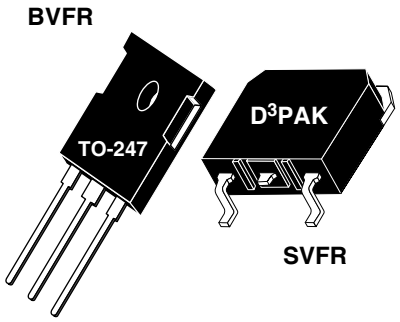
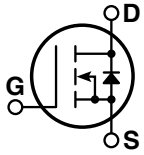
APT10M19BVFR
APT10M19SVFR
100V 75A 0.019Ω

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.

- **Faster Switching**
- **Avalanche Energy Rated**
- **Lower Leakage**
- **FAST RECOVERY BODY DIODE**
- **TO-247 or Surface Mount D³PAK Package**



MAXIMUM RATINGS All Ratings: $T_C = 25°C$ unless otherwise specified.

Symbol	Parameter	APT10M19BVFR_SVFR	UNIT
V_{DSS}	Drain-Source Voltage	100	Volts
I_D	Continuous Drain Current @ $T_C = 25°C$	75	Amps
I_{DM}	Pulsed Drain Current ①	300	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ $T_C = 25°C$	370	Watts
	Linear Derating Factor	2.96	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)	75	Amps
E_{AR}	Repetitive Avalanche Energy ①	30	mJ
E_{AS}	Single Pulse Avalanche Energy ④	1500	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V$, $I_D = 250\mu A$)	100			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② ($V_{GS} = 10V$, $I_D = 37.5A$)			0.019	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 100V$, $V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 80V$, $V_{GS} = 0V$, $T_C = 125°C$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V$, $V_{DS} = 0V$)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 1mA$)	2		4	Volts

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

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		5100	6120	pF
C_{oss}	Output Capacitance			1900	2660	
C_{rss}	Reverse Transfer Capacitance			800	1200	
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 50V I_D = 75A @ 25°C		200	300	nC
Q_{gs}	Gate-Source Charge			40	60	
Q_{gd}	Gate-Drain ("Miller") Charge			92	140	
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 50V I_D = 75A @ 25°C R_G = 1.6Ω		16	32	ns
t_r	Rise Time			40	80	
$t_{d(off)}$	Turn-off Delay Time			50	75	
t_f	Fall Time			20	40	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				75	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				300	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -75A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				5	V/ns
t_{rr}	Reverse Recovery Time (I_S = -75A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C			200	ns
		T_j = 125°C			350	
Q_{rr}	Reverse Recovery Charge (I_S = -75A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		0.5		µC
		T_j = 125°C		1.0		
I_{RRM}	Peak Recovery Current (I_S = -75A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		8		Amps
		T_j = 125°C		12		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.34	°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°C, L = 0.53mH, R_G = 25Ω, Peak I_L = 75A

⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_D 75A$ $^{di}/_{dt} \leq 700A/\mu s$ $V_R \leq 100V$ $T_J \leq 150°C$

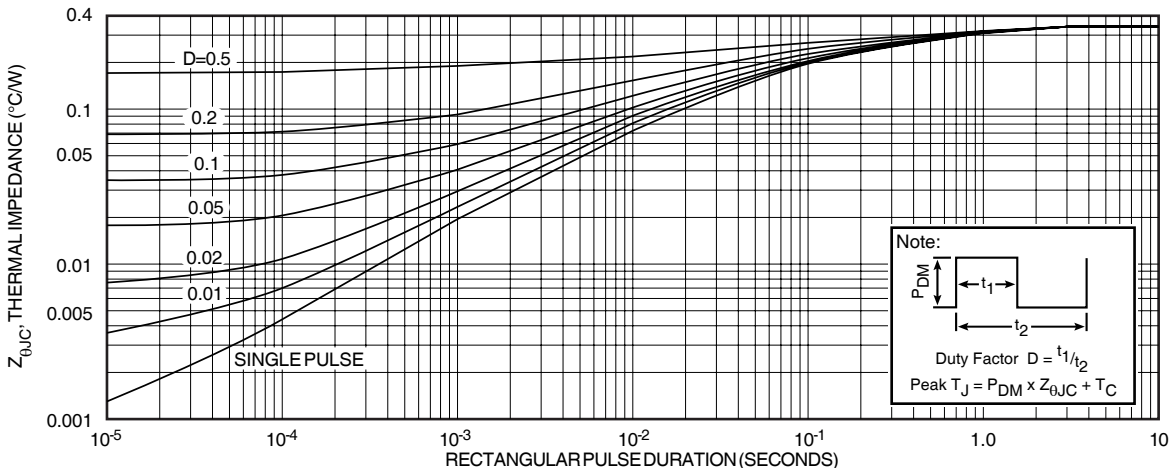


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

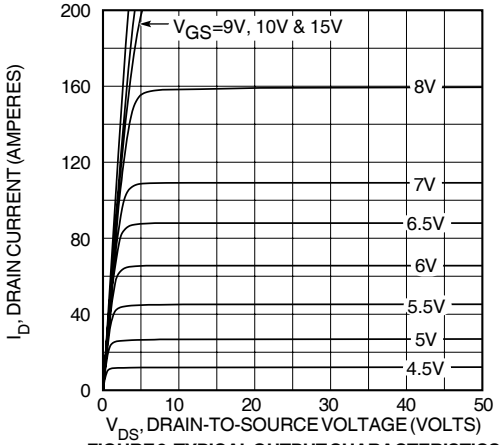


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

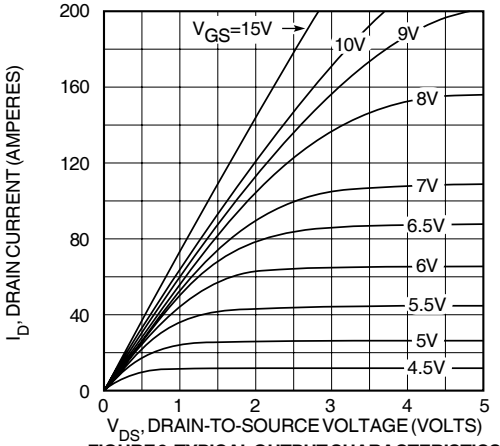


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

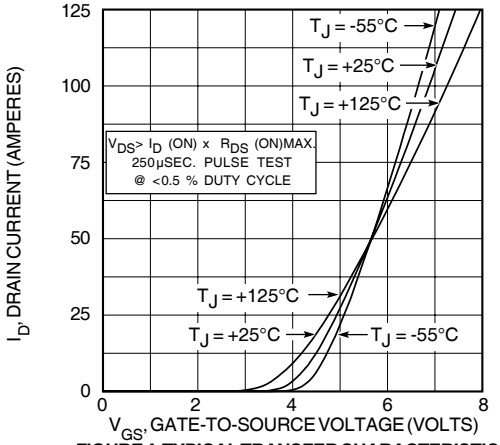


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

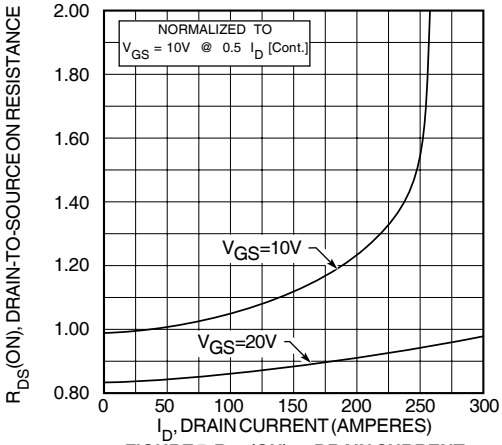


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

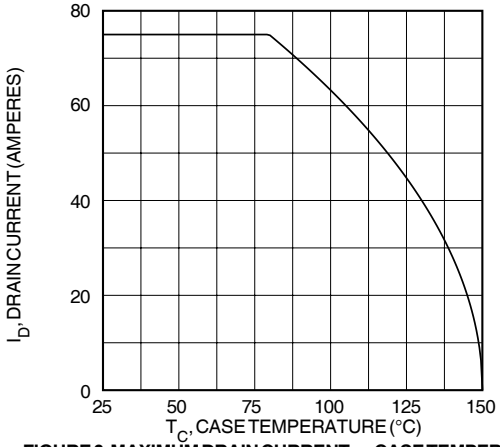


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

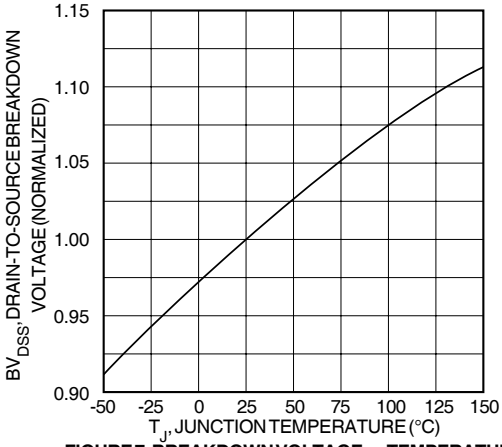


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

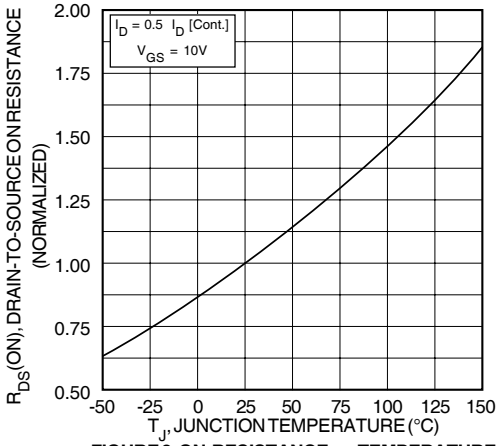


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

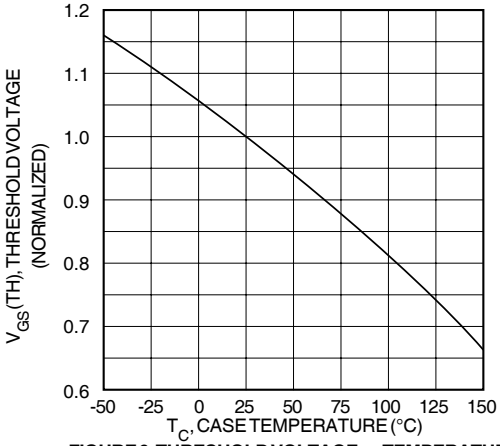


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

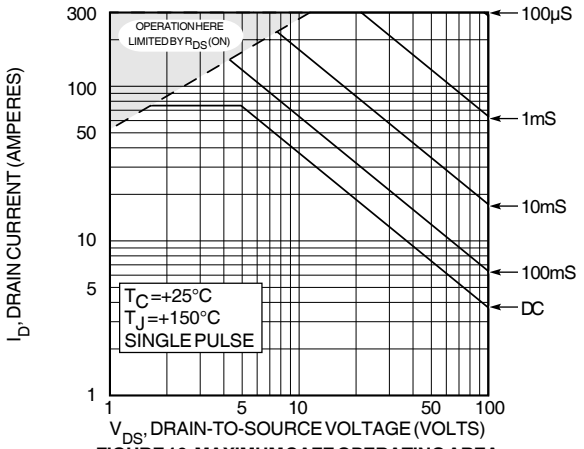


FIGURE 10, MAXIMUM SAFE OPERATING AREA

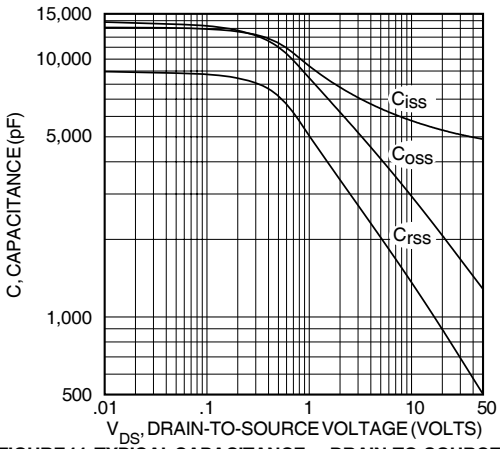


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

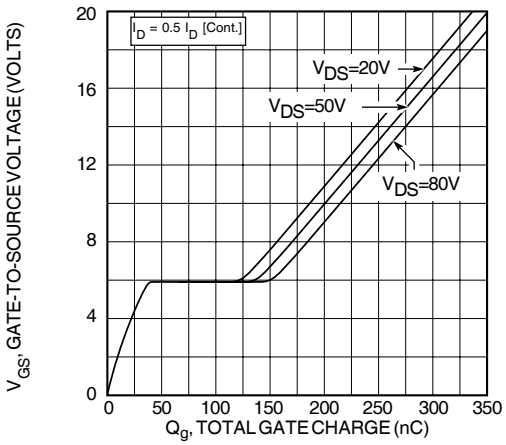


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

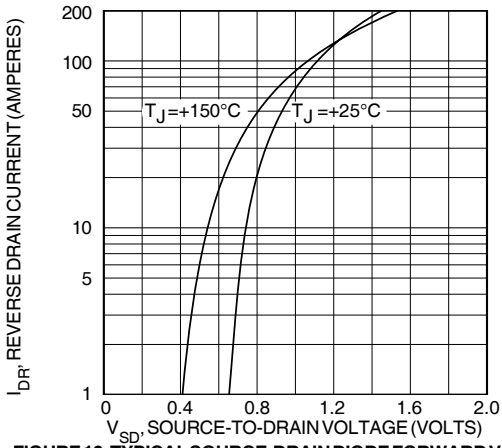
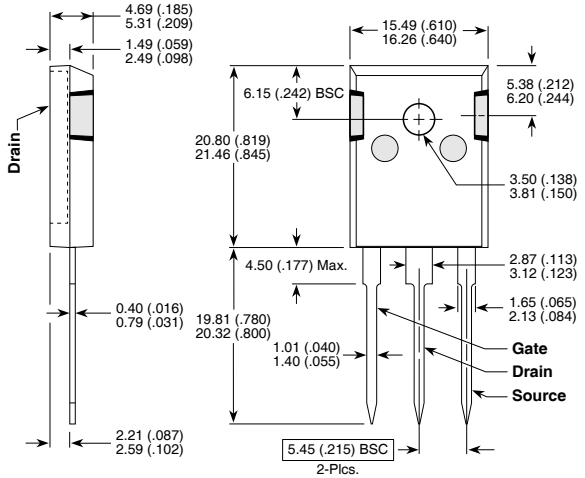


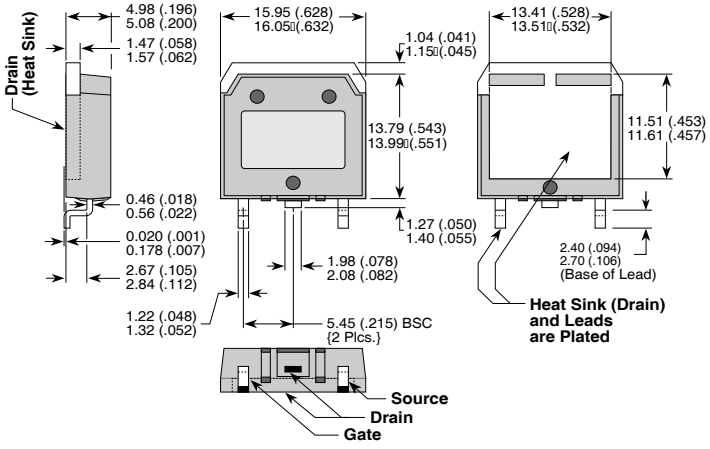
FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247 Package Outline (BVFR)



Dimensions in Millimeters and (Inches)

D^{3}PAK Package Outline (SVFR)



Dimensions in Millimeters (Inches)