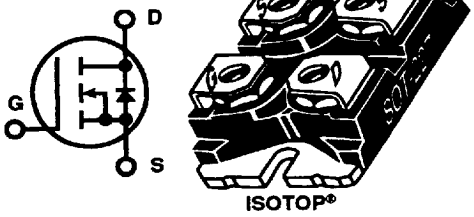

ADVANCED POWER TECHNOLOGY®

APT20M40JN 200V 77.0A 0.040Ω
APT20M45JN 200V 73.0A 0.045Ω

"UL Recognized" File No. E145592 (S)

POWER MOS IV™

SINGLE DIE ISOTOP® PACKAGE

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

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

Symbol	Parameter	APT 20M40JN	APT 20M45JN	UNIT
V_{DSS}	Drain-Source Voltage	200	200	Volts
I_D	Continuous Drain Current @ T_C = 25°C	77	73	Amps
I_{DM}, I_{LM}	Pulsed Drain Current ① and Inductive Current Clamped	308	292	
V_{GS}	Gate-Source Voltage	±30		Volts
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		

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250 µA)	APT20M40JN	200			Volts
		APT20M45JN	200			
$I_{D(ON)}$	On State Drain Current ② (V_{DS} > $I_{D(ON)}$ x $R_{DS(ON)}$ Max, V_{GS} = 10V)	APT20M40JN	77			Amps
		APT20M45JN	73			
$R_{DS(ON)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, 0.5 I_D [Cont.])	APT20M40JN			0.040	Ohms
		APT20M45JN			0.045	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = V_{DSS}, V_{GS} = 0V)				250	µA
	Zero Gate Voltage Drain Current (V_{DS} = 0.8 V_{DSS}, 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 = 2.5mA)		2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.24	°C/W
$R_{\theta CS}$	Case to Sink (Use High Efficiency Thermal Joint Compound and Planer Heat Sink Surface.)		0.06		

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

405 S.W. COLUMBIA STREET
BEND, OREGON 97702-1035
U.S.A.

PHONE . . . (503) 382-8028
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DYNAMIC CHARACTERISTICS

APT20M40/20M45JN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		5830	6800	pF
C_{oss}	Output Capacitance			2270	3000	
C_{rss}	Reverse Transfer Capacitance			1030	1440	
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 0.5 V_{DSS} I_D = I_D [Cont.] @ 25°C		280	370	nC
Q_{gs}	Gate-Source Charge			39	60	
Q_{gd}	Gate-Drain ("Miller") Charge			162	220	
$t_d(on)$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 0.5 V_{DSS} I_D = I_D [Cont.] @ 25°C R_G = 0.6Ω		17	34	ns
t_r	Rise Time			55	110	
$t_d(off)$	Turn-off Delay Time			49	75	
t_f	Fall Time			16	32	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	**APT20M40JN**			77	Amps
		APT20M45JN			73	
I_{SM}	Pulsed Source Current ① (Body Diode)	**APT20M40JN**			308	
		APT20M45JN			292	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -I_D [Cont.])				1.8	Volts
t_{rr}	Reverse Recovery Time (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		120	240	480	ns
Q_{rr}	Reverse Recovery Charge (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		1.3	2.7	5.4	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 = 1MHz)		35		pF
Torque	Maximum Torque for Device Mounting Screws and Electrical Terminations.			13	in-lbs

①Repetitive Rating: Pulse width limited by maximum junction temperature. See Transient Thermal Impedance Curve. (Fig.1)

②Pulse Test: Pulse width < 380 µS, Duty Cycle < 2%

③See MIL-STD-750 Method 3471

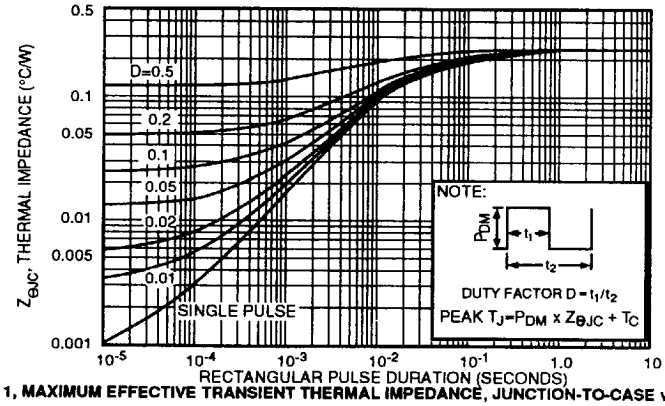


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT20M40/20M45JN

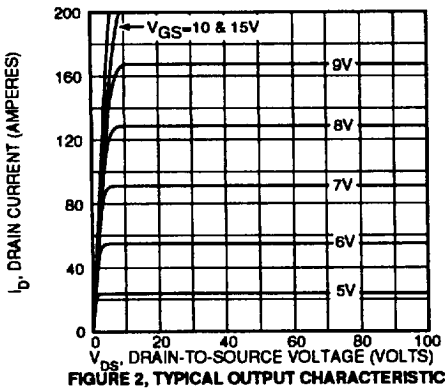


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

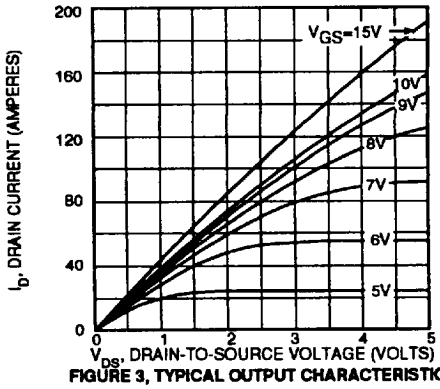


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

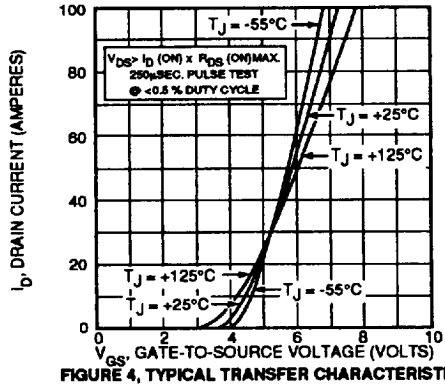


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

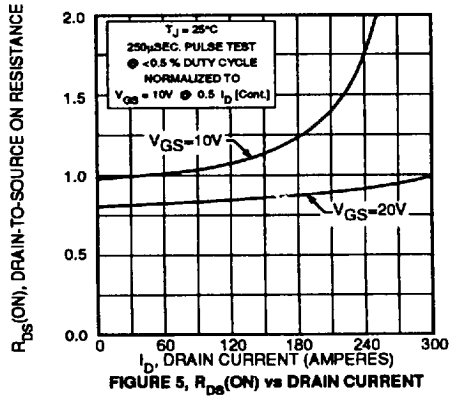


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

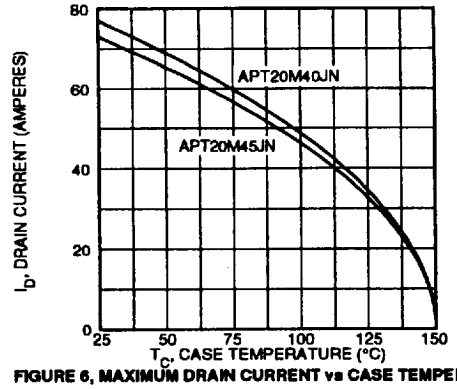


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

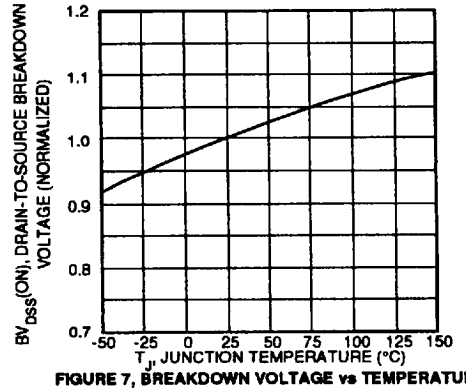


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

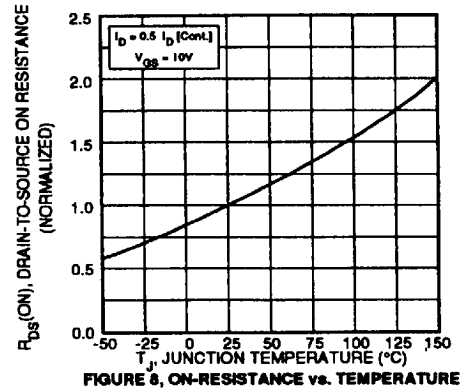


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

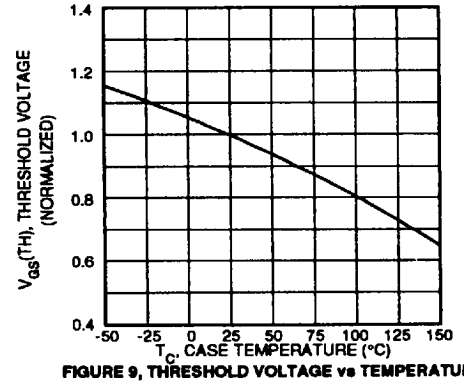


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

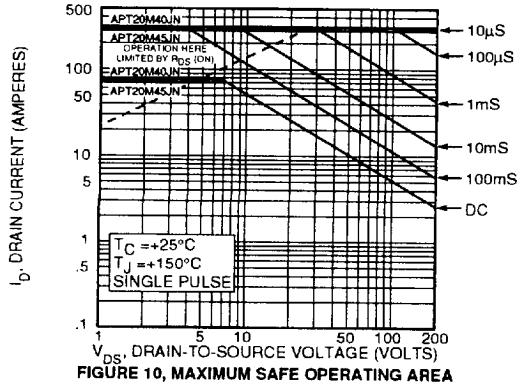


FIGURE 10, MAXIMUM SAFE OPERATING AREA

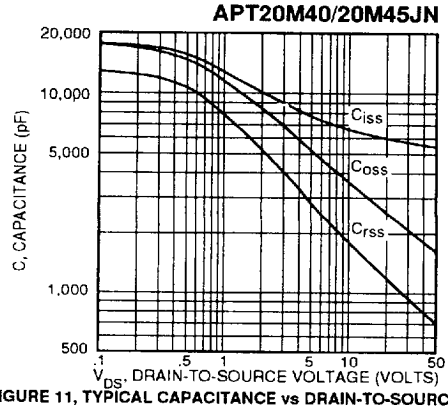


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

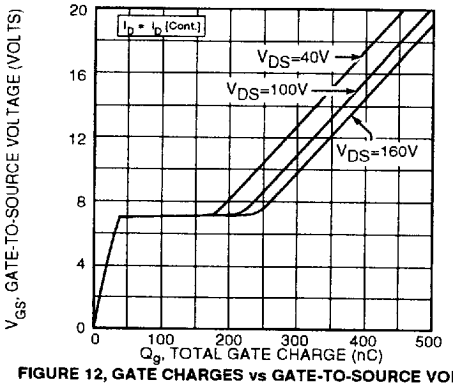


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

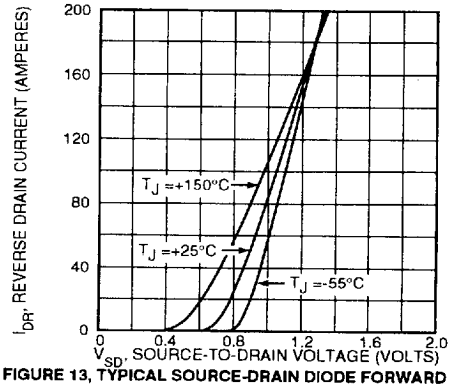
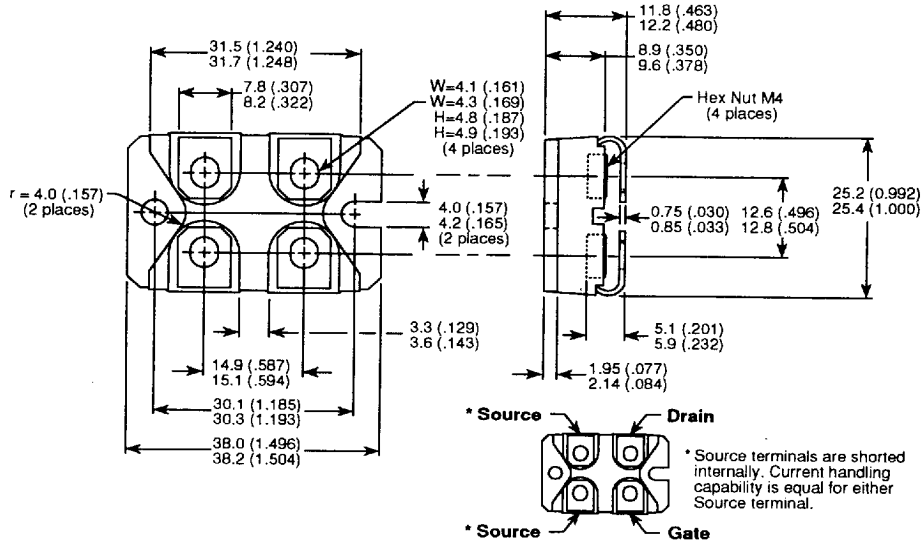


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)

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