



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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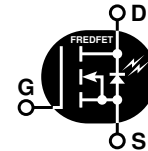
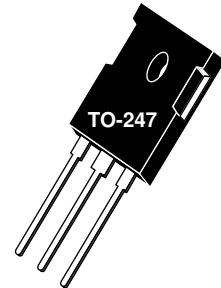
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POWER MOS V®
FREDFET

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 TO-247 Package

MAXIMUM RATINGS

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

Symbol	Parameter	APT20M45BVFR(G)	UNIT
V_{DSS}	Drain-Source Voltage	200	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	56	Amps
I_{DM}	Pulsed Drain Current ^①	224	
V_{GS}	Gate-Source Voltage Continuous	± 30	Volts
V_{GSM}	Gate-Source Voltage Transient	± 40	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	300	Watts
	Linear Derating Factor	2.4	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)	56	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, $V_{GS} = 10V$)	56			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_{D[Cont.]}$)			0.045	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 ($V_{DS} = V_{GS}, I_D = 1.0\text{mA}$)	2		4	Volts


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

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DYNAMIC CHARACTERISTICS

APT20M45BVFR(G)

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C _{iss}	Input Capacitance	V _{GS} = 0V		4050	4860	pF
C _{oss}	Output Capacitance	V _{DS} = 25V		980	1375	
C _{rss}	Reverse Transfer Capacitance	f = 1 MHz		300	450	
Q _g	Total Gate Charge ③	V _{GS} = 10V		130	195	nC
Q _{gs}	Gate-Source Charge	V _{DD} = 0.5 V _{DSS}		30	45	
Q _{gd}	Gate-Drain ("Miller") Charge	I _D = I _D [Cont.] @ 25°C		55	80	
t _{d(on)}	Turn-on Delay Time	V _{GS} = 15V		12	24	ns
t _r	Rise Time	V _{DD} = 0.5 V _{DSS}		14	28	
t _{d(off)}	Turn-off Delay Time	I _D = I _D [Cont.] @ 25°C		43	70	
t _f	Fall Time	R _G = 1.6Ω		7	14	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I _S	Continuous Source Current (Body Diode)			56	Amps
I _{SM}	Pulsed Source Current ① (Body Diode)			224	
V _{SD}	Diode Forward Voltage ② (V _{GS} = 0V, I _S = -I _D [Cont.])			1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⑤			5	V/ns
t _{rr}	Reverse Recovery Time (I _S = -I _D [Cont.], di/dt = 100A/μs)	T _j = 25°C		200	ns
		T _j = 125°C		300	
Q _{rr}	Reverse Recovery Charge (I _S = -I _D [Cont.], di/dt = 100A/μs)	T _j = 25°C	0.7		μC
		T _j = 125°C	2.4		
I _{RRM}	Peak Recovery Current (I _S = -I _D [Cont.], di/dt = 100A/μs)	T _j = 25°C	10		Amps
		T _j = 125°C	18		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
R _{θJC}	Junction to Case			0.42	°C/W
R _{θJA}	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°C, L = 0.83mH, R_G = 25Ω, Peak I_L = 56A

⑤ I_S ≤ -I_D [Cont.], di/dt = 100A/μs, V_{DD} ≤ V_{DSS}, T_j ≤ 150°C, R_G = 2.0Ω, V_R = 200V.

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

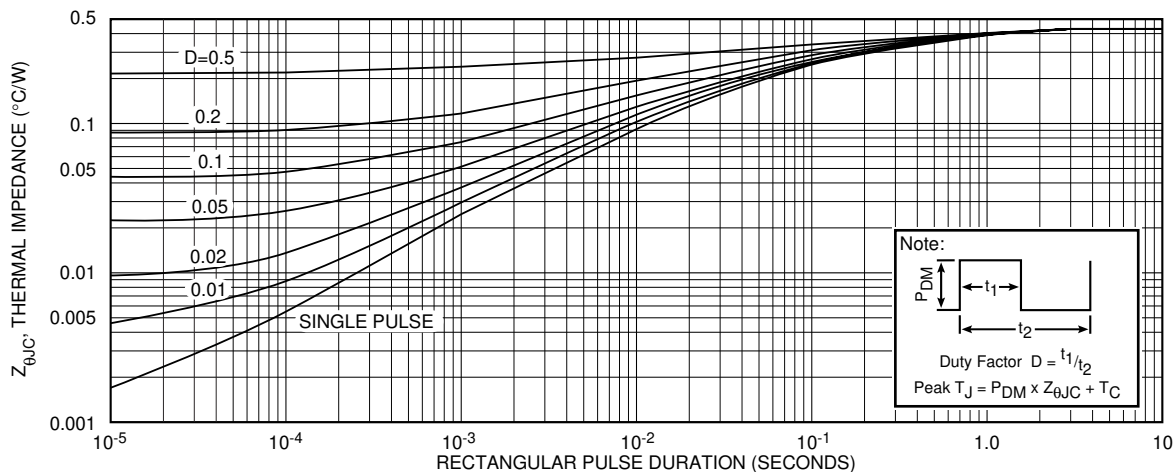


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT20M45BVFR(G)

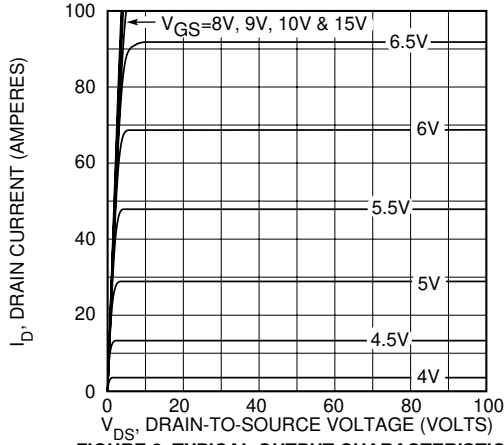


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

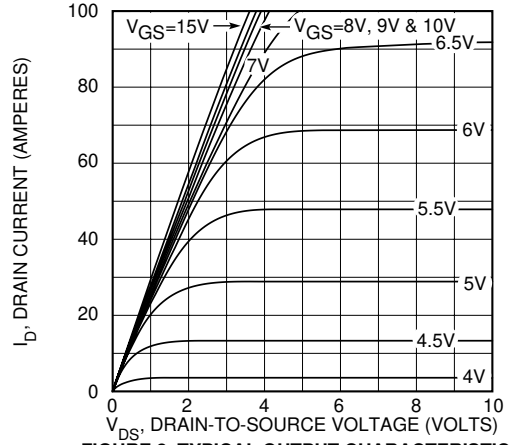


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

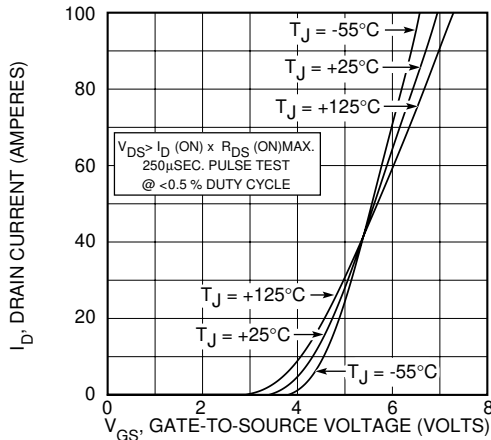


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

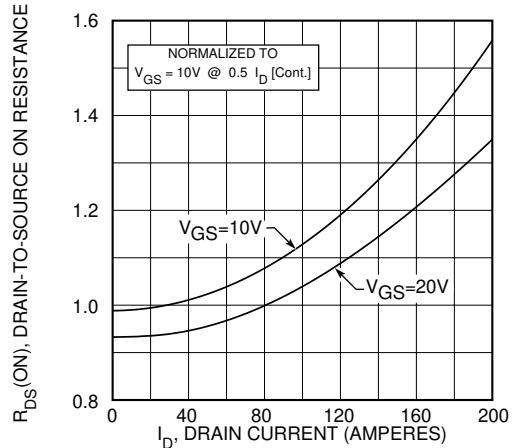


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

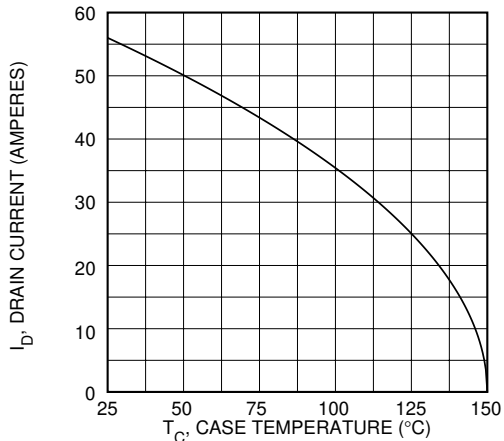


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

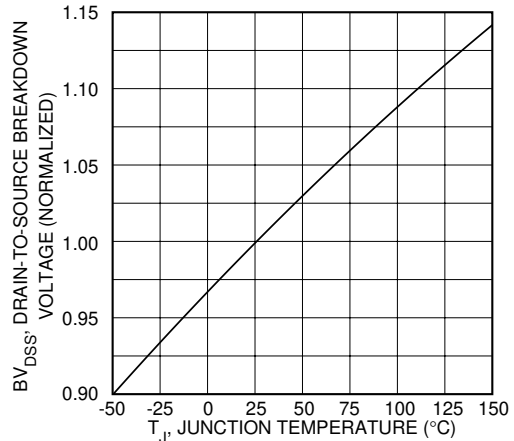


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

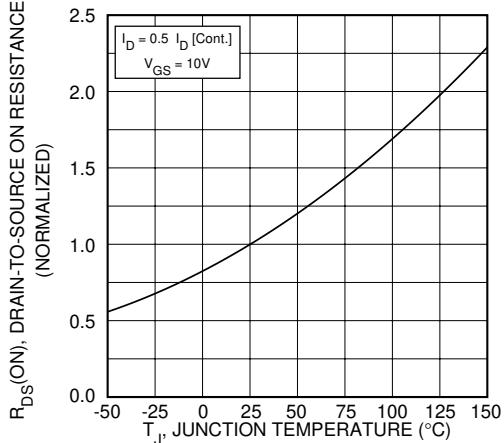


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

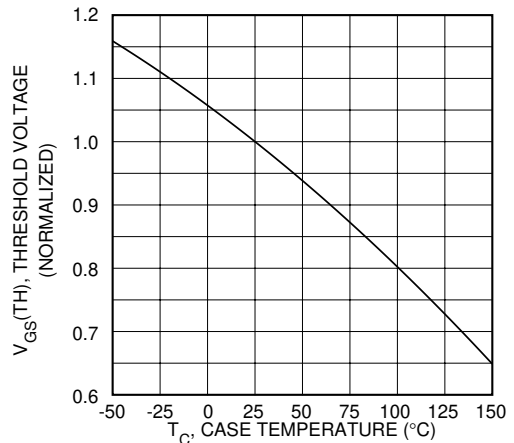


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

APT20M45BVFR(G)

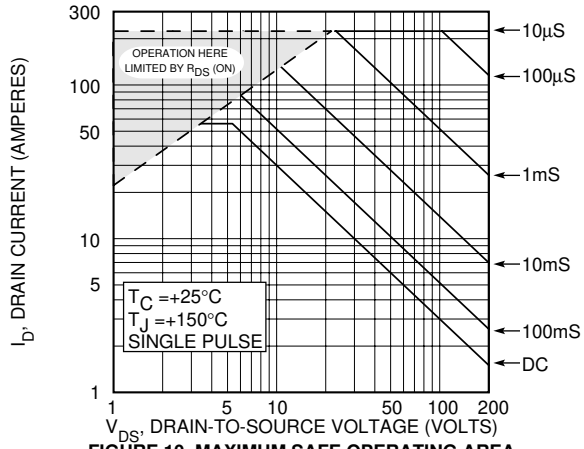


FIGURE 10, MAXIMUM SAFE OPERATING AREA

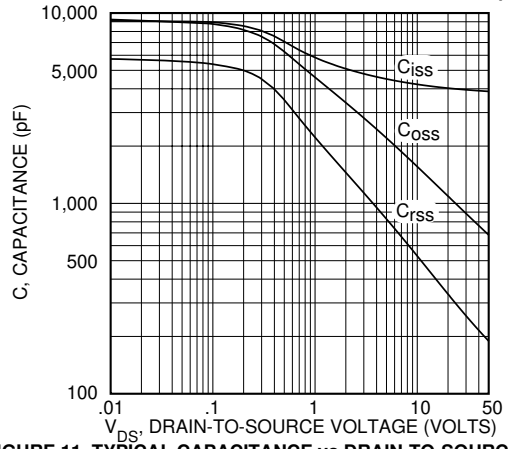


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

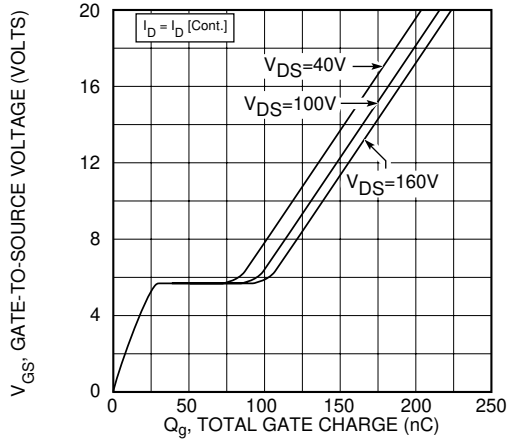


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

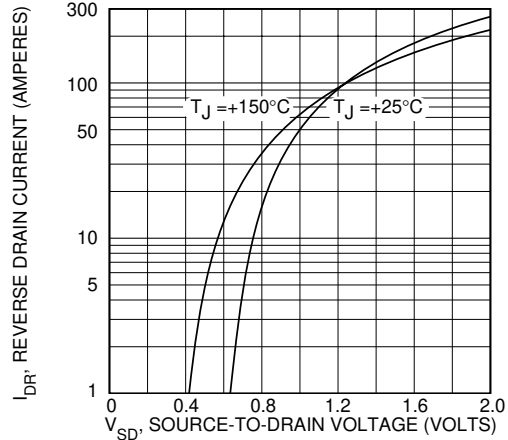
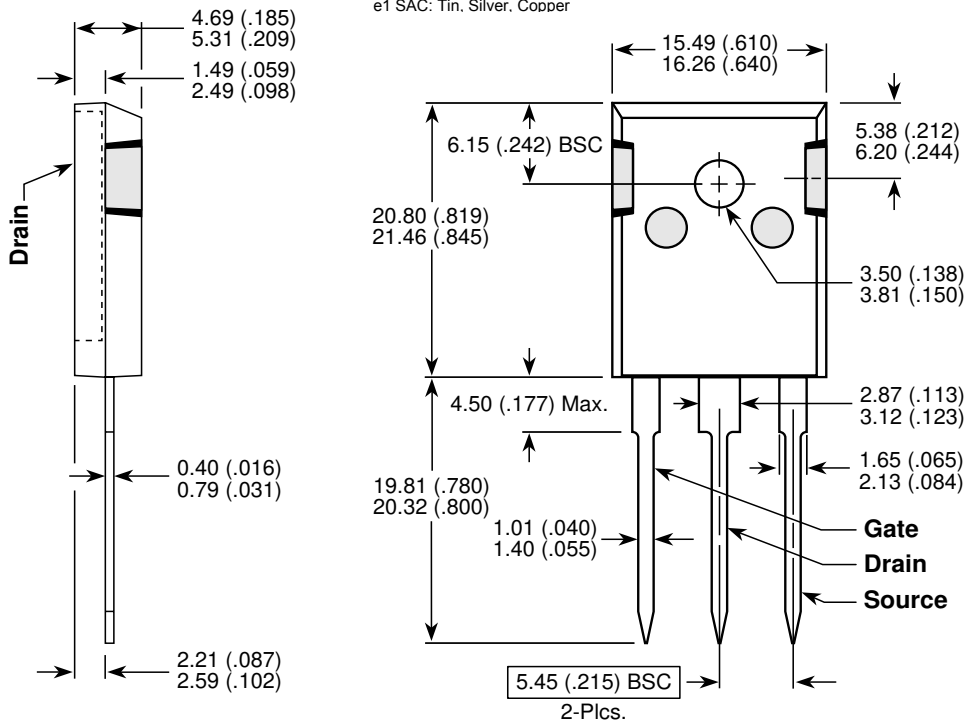


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247 Package Outline

e1 SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)