



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.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

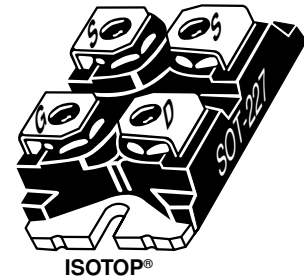
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



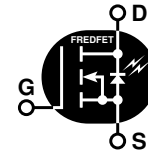
### POWER MOS V®

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
- 100% Avalanche Tested
- Popular SOT-227 Package



#### MAXIMUM RATINGS

All Ratings:  $T_C = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	APT20M11JVFR	UNIT
$V_{DSS}$	Drain-Source Voltage	200	Volts
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	175	Amps
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	700	
$V_{GS}$	Gate-Source Voltage Continuous	$\pm 30$	Volts
$V_{GSM}$	Gate-Source Voltage Transient	$\pm 40$	
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	700	Watts
	Linear Derating Factor	5.6	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$T_L$	Lead Temperature: 0.063" from Case for 10 Sec.	300	
$I_{AR}$	Avalanche Current <sup>①</sup> (Repetitive and Non-Repetitive)	175	Amps
$E_{AR}$	Repetitive Avalanche Energy <sup>①</sup>	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy <sup>④</sup>	3600	

#### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{DSS}$	Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu\text{A}$ )	200			Volts
$I_{D(on)}$	On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$ )	175			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D[Cont.]}$ )			0.011	Ohms
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )			250	$\mu\text{A}$
	Zero Gate Voltage Drain Current ( $V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$ )			1000	
$I_{GSS}$	Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )			$\pm 100$	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.

#### USA

405 S.W. Columbia Street

#### EUROPE

Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord

**APT Website - <http://www.advancedpower.com>**

Bend, Oregon 97702-1035

Phone: (541) 382-8028

FAX: (541) 388-0364

F-33700 Merignac - France

Phone: (33) 557 92 15 15

FAX: (33) 5 56 47 97 61

## DYNAMIC CHARACTERISTICS

APT20M11JVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		18000	21600	pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		4100	5740	
$C_{rss}$	Reverse Transfer Capacitance	$f = 1 \text{ MHz}$		1350	2025	
$Q_g$	Total Gate Charge <sup>③</sup>	$V_{GS} = 10V$		690	1035	nC
$Q_{gs}$	Gate-Source Charge	$V_{DD} = 0.5 V_{DSS}$		95	140	
$Q_{gd}$	Gate-Drain ("Miller") Charge	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		290	435	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		20	40	ns
$t_r$	Rise Time	$V_{DD} = 0.5 V_{DSS}$		40	80	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		75	115	
$t_f$	Fall Time	$R_G = 0.6\Omega$		10	20	

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode)			175	Amps
$I_{SM}$	Pulsed Source Current <sup>①</sup> (Body Diode)			700	
$V_{SD}$	Diode Forward Voltage <sup>②</sup> ( $V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$ )			1.3	Volts
$dv/dt$	Peak Diode Recovery $dv/dt$ <sup>⑤</sup>			5	V/ns
$t_{rr}$	Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		150	ns
		$T_j = 125^\circ\text{C}$		250	
$Q_{rr}$	Reverse Recovery Charge ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		0.9	$\mu\text{C}$
		$T_j = 125^\circ\text{C}$		2.5	
$I_{RRM}$	Peak Recovery Current ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		12	Amps
		$T_j = 125^\circ\text{C}$		20	

## THERMAL/PACKAGE CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.18	$^\circ\text{C/W}$
$R_{\theta JA}$	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.			13	lb·in

① Repetitive Rating: Pulse width limited by maximum junction temperature.

② Pulse Test: Pulse width < 380  $\mu\text{s}$ , Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting  $T_j = +25^\circ\text{C}$ ,  $L = 235\mu\text{H}$ ,  $R_G = 25\Omega$ , Peak  $I_L = 175\text{A}$

⑤  $I_S \leq -I_D [\text{Cont.}], di/dt = 100\text{A}/\mu\text{s}, V_{DD} \leq V_{DSS}, T_j \leq 150^\circ\text{C}, R_G = 2.0\Omega, V_R = 200\text{V}$

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

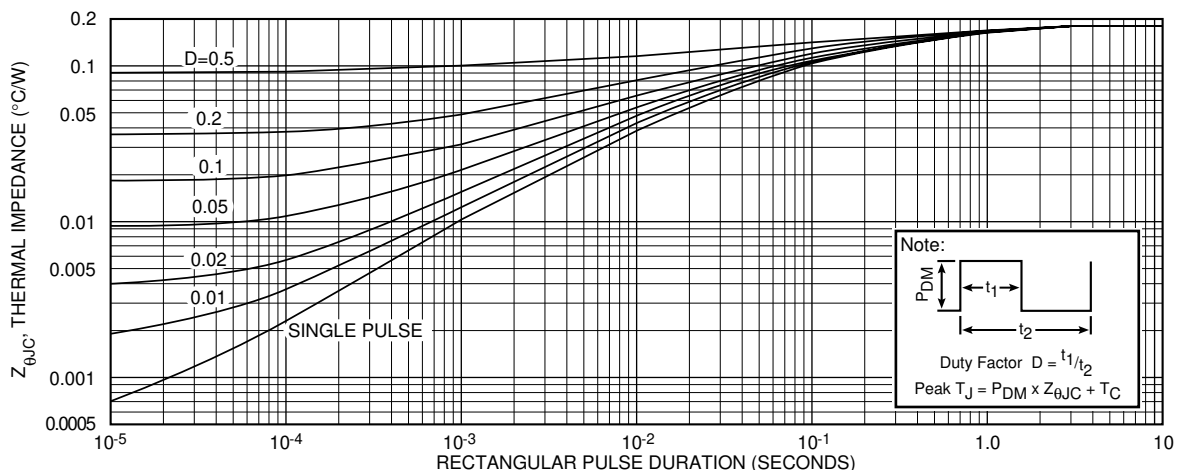
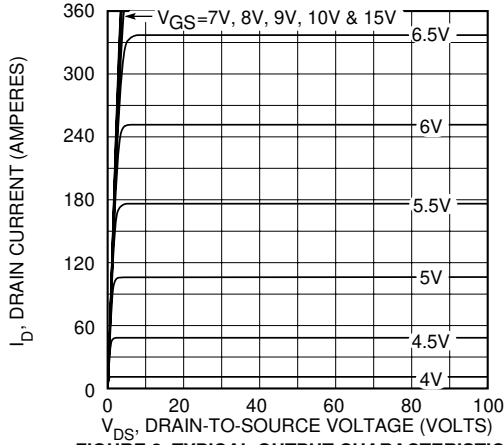
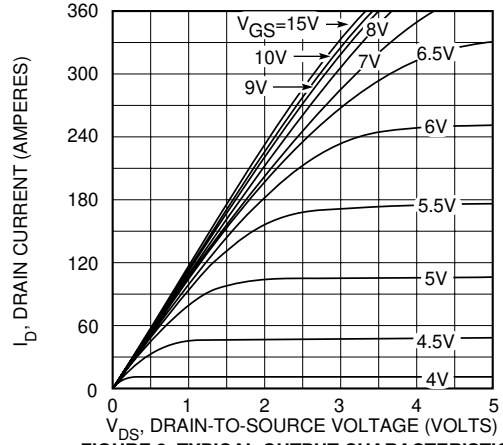


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

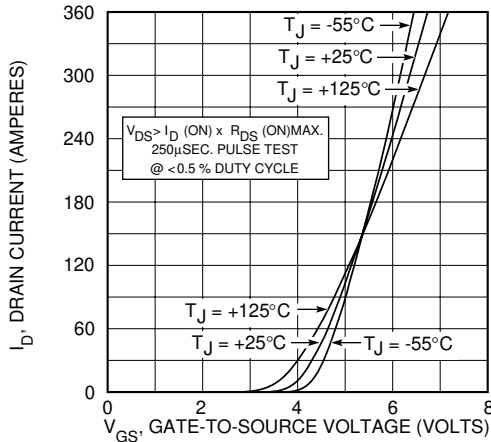
**APT20M11JVFR**



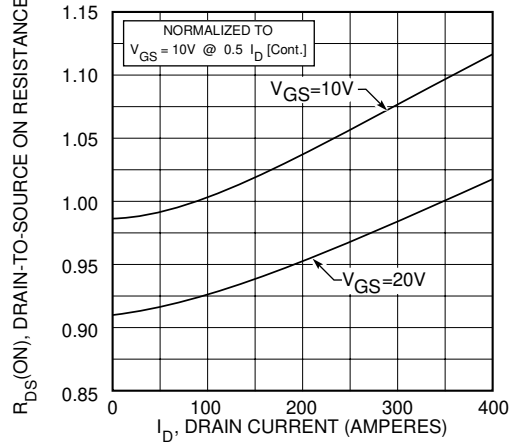
**FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS**



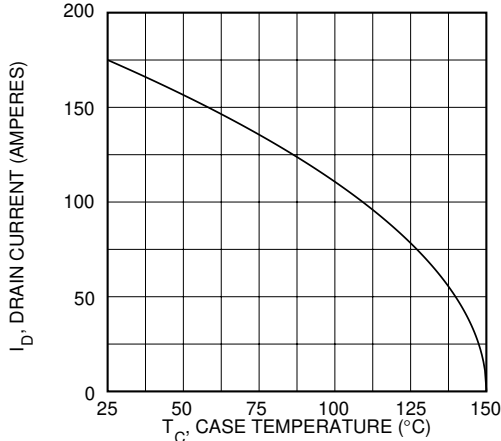
**FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS**



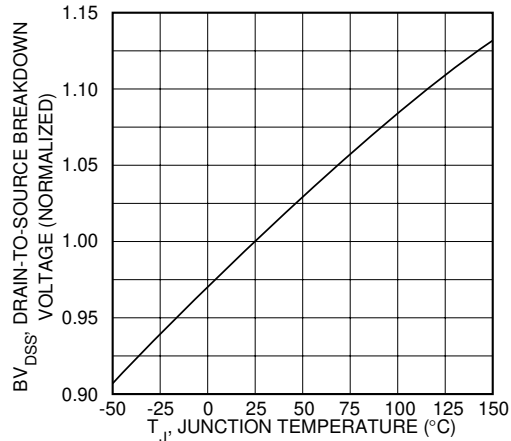
**FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS**



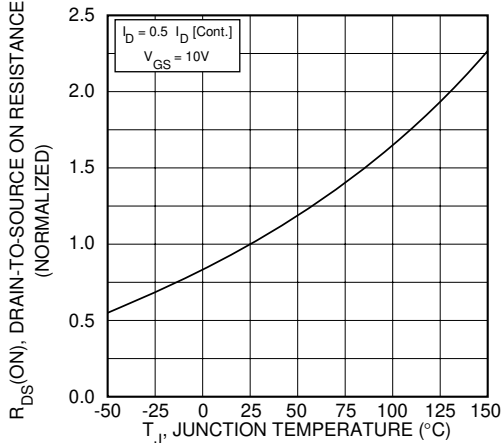
**FIGURE 5,  $R_{DS(ON)}$  vs DRAIN CURRENT**



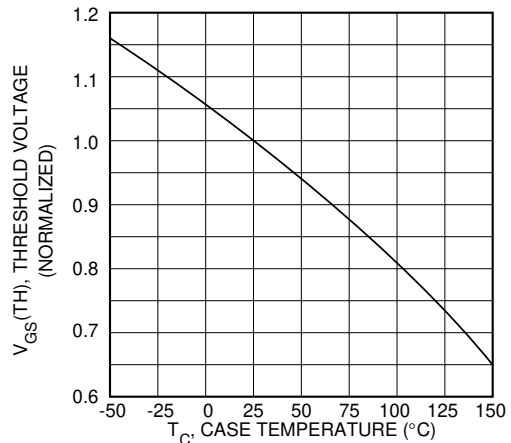
**FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE**



**FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE**

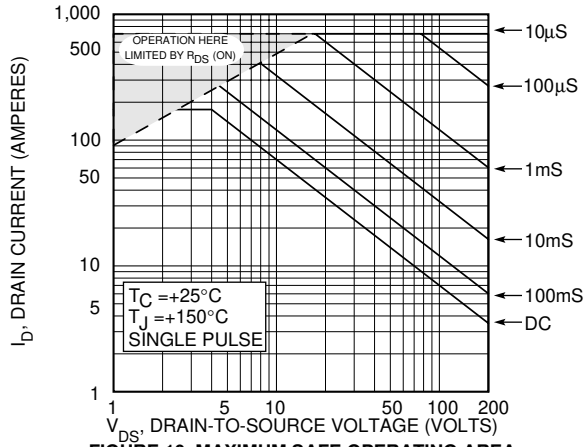


**FIGURE 8, ON-RESISTANCE vs. TEMPERATURE**

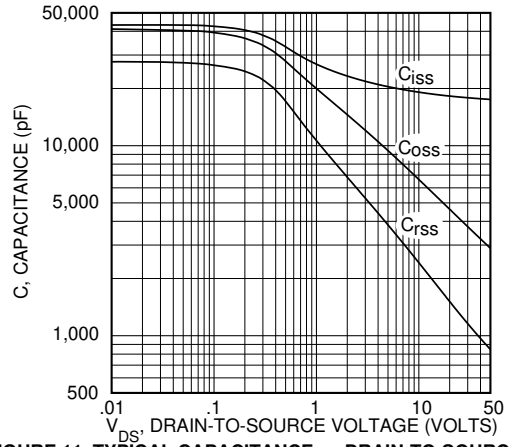


**FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE**

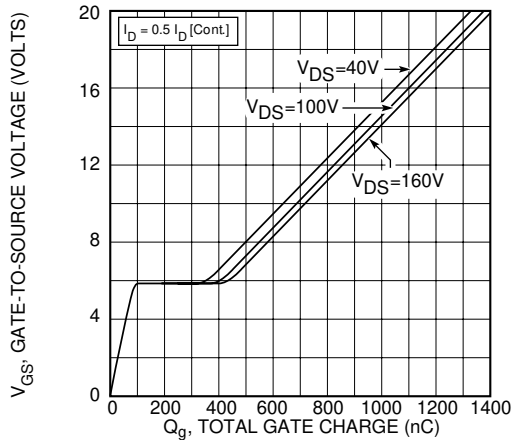
**APT20M11JVFR**



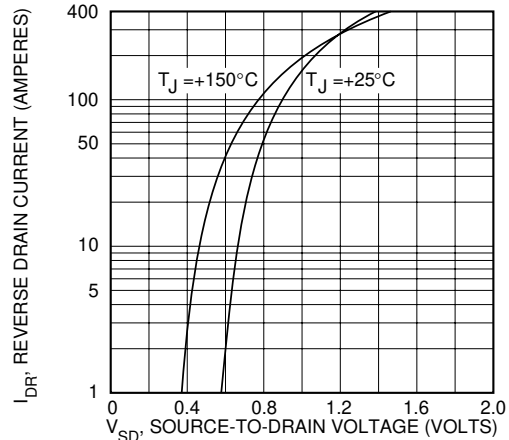
**FIGURE 10, MAXIMUM SAFE OPERATING AREA**



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

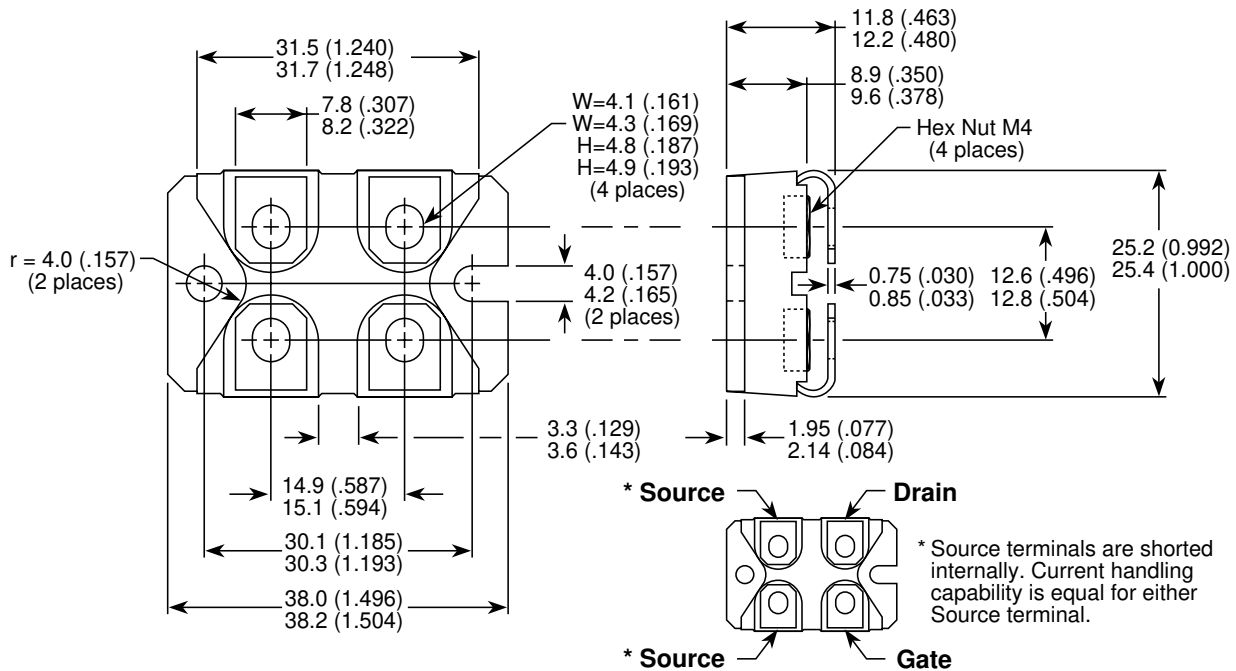


**FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE**



**FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE**

**SOT-227 (ISOTOP®) Package Outline**



Dimensions in Millimeters and (Inches)

$V_{Isolation}$ , RMS Voltage (50-60 Hz Sinusoidal Waveform from Terminals to Mounting Base for 1 Minute) = 2500 Volts Minimum