

APT4030BN	400V	18.5A	0.30Ω
APT3530BN	350V	18.5A	0.30Ω
APT4040BN	400V	16.0A	0.40Ω
APT3540BN	350V	16.0A	0.40Ω

POWER MOS IV®

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT				UNIT
		3530BN	4030BN	3540BN	4040BN	
V _{DSS}	Drain-Source Voltage	350	400	350	400	Volts
I _D	Continuous Drain Current	18.5		16		Amps
I _{DM}	Pulsed Drain Current ①	74		64		Amps
V _{GS}	Gate-Source Voltage	±30				Volts
P _D	Total Power Dissipation @ T _C = 25°C, Derate Above 25°C	240				Watts
T _J ,T _{STG}	Operating and Storage Junction Temperature Range	- 55 to 150				°C

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250 \mu A$)	APT4030BN / APT4040BN	400			Volts
		APT3530BN / APT3540BN	350			Volts
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)				250	μA
	($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)				1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)				± 100	nA
$I_{D(ON)}$	On State Drain Current ② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}, V_{GS} = 10V$)	APT4030BN / APT3530BN	18.5			Amps
		APT4040BN / APT3540BN	16			Amps
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1mA$)		2		4	Volts
$R_{DS(ON)}$	Static Drain-Source On-State Resistance ② ($V_{GS} = 10V, I_D = 0.5 I_D \text{ (Cont.)}$)	APT4030BN / APT3530BN			0.30	Ohms
		APT4040BN / APT3540BN			0.40	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.51	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	$^\circ\text{C/W}$
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	$^\circ\text{C}$



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

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DYNAMIC CHARACTERISTICS

APT4030/3530/4040/3540BN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		1500	1800	pF
C_{oss}	Output Capacitance			385	540	pF
C_{rss}	Reverse Transfer Capacitance			160	240	pF
Q_g	Total Gate Charge ③	$V_{GS} = 10V, I_D = I_D [\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$		71	105	nC
Q_{gs}	Gate-Source Charge			8	12	nC
Q_{gd}	Gate-Drain ("Miller") Charge			36	54	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}], V_{GS} = 15V$ $R_G = 1.8\Omega$		13	25	ns
t_r	Rise Time			24	47	ns
$t_{d(off)}$	Turn-off Delay Time			50	75	ns
t_f	Fall Time			26	52	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT4030BN / APT3530BN		18.5	Amps
		APT4040BN / APT3540BN		16	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)	APT4030BN / APT3530BN		74	Amps
		APT4040BN / APT3540BN		64	Amps
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], dI_S/dt = 100A/\mu s$)	142	284	568	ns
Q_{rr}	Reverse Recovery Charge	2.2	4.5	8.0	μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1 \text{ Sec.}$	240			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}], V_{DS} = P_D / I_D [\text{Cont.}], t = 1 \text{ Sec.}$	240			Watts
I_{LM}	Inductive Current Clamped	APT4030BN / APT3530BN	74			Amps
		APT4040BN / APT3540BN	64			Amps

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

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

③ See MIL-STD-750 Method 3471

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

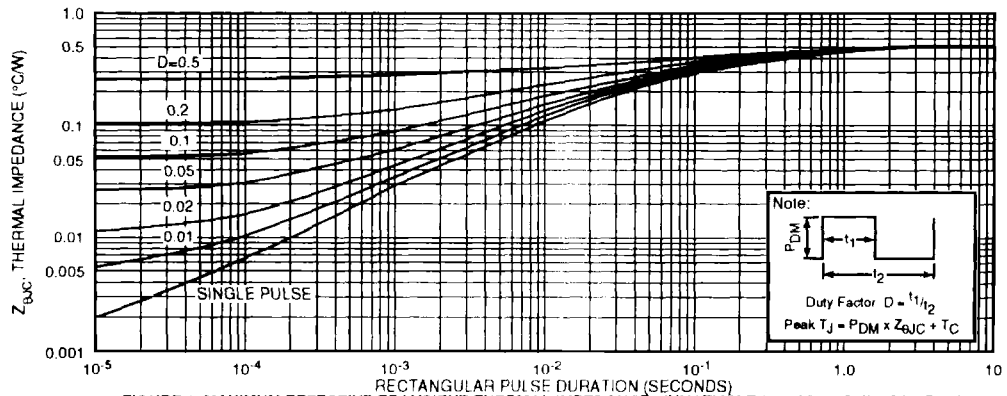


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION
Page 18

APT4030/3530/4040/3540BN

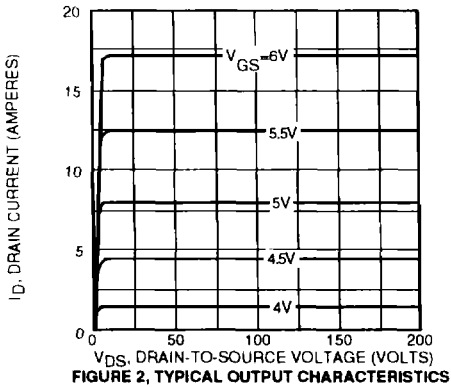


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

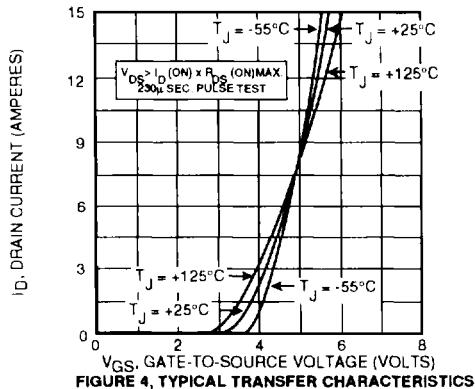


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

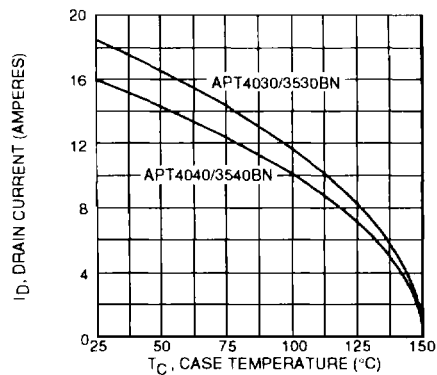


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

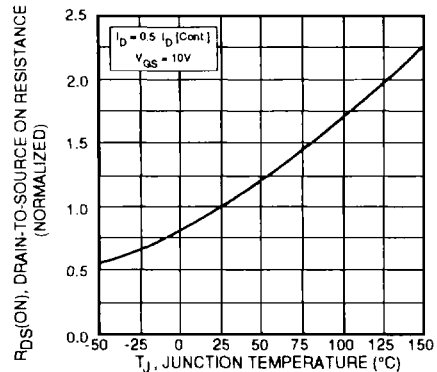


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

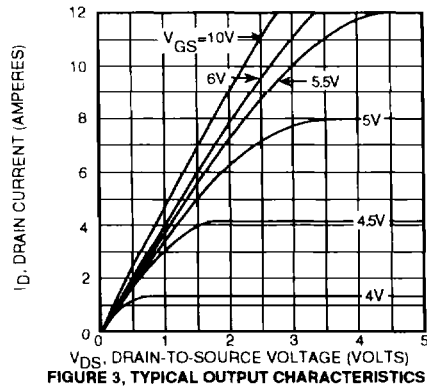


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

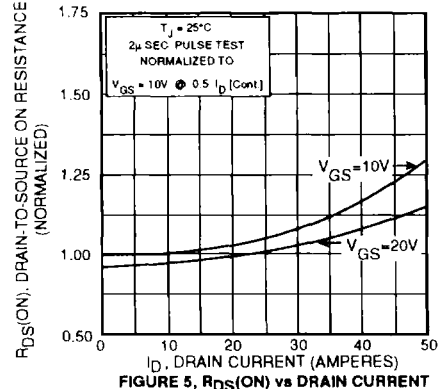


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

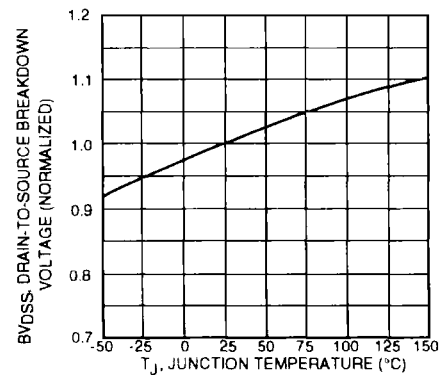


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

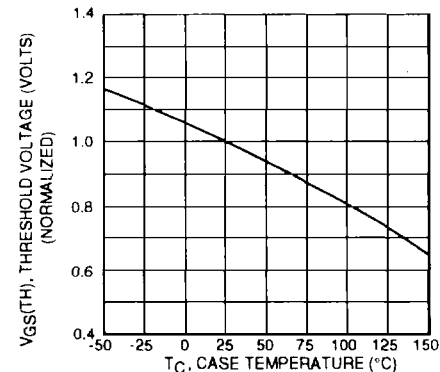
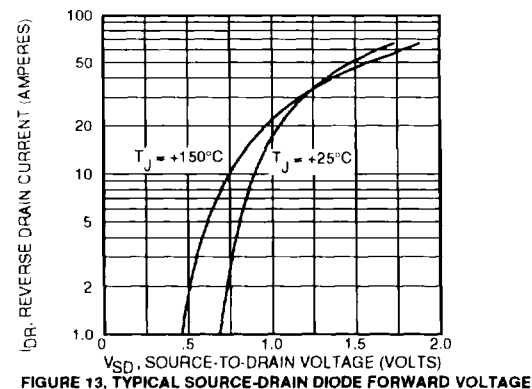
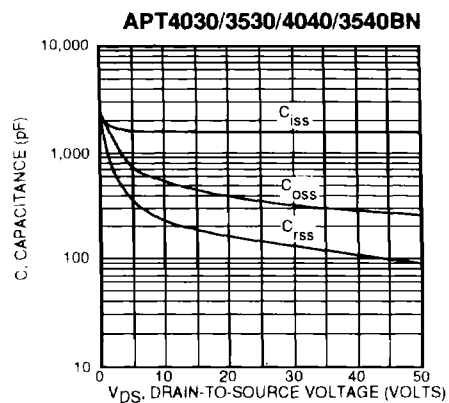
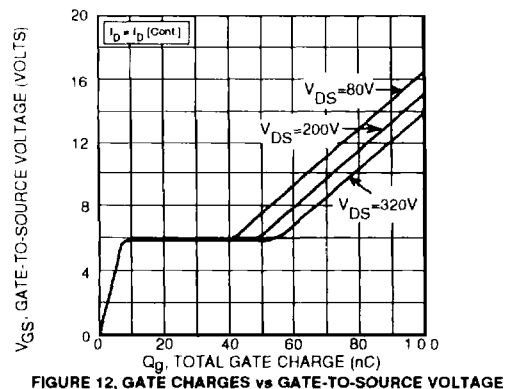
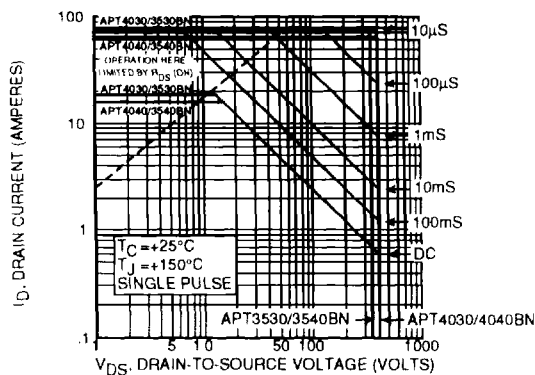


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE



TO-247AD Package Outline

