

APT20M25JNR 200V 100A 0.025Ω

APT20M30JNR 200V 90A 0.030Ω

"UL Recognized" File No. E145592 (S)

POWER MOS IV®

AVALANCHE RATED ISOTOP® PACKAGE

N-CHANNEL ENHANCEMENT MODE LOW VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT20M25JNR	APT20M30JNR	UNIT
V _{DSS}	Drain-Source Voltage	200	200	Volts
I _D	Continuous Drain Current @ T _C = 25°C	100	90	Amps
I _{DM}	Pulsed Drain Current ①	400	360	
V _{GS}	Gate-Source Voltage Continuous	±20		Volts
V _{GSM}	Gate-Source Voltage Transient	±30		
P _D	Total Power Dissipation @ T _C = 25°C	520		Watts
	Linear Derating Factor	4.16		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)	58		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 ($V_{GS} = 0V, I_D = 1.0mA$)	200			Volts
$I_{D(ON)}$	On State Drain Current ② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT20M25JNR	100		Amps
		APT20M30JNR	90		
$R_{DS(ON)}$	Drain-Source On-State Resistance ② ($V_{GS} = 10V, 0.5 I_D$ [Cont.])	APT20M25JNR		0.025	Ohms
		APT20M30JNR		0.030	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V$)			250	μA
	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 ($V_{GS} = \pm 20V, V_{DS} = 0V$)			± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0mA$)	2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.24	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	

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

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DYNAMIC CHARACTERISTICS

APT20M25/20M30JNR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		10100	13000	pF
C_{oss}	Output Capacitance			2460	3400	
C_{rss}	Reverse Transfer Capacitance			730	1080	
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		324	480	nC
Q_{gs}	Gate-Source Charge			59	90	
Q_{gd}	Gate-Drain ("Miller") Charge			152	230	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 0.6\Omega$		20	30	ns
t_r	Rise Time			56	110	
$t_{d(off)}$	Turn-off Delay Time			100	150	
t_f	Fall Time			80	120	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT20M25JNR		100	Amps
		APT20M30JNR		90	
I_{SM}	Pulsed Source Current ① (Body Diode)	APT20M25JNR		400	
		APT20M30JNR		360	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V$, $I_S = -I_D [\text{Cont.}]$)			1.75	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}]$, $dI_S/dt = 100A/\mu s$)		330	660	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}]$, $dI_S/dt = 100A/\mu s$)		5.1	10	μC

PACKAGE CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
L_D	Internal Drain Inductance (Measured From Drain Terminal to Center of Die.)		3		nH
L_S	Internal Source Inductance (Measured From Source Terminals to Source Bond Pads)		5		
$V_{isolation}$	RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.)	2500			Volts
$C_{isolation}$	Drain-to-Mounting Base Capacitance ($f = 1\text{ MHz}$)		35		pF
Torque	Maximum Torque for Device Mounting Screws and Electrical Terminations.			13	in-lbs

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 $T_J = 25^\circ\text{C}$, $L = 773\mu H$, $R_G = 25\Omega$, Peak $I_L = 58A$

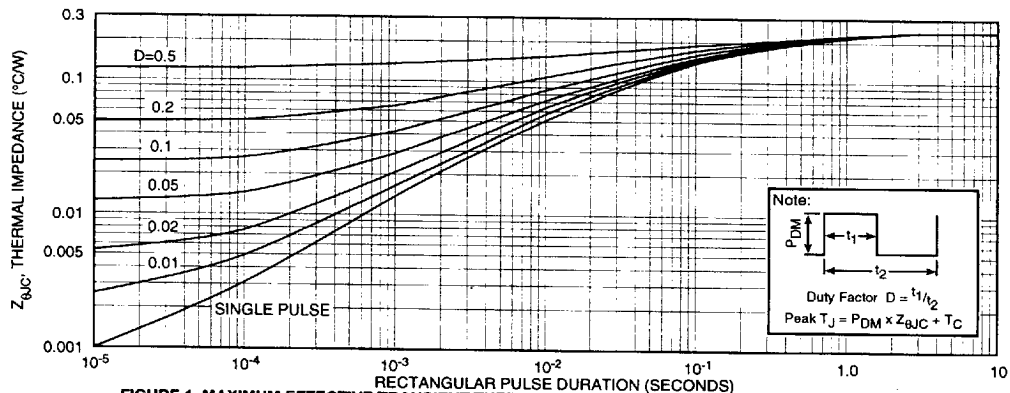


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT20M25/20M30JNR

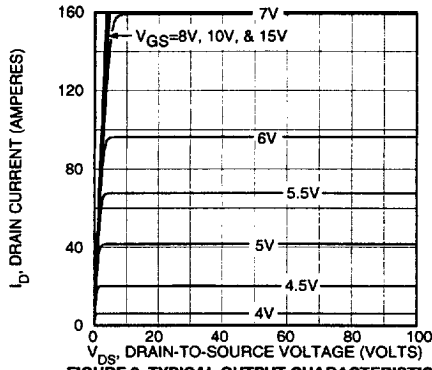


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

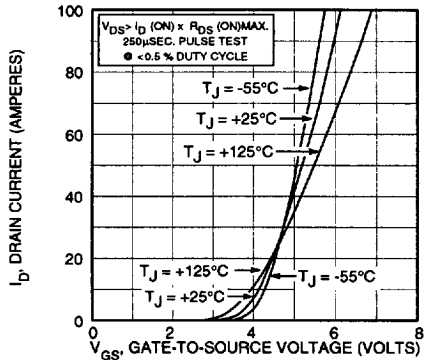


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

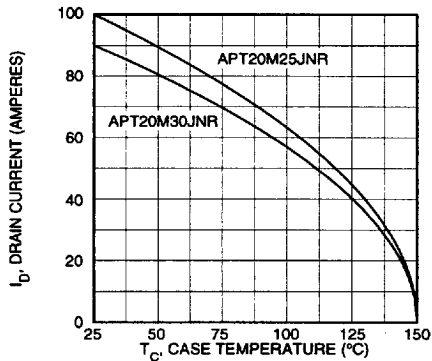


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

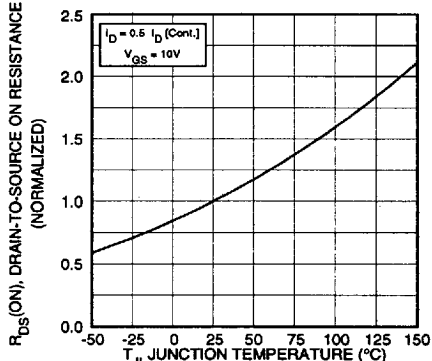


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

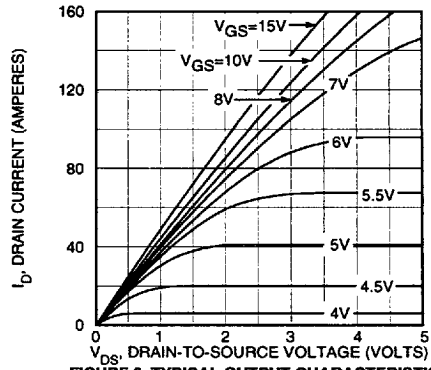


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

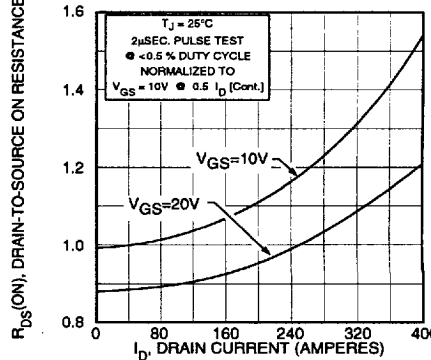


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

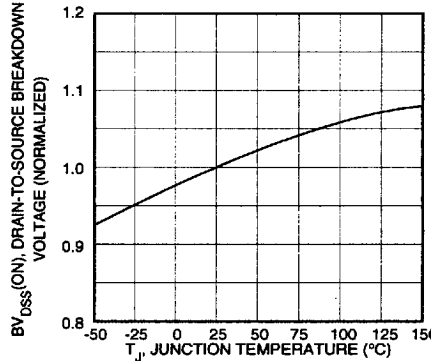


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

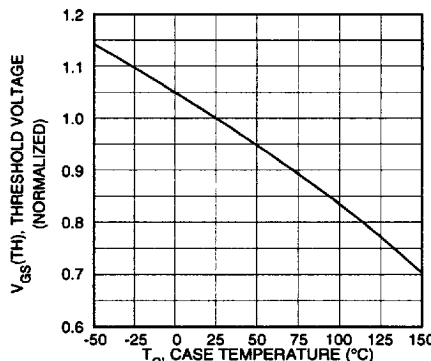


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

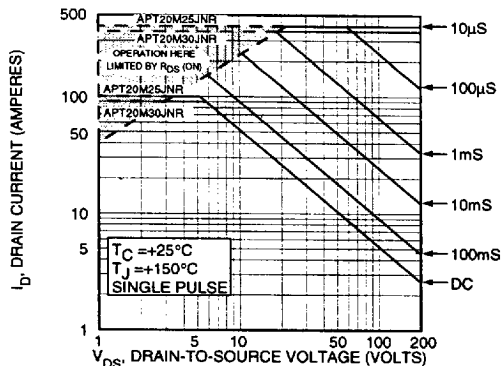


FIGURE 10, MAXIMUM SAFE OPERATING AREA

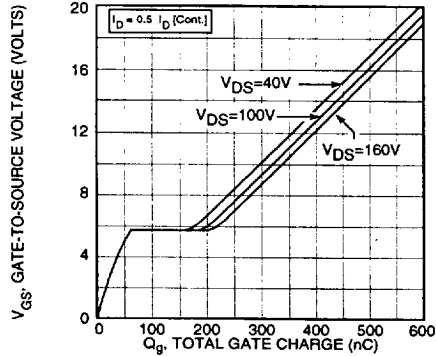


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

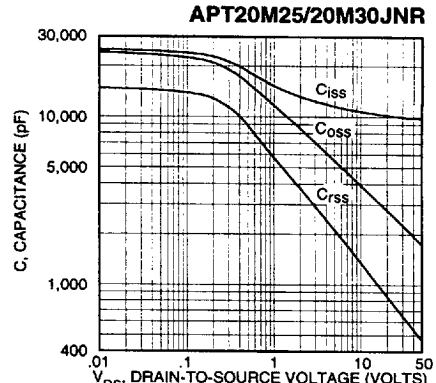


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

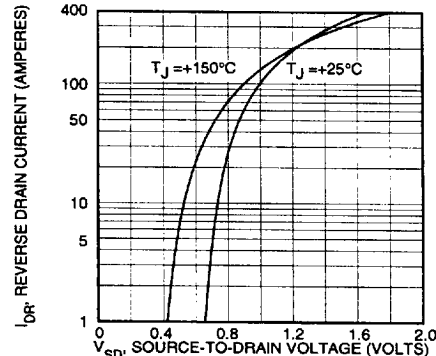
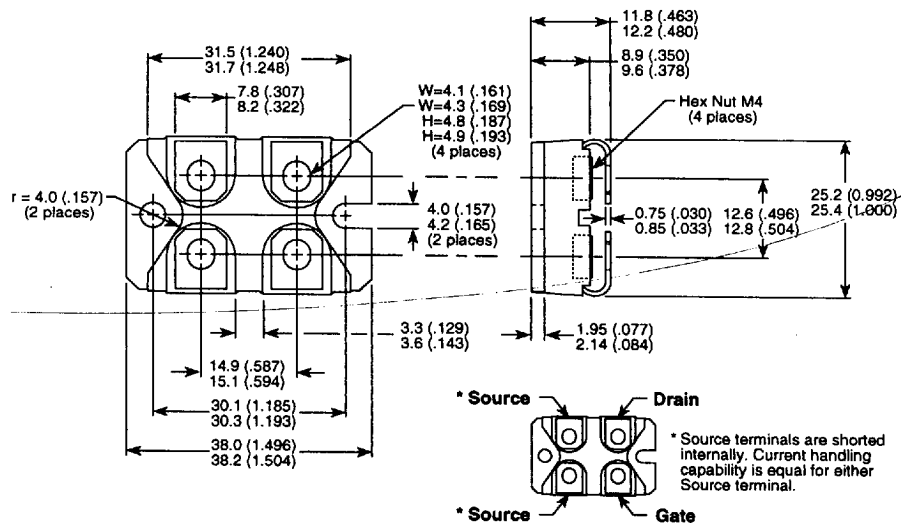


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

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

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)

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