Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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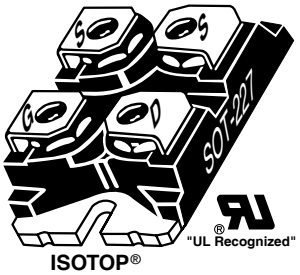
APT14050JVFR

1400V 23A 0.500Ω

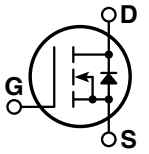
POWER MOS V® FREDFET



ISOTOP®

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.

- **Fast Recovery Body Diode**
- **Lower Leakage**
- **Faster Switching**
- **Avalanche Energy Rated**
- **Popular SOT-227 Package**



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

Symbol	Parameter	APT14050JVFR	UNIT
V_{DSS}	Drain-Source Voltage	1400	Volts
I_D	Continuous Drain Current @ T_C = 25°C	23	Amps
I_{DM}	Pulsed Drain Current ①	92	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ T_C = 25°C	694	Watts
	Linear Derating Factor	5.56	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)	23	Amps
E_{AR}	Repetitive Avalanche Energy ①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ④	3600	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250μA)	1400			Volts
$R_{DS(on)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 11.5A)			0.500	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 1400V, V_{GS} = 0V)			250	μA
	Zero Gate Voltage Drain Current (V_{DS} = 1120V, 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.

DYNAMIC CHARACTERISTICS

APT14050JVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V		13500		pF
C_{oss}	Output Capacitance	V_{DS} = 25V		1150		
C_{rss}	Reverse Transfer Capacitance	f = 1 MHz		600		
Q_g	Total Gate Charge ③	V_{GS} = 10V		820		nC
Q_{gs}	Gate-Source Charge	V_{DD} = 700V		55		
Q_{gd}	Gate-Drain ("Miller") Charge	I_D = 23A @ 25°C		375		
$t_d(on)$	Turn-on Delay Time	V_{GS} = 15V		20		ns
t_r	Rise Time	V_{DD} = 700V		18		
$t_d(off)$	Turn-off Delay Time	I_D = 23A @ 25°C		110		
t_f	Fall Time	R_G = 0.6Ω		20		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				23	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				92	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = I_D -23A)				1.3	Volts
$^{dv}/_{dt}$	Peak Diode Recovery $^{dv}/_{dt}$ ⑤				18	V/ns
t_{rr}	Reverse Recovery Time (I_S = -I_D 23A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C			300	ns
		T_j = 125°C			600	
Q_{rr}	Reverse Recovery Charge (I_S = -I_D 23A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		1.8		µC
		T_j = 125°C		7.4		
I_{RRM}	Peak Recovery Current (I_S = -I_D 23A, $^{di}/_{dt}$ = 100A/µs)	T_j = 25°C		16		Amps
		T_j = 125°C		30		

THERMAL / PACKAGE CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.18	°C/W
$R_{\theta JA}$	Junction to Ambient			40	
$V_{Isolation}$	RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.)	2500			Volts
Torque	Maximum Torque for Device Mounting Screws and Electrical Terminations			10	lb•in

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 = 13.61mH, R_G = 25Ω, Peak I_L = 23A

⑤ $^{dv}/_{dt}$ numbers reflect the limitations of the test circuit rather than the device itself. $I_S \le -I_D 23A$ $^{di}/_{dt} \le 700A/\mu s$ $V_R \le 1400$ $T_J \le 150°C$

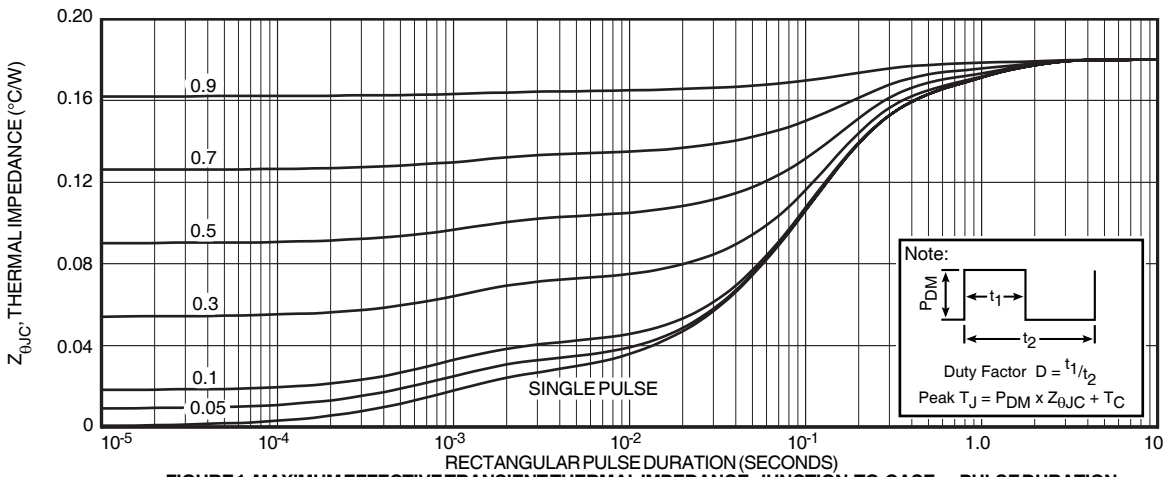


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

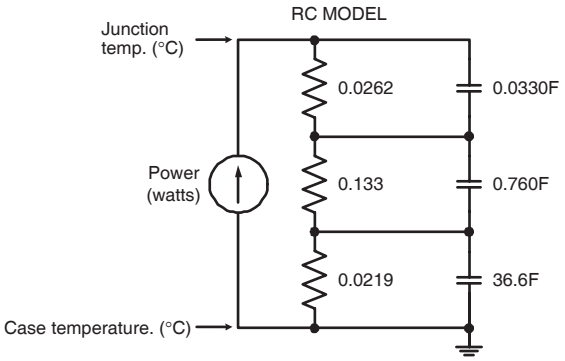


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

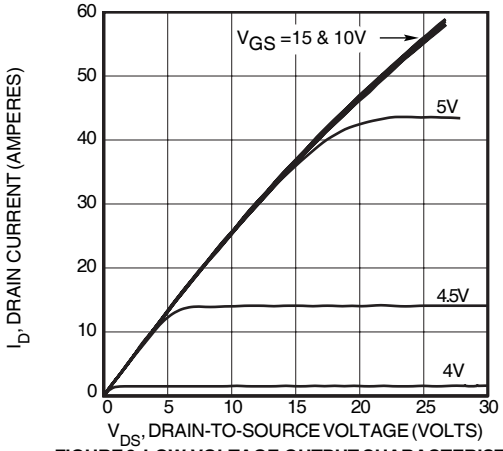


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

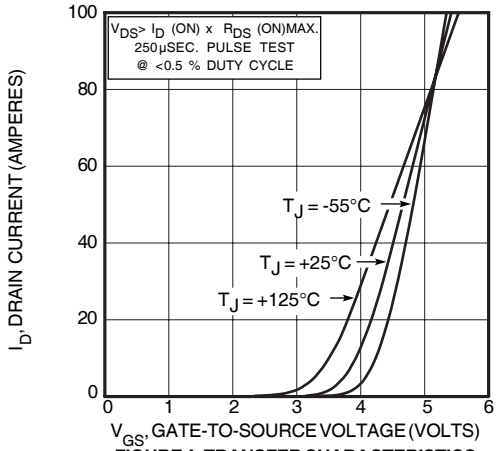


FIGURE 4, TRANSFER CHARACTERISTICS

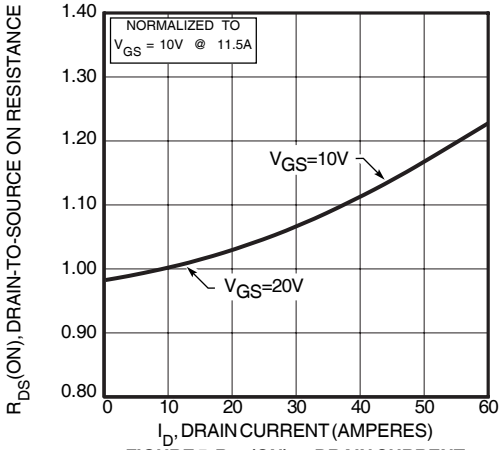


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

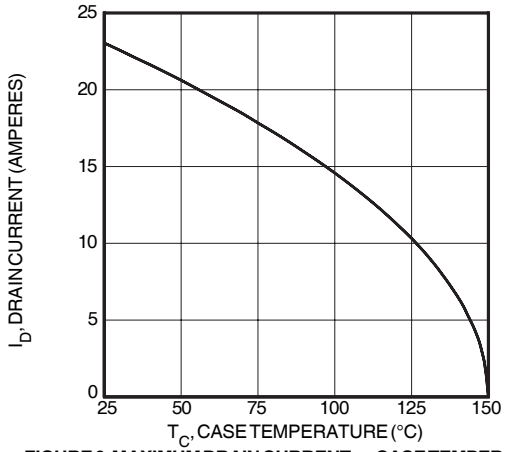


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

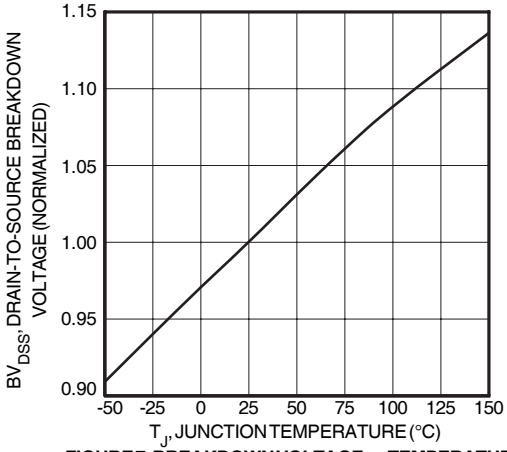


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

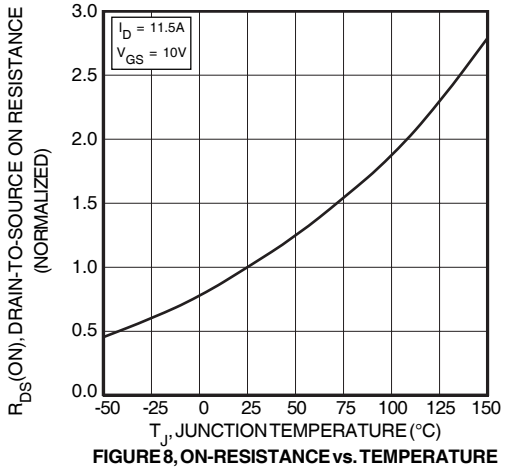


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

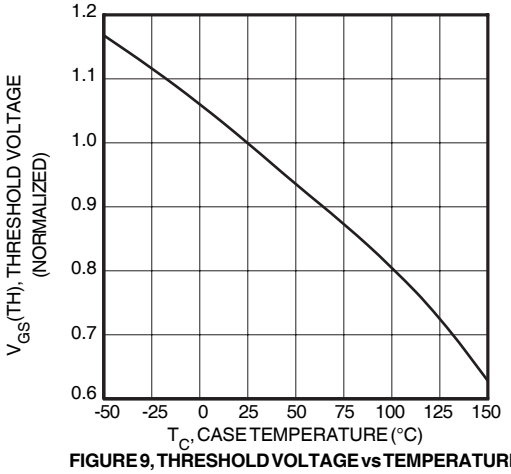


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

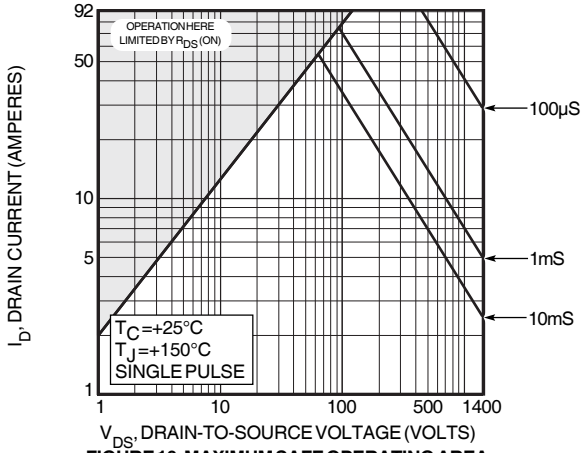


FIGURE 10, MAXIMUM SAFE OPERATING AREA

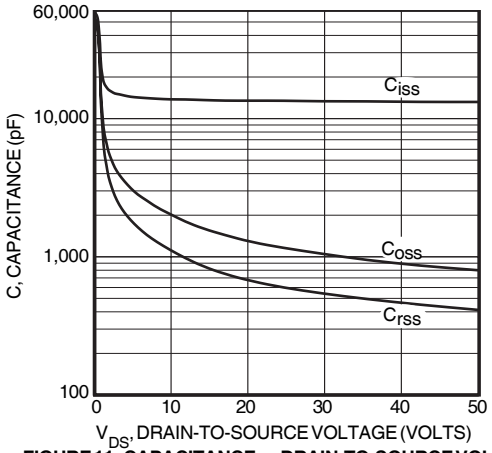


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

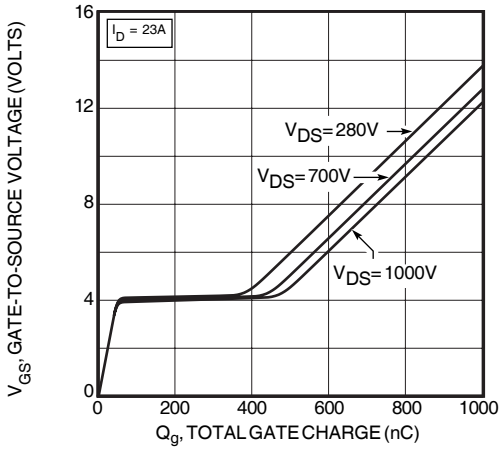


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

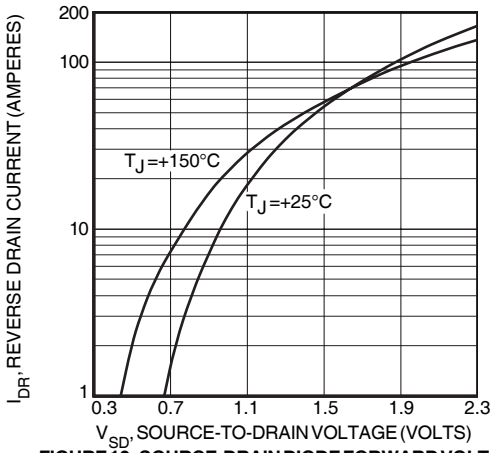
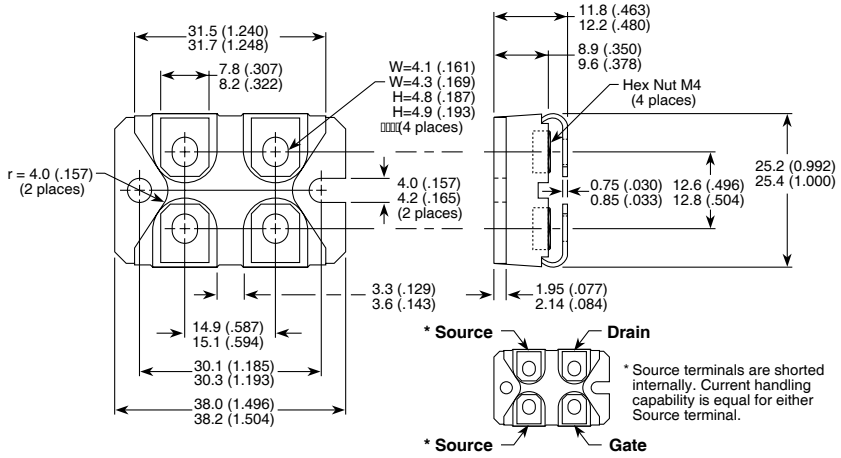


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)