Gate to Drain distance: 1.40 (.055)
- Gate to Drain distance: 1.98 (.078)
- Gate to Drain distance: 2.08 (.082)
- Gate to Drain distance: 5.45 (.215) BSC {2 Plcs.}
- Gate to Drain distance: 1.22 (.048)
- Gate to Drain distance: 1.32 (.052)

Bottom View Dimensions:

- Drain width: 13.41 (.528)
- Drain height: 13.51 (.532)
- Gate width: 11.51 (.453)
- Gate height: 11.61 (.457)
- Gate to Drain distance: 3.81 (.150)
- Gate to Drain distance: 4.06 (.160) (Base of Lead)

Labels:

- Drain (Heat Sink)
- Gate
- Source
- Drain
- Gate
- Heat Sink (Drain) and Leads are Plated

Dimensions in Millimeters (Inches)