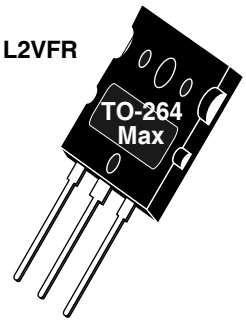
APT8018L2VFR

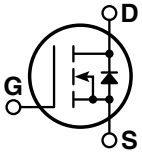
800V 43A 0.180Ω

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	APT8018L2VFR	UNIT
V_{DSS}	Drain-Source Voltage	800	Volts
I_D	Continuous Drain Current @ $T_C = 25°C$	43	Amps
I_{DM}	Pulsed Drain Current ①	172	
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	6.67	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)	43	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 ($V_{GS} = 0V$, $I_D = 250\mu A$)	800			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② ($V_{GS} = 10V$, $I_D = 21.5A$)			0.180	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 800V$, $V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 640V$, $V_{GS} = 0V$, $T_C = 125°C$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V$, $V_{DS} = 0V$)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 5mA$)	2		4	Volts

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

DYNAMIC CHARACTERISTICS

APT8018L2VFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		10700		pF
C_{oss}	Output Capacitance			1180		
C_{rss}	Reverse Transfer Capacitance			610		
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 400V I_D = 43A @ 25°C		610		nC
Q_{gs}	Gate-Source Charge			60		
Q_{gd}	Gate-Drain ("Miller") Charge			360		
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 400V I_D = 43A @ 25°C R_G = 0.6Ω		19		ns
t_r	Rise Time			17		
$t_{d(off)}$	Turn-off Delay Time			80		
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)				43	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				172	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -43A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time (I_S = -43A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C			300	ns
		T_j = 125°C			600	
Q_{rr}	Reverse Recovery Charge (I_S = -43A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		2.0		µC
		T_j = 125°C		6.0		
I_{RRM}	Peak Recovery Current (I_S = -43A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		15.5		Amps
		T_j = 125°C		27		

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 = 3.46mH, R_G = 25Ω, Peak I_L = 43A

⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_D 43A$ $^{di}/_{dt} \leq 700A/\mu s$ $V_R \leq 800V$ $T_J \leq 150°C$

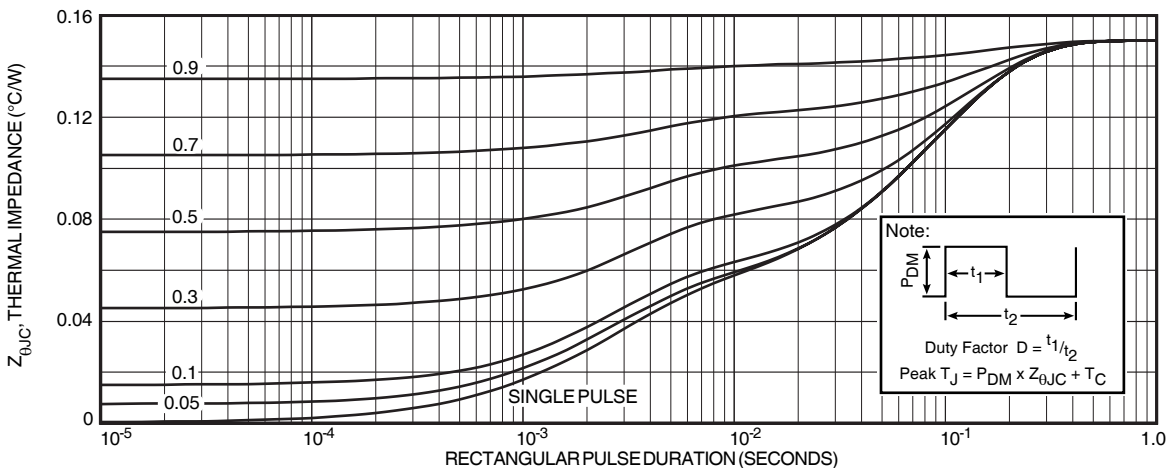


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

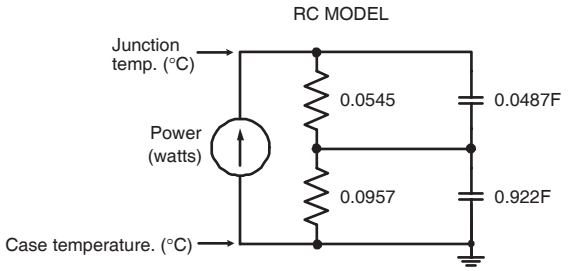


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

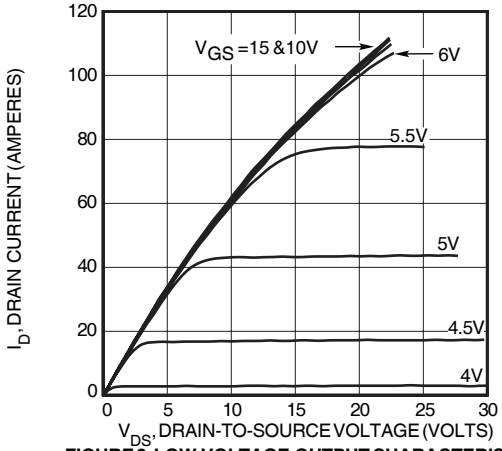


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

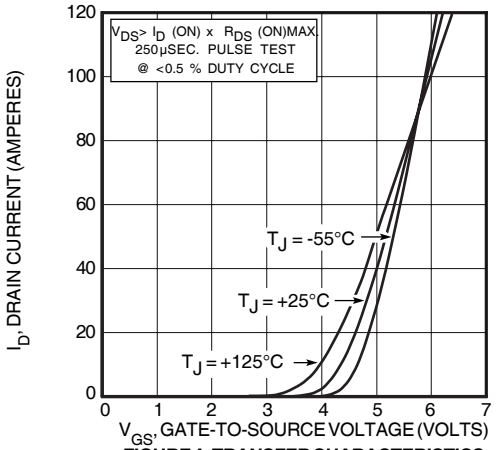


FIGURE 4, TRANSFER CHARACTERISTICS

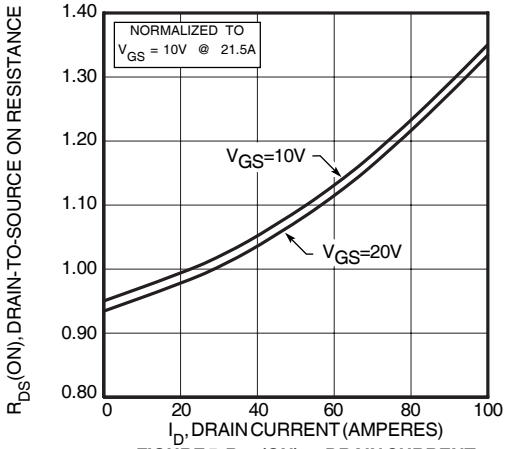


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

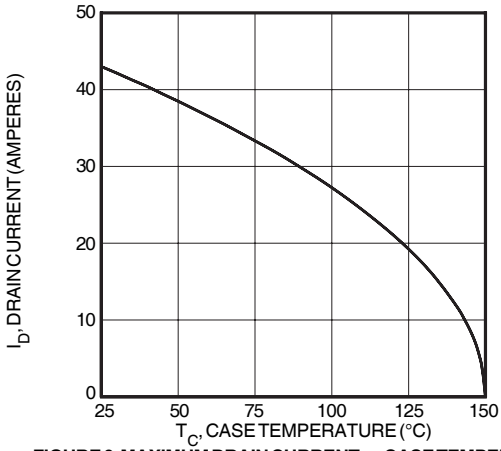


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

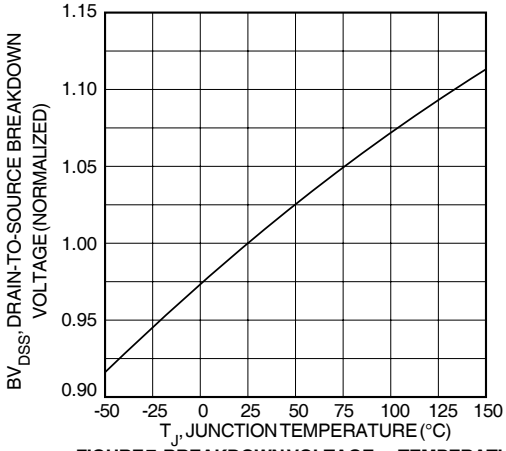


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

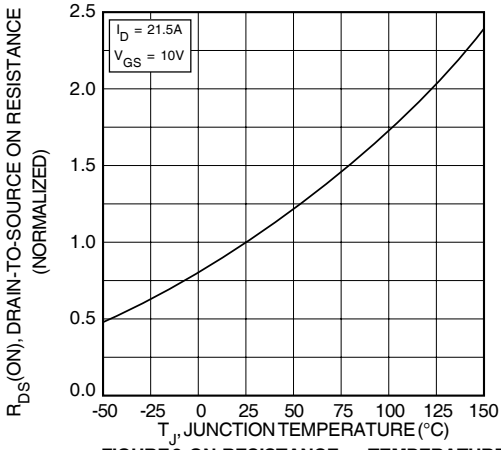


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

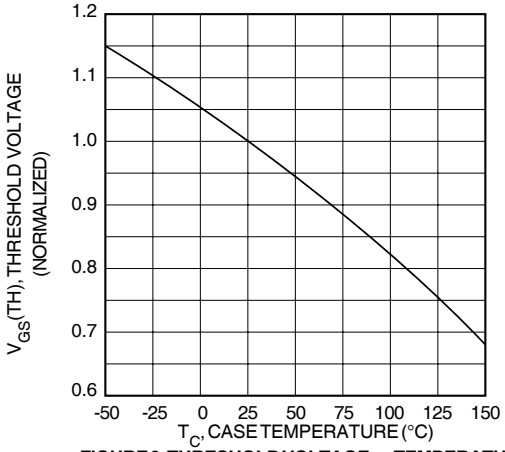


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

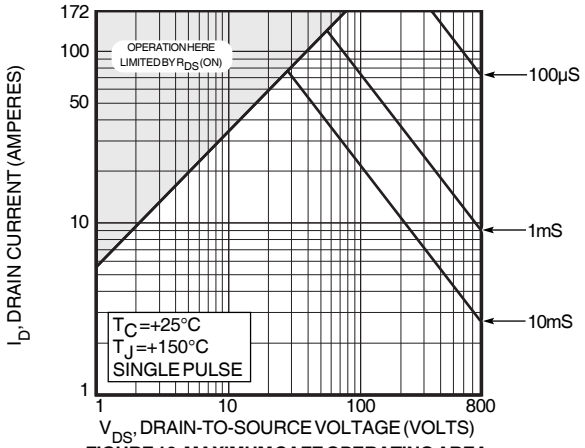


FIGURE 10, MAXIMUM SAFE OPERATING AREA

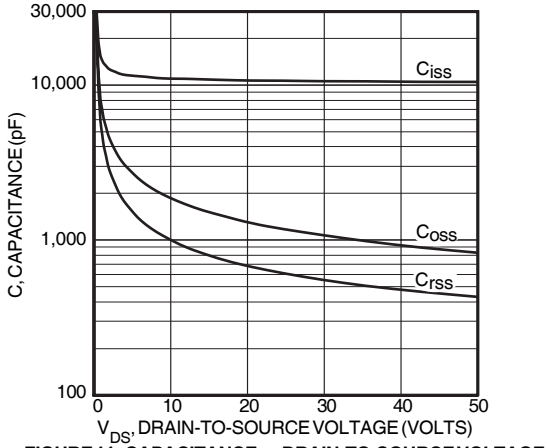


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

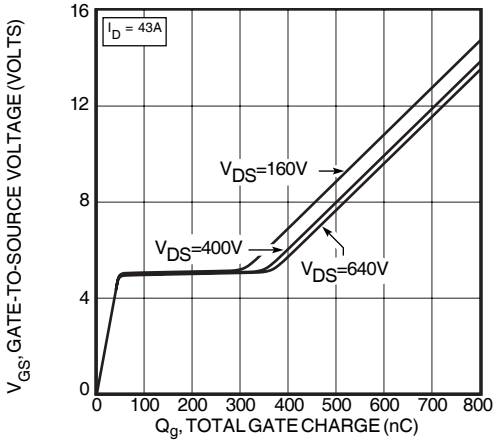


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

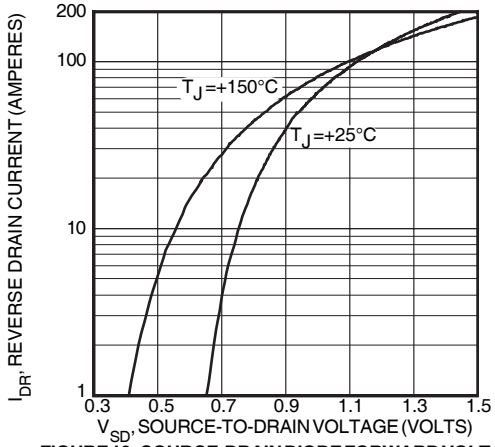
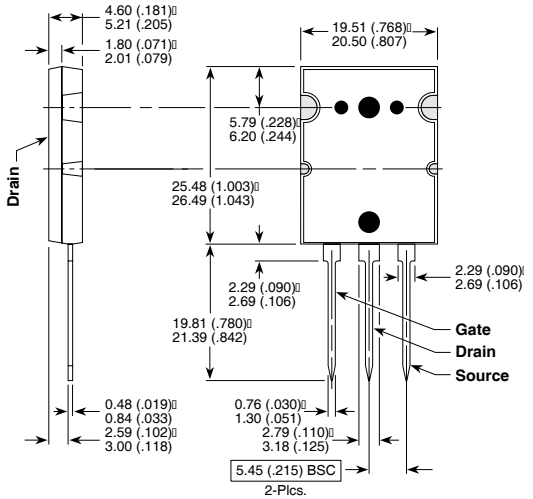


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-264 MAX™(L2) Package Outline (L2VFR)



Dimensions in Millimeters and (Inches)