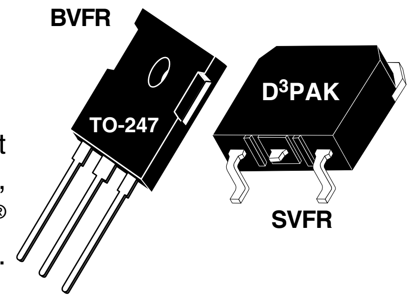
APT1001RBVFR
APT1001RSVFR

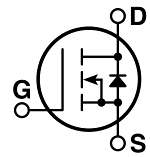
1000V 11A 1.00Ω

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.

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



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

Symbol	Parameter	APT1001RBVFR_SVFR	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
I_D	Continuous Drain Current @ T_C = 25°C	11	Amps
I_{DM}	Pulsed Drain Current ①	44	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ T_C = 25°C	278	Watts
	Linear Derating Factor	2.22	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)	11	Amps
E_{AR}	Repetitive Avalanche Energy ①	30	mJ
E_{AS}	Single Pulse Avalanche Energy ④	1210	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250μA)	1000			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 5.5A)			1.00	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 1000V, V_{GS} = 0V)			250	μA
	Zero Gate Voltage Drain Current (V_{DS} = 800V, V_{GS} = 0V, T_C = 125°C)			1000	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±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		3050		pF
C_{oss}	Output Capacitance			280		
C_{rss}	Reverse Transfer Capacitance			135		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 500V$ $I_D = 11A$ @ 25°C		150		nC
Q_{gs}	Gate-Source Charge			16		
Q_{gd}	Gate-Drain ("Miller") Charge			70		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 500V$ $I_D = 11A$ @ 25°C $R_G = 1.6\Omega$		12		ns
t_r	Rise Time			11		
$t_{d(off)}$	Turn-off Delay Time			55		
t_f	Fall Time			12		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				11	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				44	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V$, $I_S = -11A$)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time ($I_S = -11A$, $^{di}/_{dt} = 100A/\mu s$)	$T_j = 25°C$			200	ns
		$T_j = 125°C$			350	
Q_{rr}	Reverse Recovery Charge ($I_S = -11A$, $^{di}/_{dt} = 100A/\mu s$)	$T_j = 25°C$		0.7		µC
		$T_j = 125°C$		1.5		
I_{RRM}	Peak Recovery Current ($I_S = -11A$, $^{di}/_{dt} = 100A/\mu s$)	$T_j = 25°C$		11		Amps
		$T_j = 125°C$		16		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.45	°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 = 20.0mH, $R_G = 25\Omega$, Peak $I_L = 11A$

⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_D 11A$ $^{di}/_{dt} \leq 700A/\mu s$ $V_R \leq 1000V$ $T_J \leq 150°C$

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

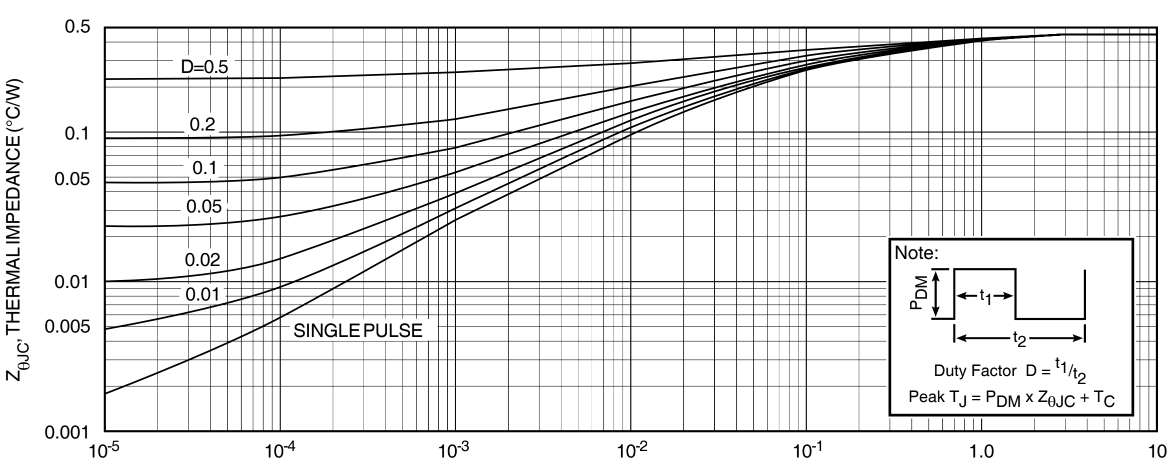


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

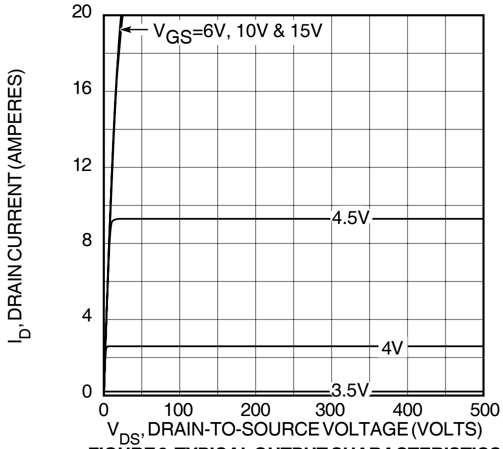


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

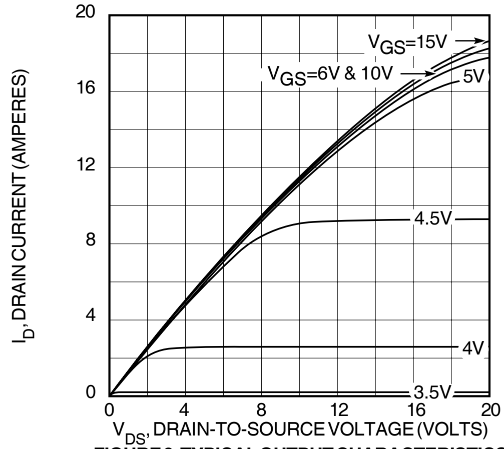


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

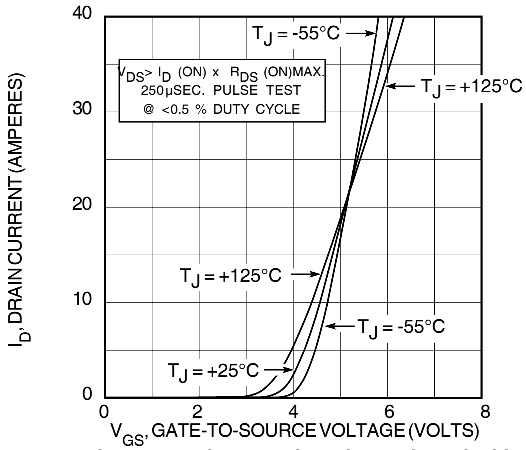


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

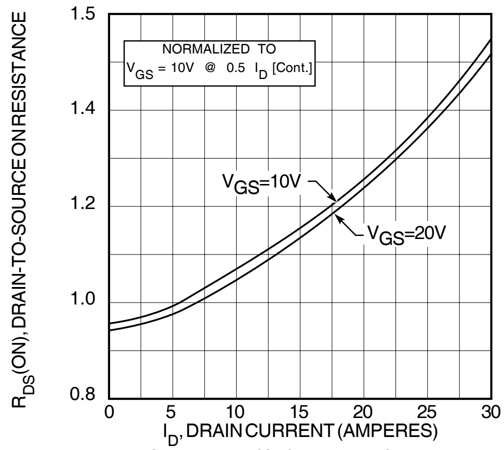


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

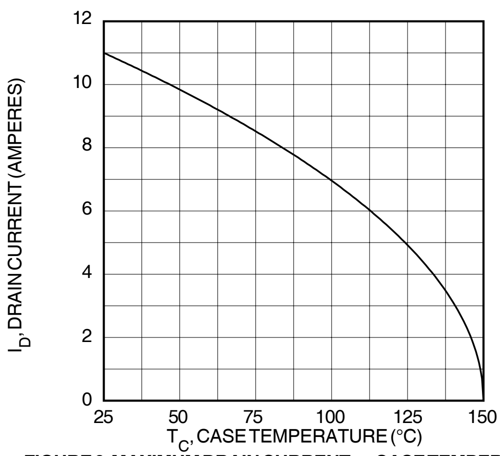


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

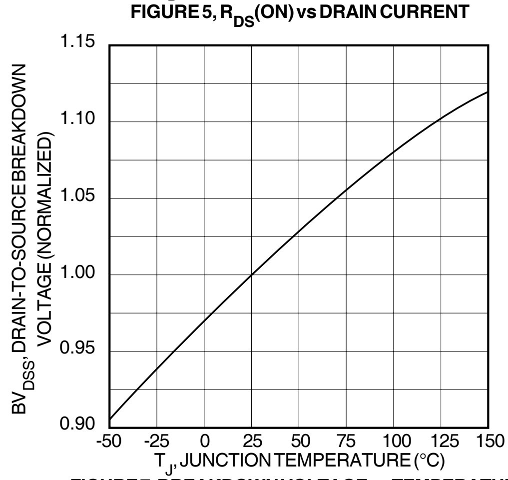


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

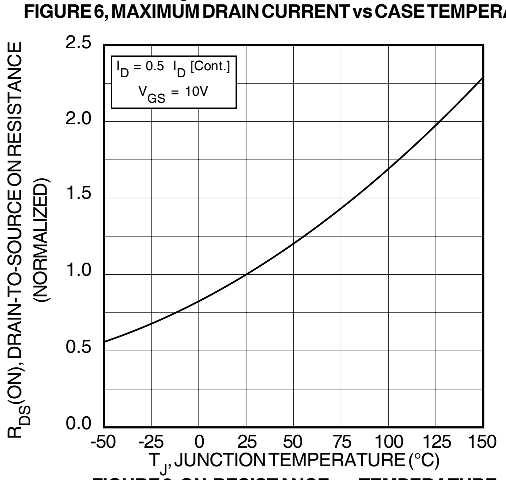


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

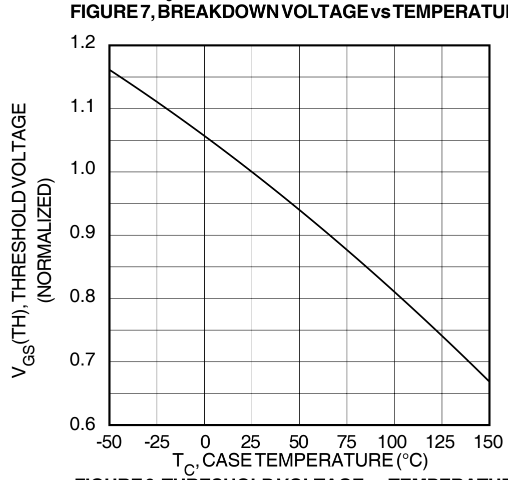


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

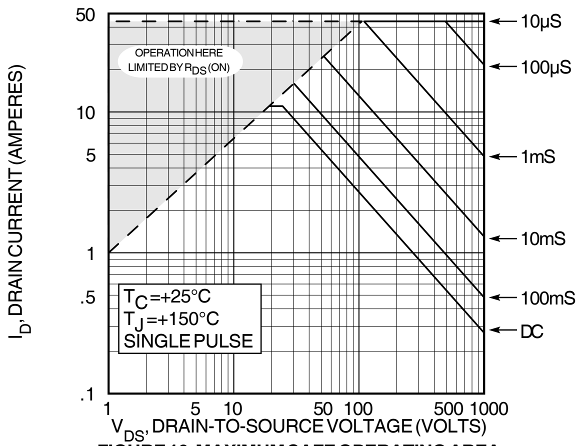


FIGURE 10, MAXIMUM SAFE OPERATING AREA

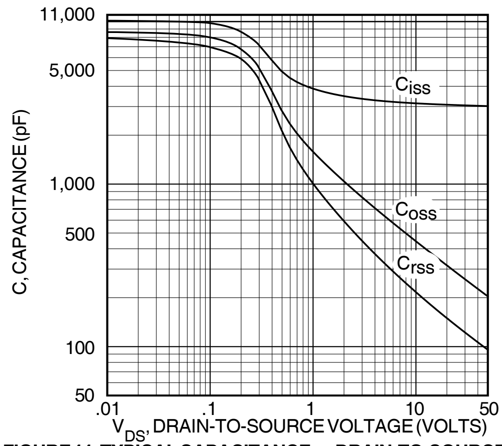


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

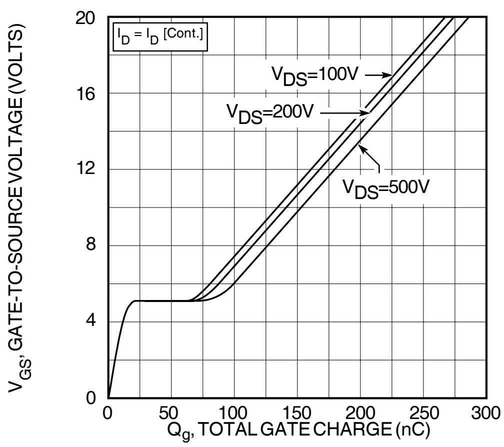


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

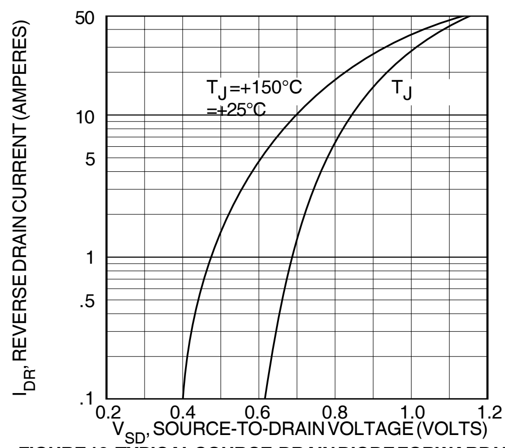
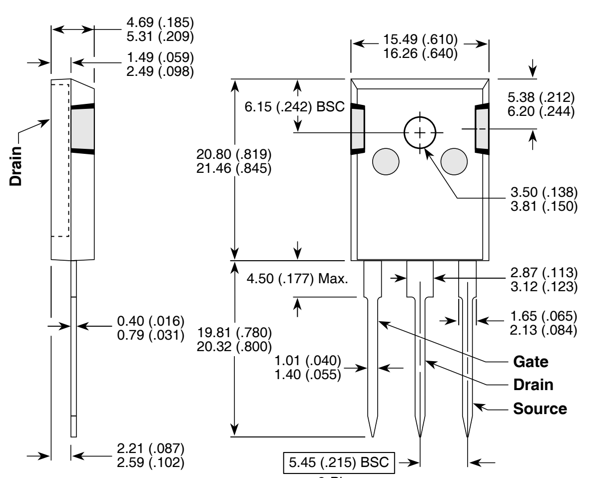


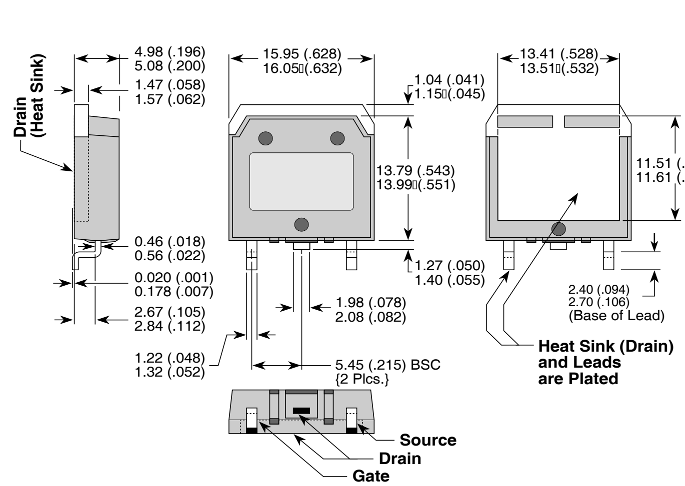
FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247 Package Outline (BVFR)



Dimensions in Millimeters and (Inches)

D³PAK Package Outline (SVFR)



Dimensions in Millimeters (Inches)