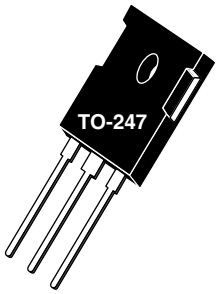
ADVANCED POWER TECHNOLOGY®

APT1201R5BVFR
APT1201R5SVFR

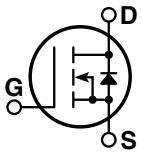
1200V 10A 1.500Ω

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**
- **Lower Leakage**
- **Avalanche Energy Rated**
- **Popular TO-247 Package**



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

Symbol	Parameter	APT1201R5BVFR_SVFR	UNIT
V_{DSS}	Drain-Source Voltage	1200	Volts
I_D	Continuous Drain Current @ T_C = 25°C	10	Amps
I_{DM}	Pulsed Drain Current ①	40	
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)	10	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 = 250µA)	1200			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 5A)			1.500	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 1200V, V_{GS} = 0V)			250	µA
	Zero Gate Voltage Drain Current (V_{DS} = 960V, 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

APT1201R5BVFR_SVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V		3700	4440	pF
C_{oss}	Output Capacitance	V_{DS} = 25V		320	450	
C_{rss}	Reverse Transfer Capacitance	f = 1 MHz		150	225	
Q_g	Total Gate Charge ③	V_{GS} = 10V		190	285	nC
Q_{gs}	Gate-Source Charge	V_{DD} = 600V		16	24	
Q_{gd}	Gate-Drain ("Miller") Charge	I_D = 10A @ 25°C		90	135	
$t_d(on)$	Turn-on Delay Time	V_{GS} = 15V		12	24	ns
t_r	Rise Time	V_{DD} = 600V		10	20	
$t_d(off)$	Turn-off Delay Time	I_D = 10A @ 25°C		50	75	
t_f	Fall Time	R_G = 1.6Ω		14	28	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				10	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				40	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -I_D 10A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time	T_j = 25°C			250	ns
	(I_S = -I_D 10A, $^{di}/_{dt}$ = 100A/μs)	T_j = 125°C			430	
Q_{rr}	Reverse Recovery Charge	T_j = 25°C		1.0		μC
	(I_S = -I_D 10A, $^{di}/_{dt}$ = 100A/μs)	T_j = 125°C		2.5		
I_{RRM}	Peak Recovery Current	T_j = 25°C		11		Amps
	(I_S = -I_D 10A, $^{di}/_{dt}$ = 100A/μs)	T_j = 125°C		17		

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 SStarting T_j = +25°C, L = 26mH, R_G = 25Ω, Peak I_L = 10A

⑤ $I_S \leq I_D$ 10A, $^{di}/_{dt}$ = 100A/μs, $T_j \leq 150°C$, R_G = 2.0Ω V_R = 1200V.

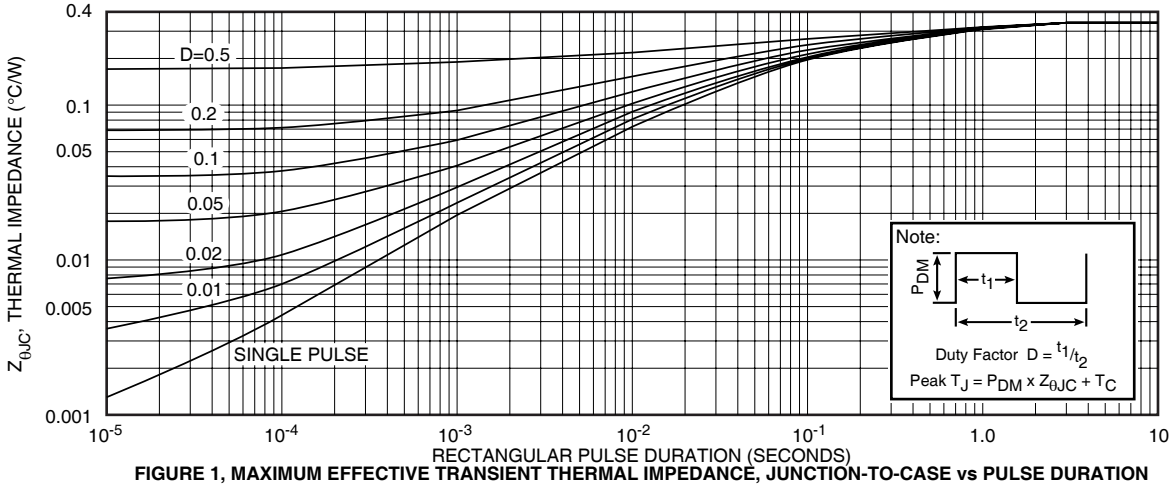


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

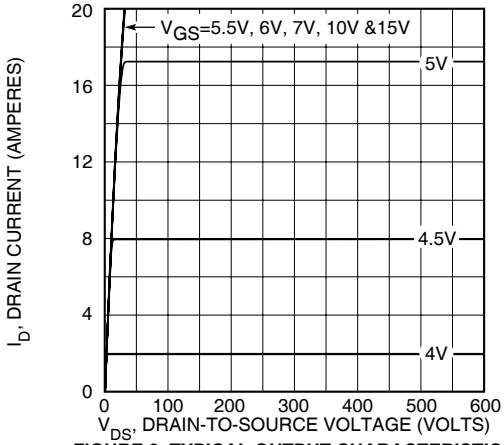


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

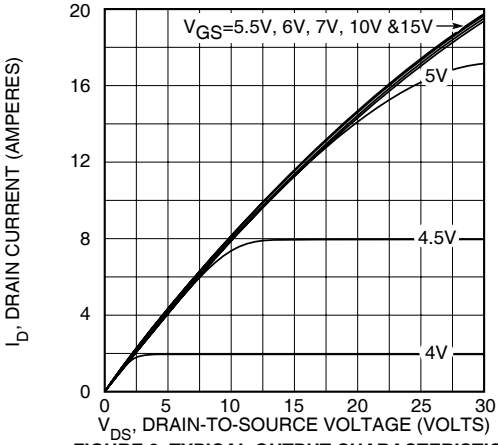


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

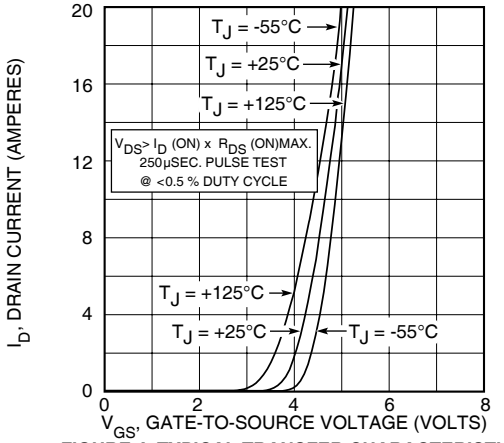


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

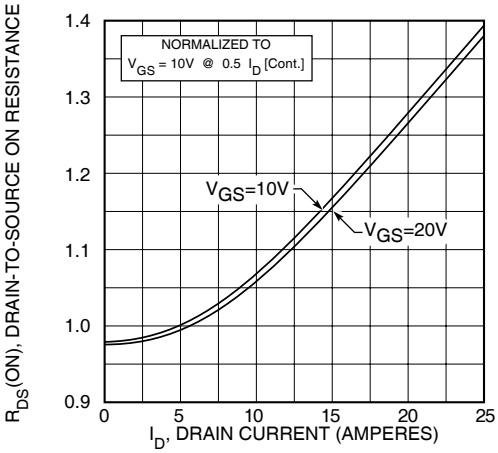


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

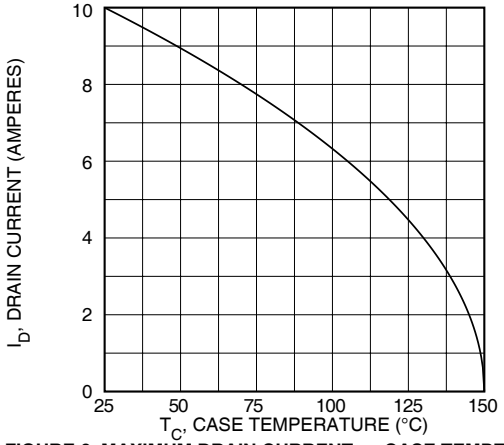


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

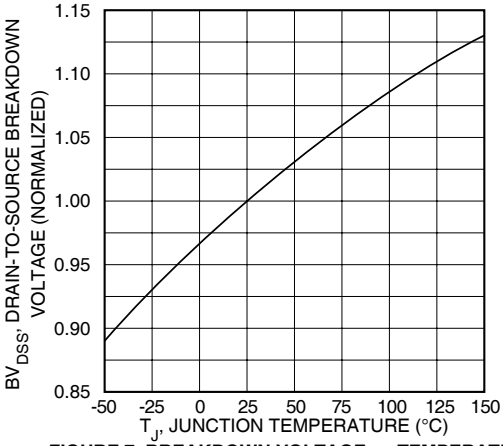


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

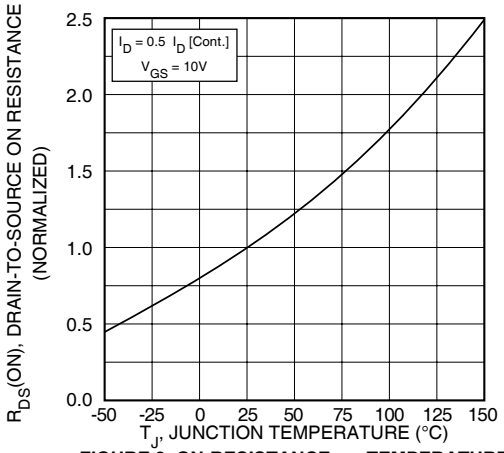


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

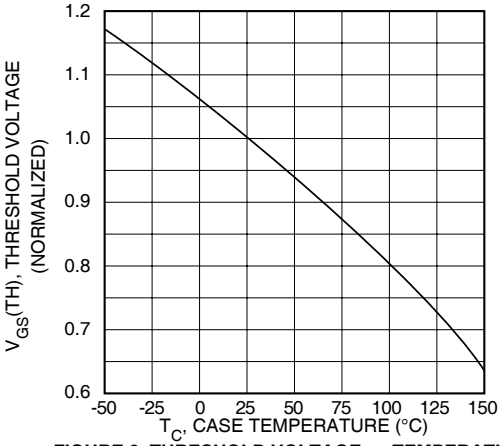


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

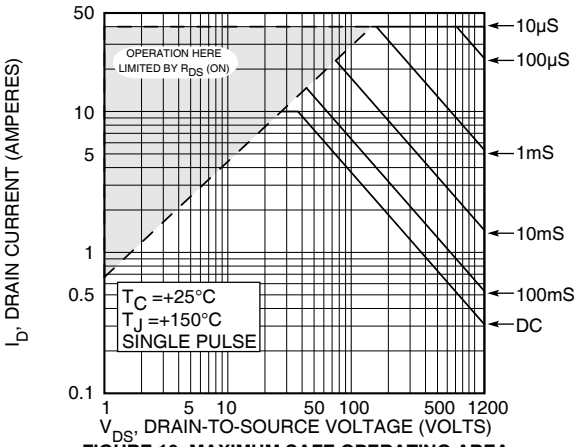


FIGURE 10, MAXIMUM SAFE OPERATING AREA

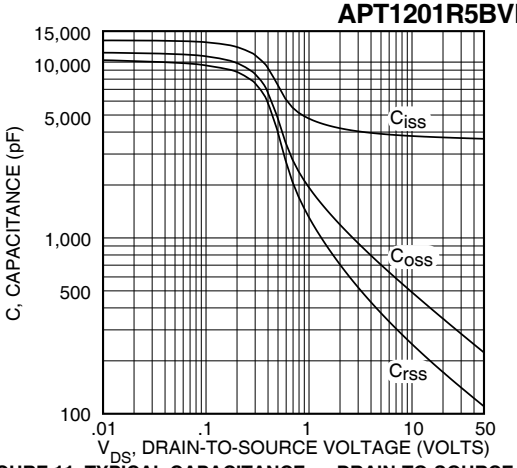


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

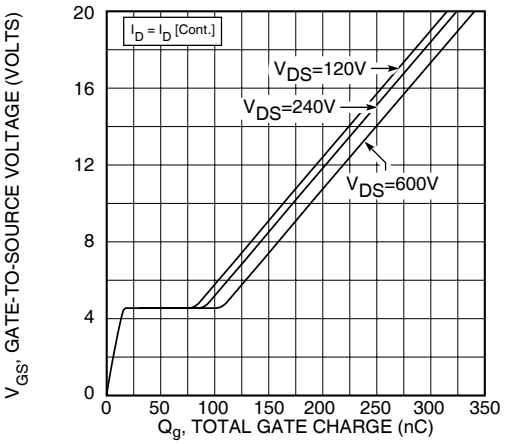


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

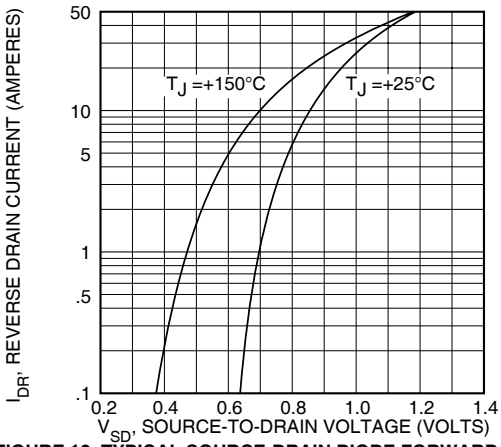
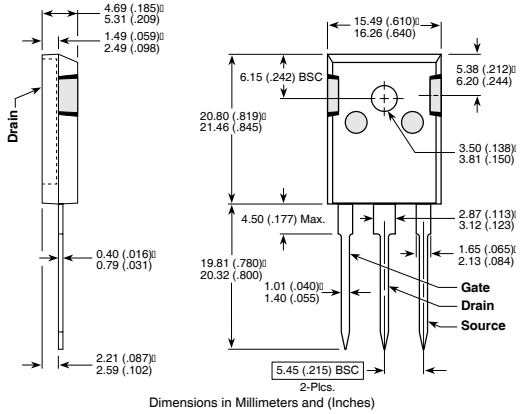


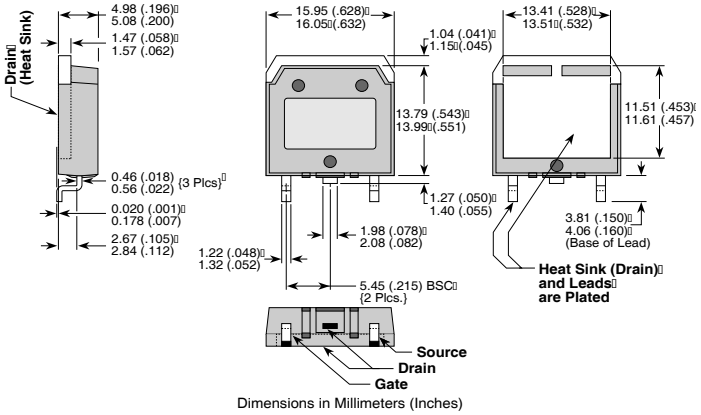
FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247 Package Outline



Dimensions in Millimeters and (Inches)

D³PAK Package Outline



Dimensions in Millimeters (Inches)