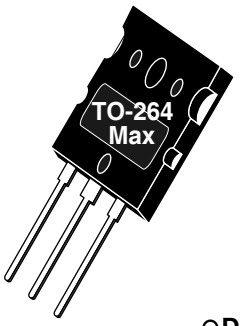
APT10030L2VFR

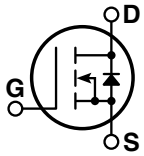
1000V 33A 0.300Ω

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.

- **TO-264 MAX Package**
- **Avalanche Energy Rated**
- **Faster Switching**
- **FAST RECOVERY BODY DIODE**
- **Lower Leakage**



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

Symbol	Parameter	APT10030L2VFR	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
I_D	Continuous Drain Current @ T_C = 25°C	33	Amps
I_{DM}	Pulsed Drain Current ①	132	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ T_C = 25°C	833	Watts
	Linear Derating Factor	6.66	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)	33	Amps
E_{AR}	Repetitive Avalanche Energy ①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ④	3200	

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 = 16.5A)			0.300	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 = 5mA)	2		4	Volts

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

APT Website - http://www.advancedpower.com

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DYNAMIC CHARACTERISTICS

APT10030L2VFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		10600		pF
C_{oss}	Output Capacitance			1000		
C_{rss}	Reverse Transfer Capacitance			500		
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 500V I_D = 33A @ 25°C		585		nC
Q_{gs}	Gate-Source Charge			55		
Q_{gd}	Gate-Drain ("Miller") Charge			265		
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 500V I_D = 33A @ 25°C R_G = 0.6Ω		14		ns
t_r	Rise Time			16		
$t_{d(off)}$	Turn-off Delay Time			75		
t_f	Fall Time			14		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				33	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				132	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -33A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time (I_S = -33A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C			310	ns
		T_j = 125°C			625	
Q_{rr}	Reverse Recovery Charge (I_S = -33A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		2.0		µC
		T_j = 125°C		6.0		
I_{RRM}	Peak Recovery Current (I_S = -33A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		15		Amps
		T_j = 125°C		26		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.15	°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 = 5.88mH, R_G = 25Ω, Peak I_L = 33A

⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \le -I_D 33A$ $^{di}/_{dt} \le 700A/\mu s$ $V_R \le 1000V$ $T_J \le 150°C$

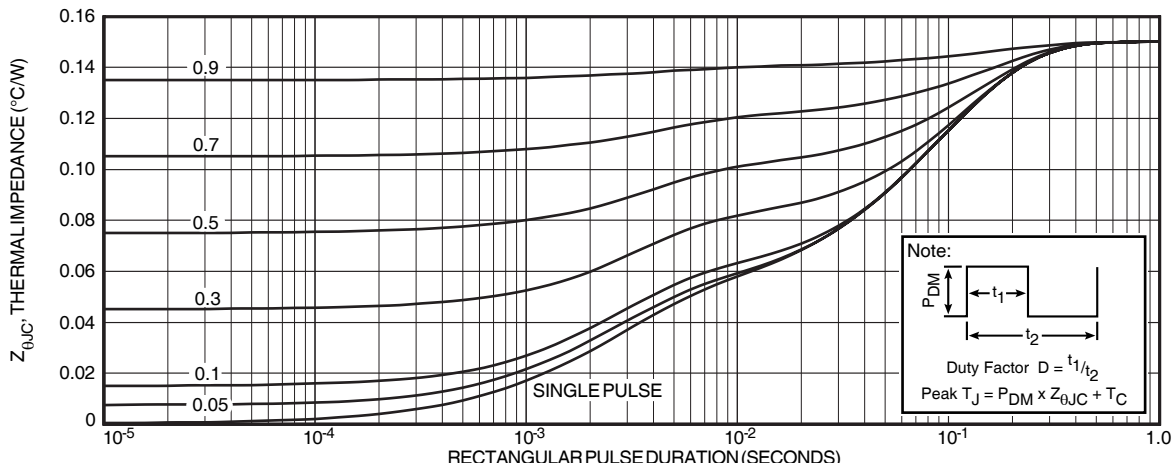

FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

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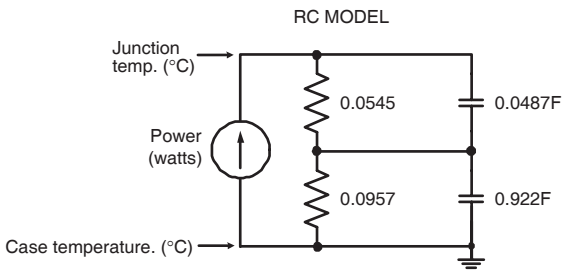


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

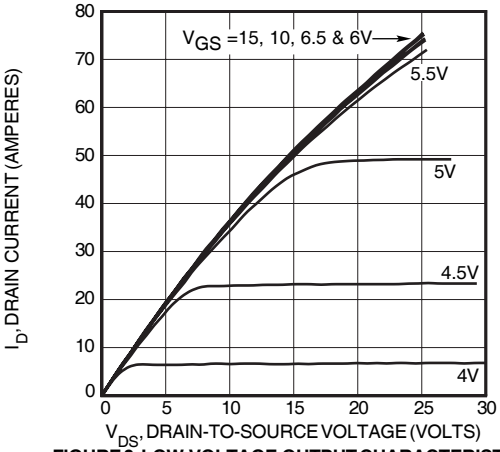


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

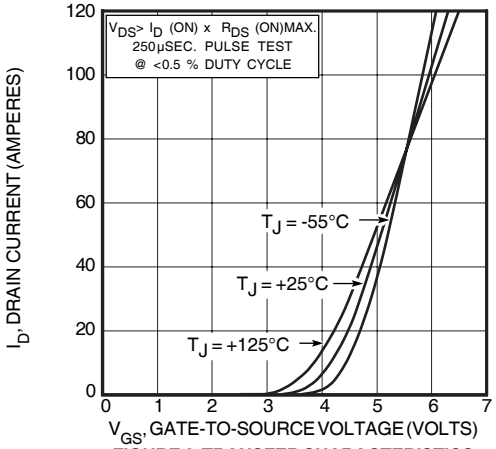


FIGURE 4, TRANSFER CHARACTERISTICS

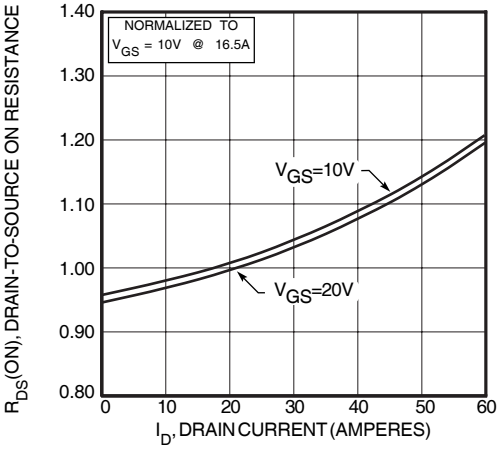


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

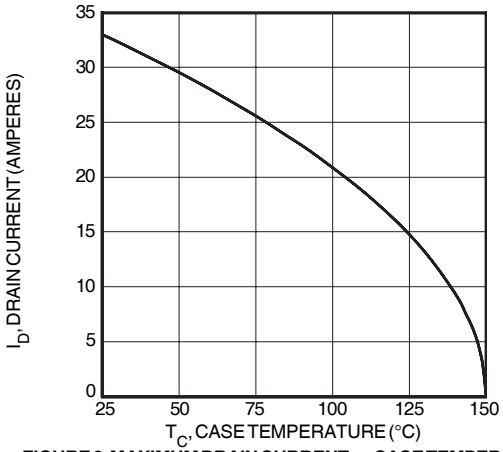


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

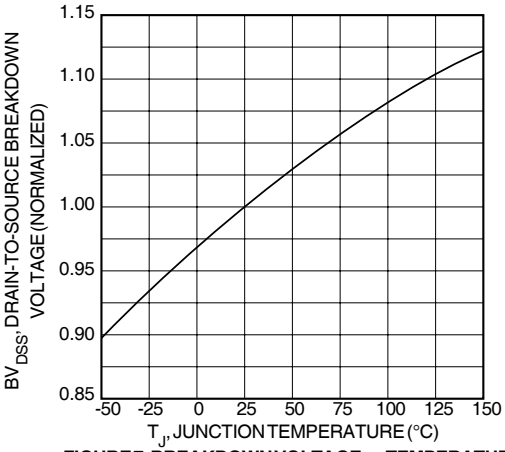


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

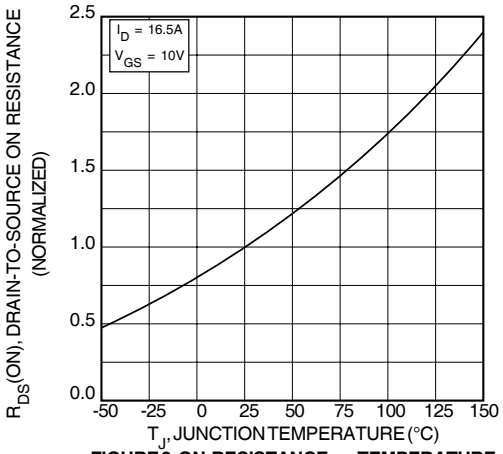


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

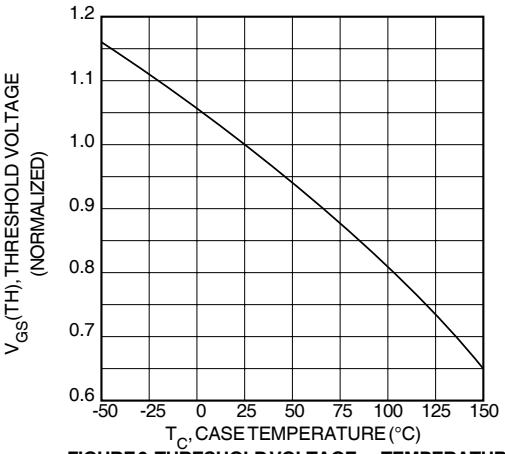


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

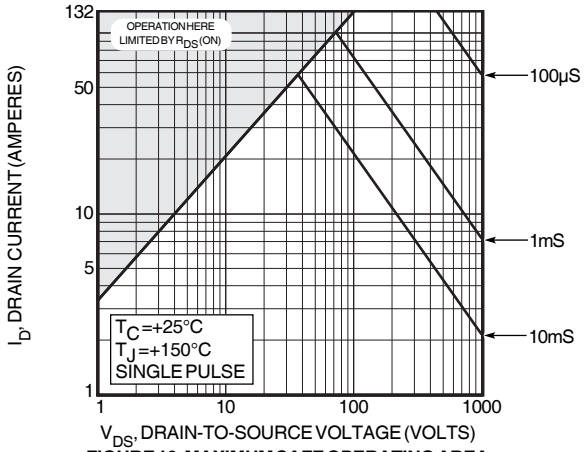


FIGURE 10, MAXIMUM SAFE OPERATING AREA

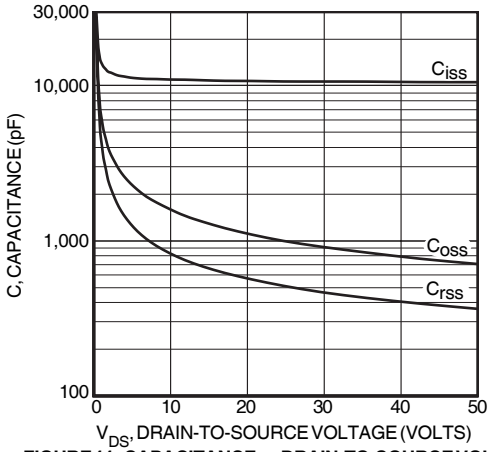


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

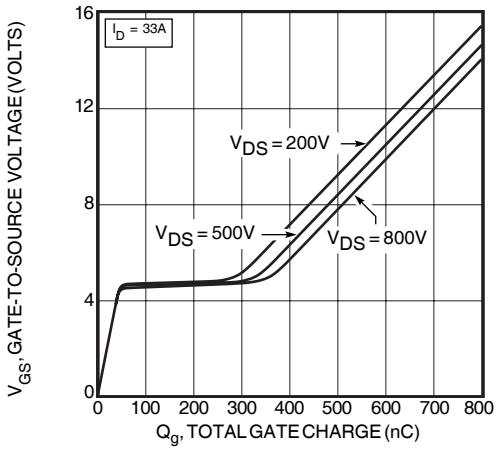


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

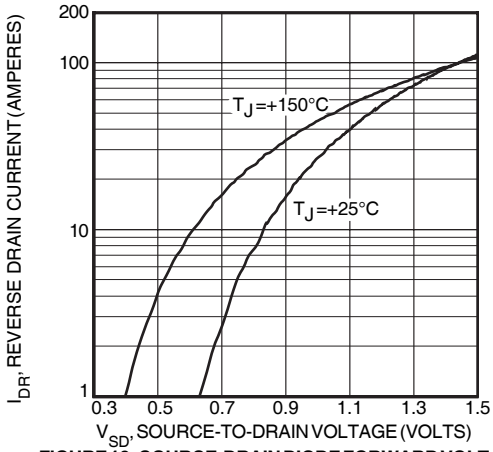
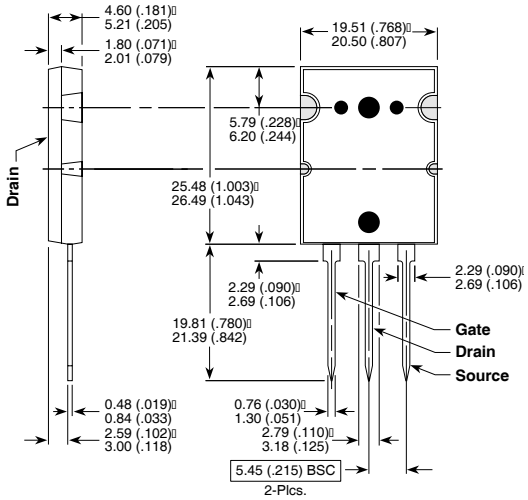


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-264 MAX™(L2) Package Outline



Dimensions in Millimeters and (Inches)