

APT6040BN	600V	18.0A	0.40Ω
APT5540BN	550V	18.0A	0.40Ω
APT6045BN	600V	17.0A	0.45Ω
APT5545BN	550V	17.0A	0.45Ω

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
		5540BN	6040BN	5545BN	6045BN	
V _{DSS}	Drain-Source Voltage	550	600	550	600	Volts
I _D	Continuous Drain Current	18		17		Amps
I _{DM}	Pulsed Drain Current ①	72		68		Amps
V _{GS}	Gate-Source Voltage	±30				Volts
P _D	Total Power Dissipation @ T _C = 25°C, Derate Above 25°C	310				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 ($V_{GS} = 0V, I_D = 250 \mu A$)	APT6040BN / APT6045BN	600			Volts
		APT5540BN / APT5545BN	550			Volts
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$) ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)				250	μA
					1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)				± 100	nA
$I_{D(ON)}$	On State Drain Current ^② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT6040BN / APT5540BN	18			Amps
		APT6045BN / APT5545BN	17			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 ($V_{GS} = 10V, I_D = 0.5 I_D$ [Cont.])	APT6040BN / APT5540BN			0.40	Ohms
		APT6045BN / APT5545BN			0.45	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.40	$^\circ\text{C/W}$
$R_{\theta JA}$	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.

USA
405 S.W. Columbia Street
EUROPE

Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord F-33700 Merignac - France

Bend, Oregon 97702-1035 Phone: (503) 382-8028 FAX: (503) 388-0364

Phone: (33) 56 34 34 71 FAX: (33) 56 47 97 61

DYNAMIC CHARACTERISTICS

APT6040/5540/6045/5545BN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		2400	2950	pF
C_{oss}	Output Capacitance			436	610	pF
C_{rss}	Reverse Transfer Capacitance			154	230	pF
Q_g	Total Gate Charge ^③	$V_{GS} = 10V, I_D = I_D [\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$		87	130	nC
Q_{gs}	Gate-Source Charge			11	16	nC
Q_{gd}	Gate-Drain ("Miller") Charge			46	69	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}], V_{GS} = 15V$ $R_G = 1.8\Omega$		14	28	ns
t_r	Rise Time			23	46	ns
$t_{d(off)}$	Turn-off Delay Time			63	95	ns
t_f	Fall Time			23	46	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT6040BN / APT5540BN		18	Amps
		APT6045BN / APT5545BN		17	Amps
I_{SM}	Pulsed Source Current ^① (Body Diode)	APT6040BN / APT5540BN		72	Amps
		APT6045BN / APT5545BN		68	Amps
V_{SD}	Diode Forward Voltage ^② ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], dI_S/dt = 100A/\mu s$)	152	334	668	ns
Q_{rr}	Reverse Recovery Charge	2.5	5	10	μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1 \text{ Sec.}$	310			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}], V_{DS} = P_D / I_D [\text{Cont.}], t = 1 \text{ Sec.}$	310			Watts
I_{LM}	Inductive Current Clamped	APT6040BN / APT5540BN	72			Amps
		APT6045BN / APT5545BN	68			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.

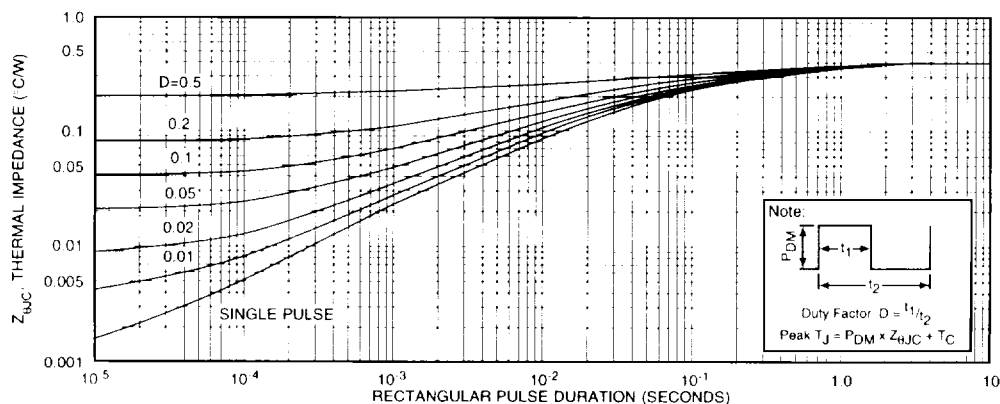
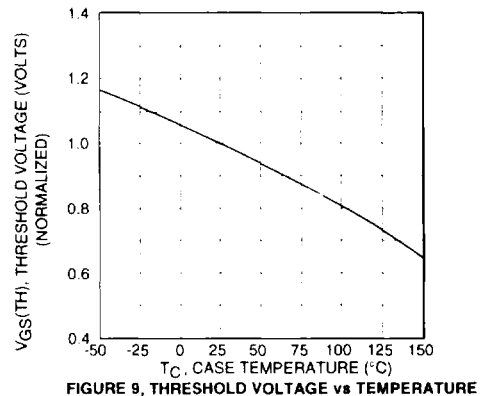
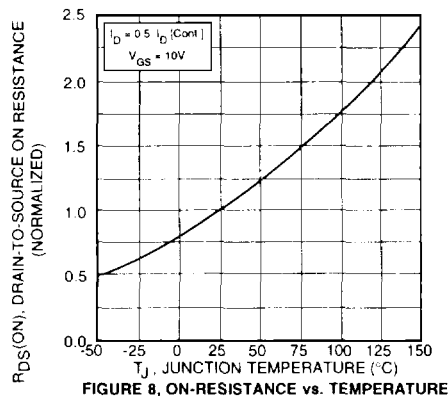
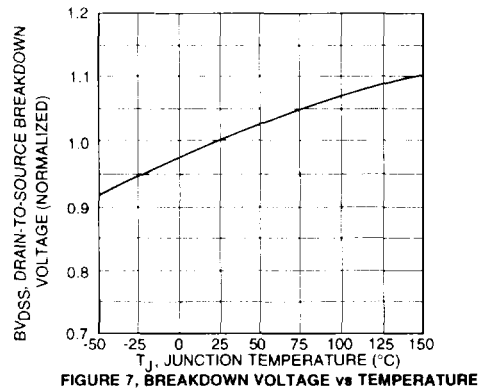
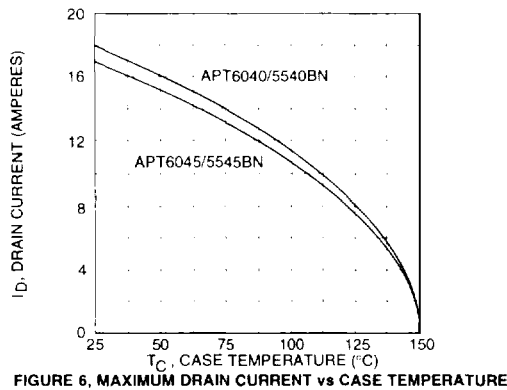
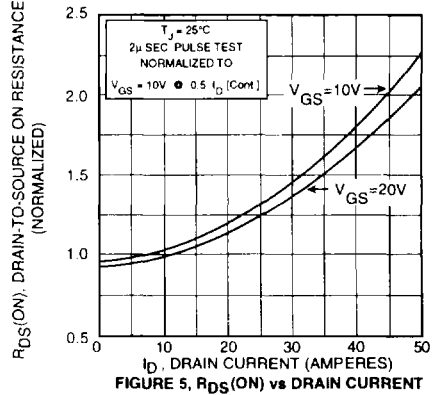
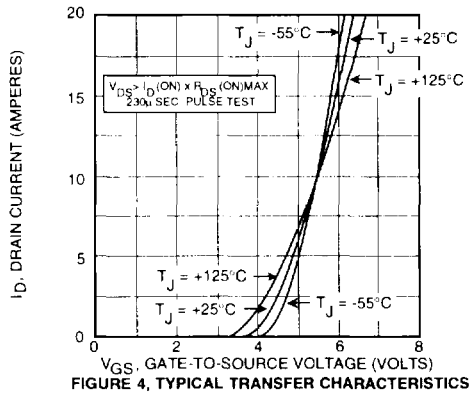
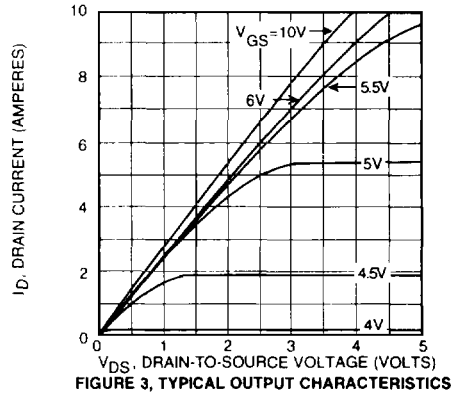
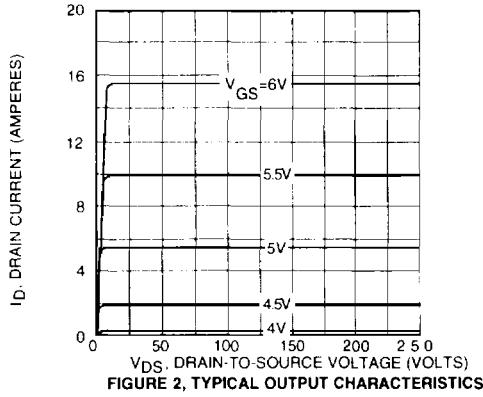


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT6040/5540/6045/5545BN



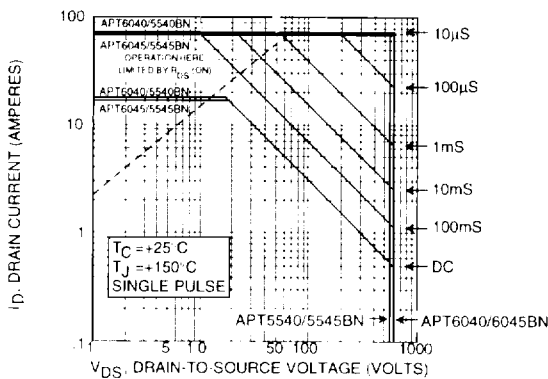


FIGURE 10. MAXIMUM SAFE OPERATING AREA

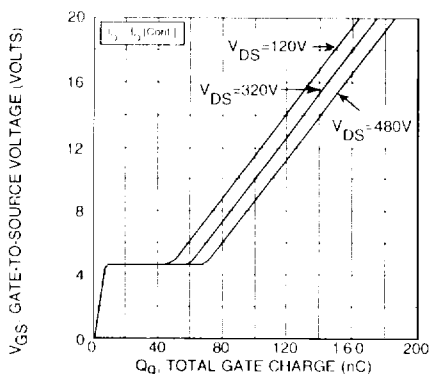


FIGURE 12. GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

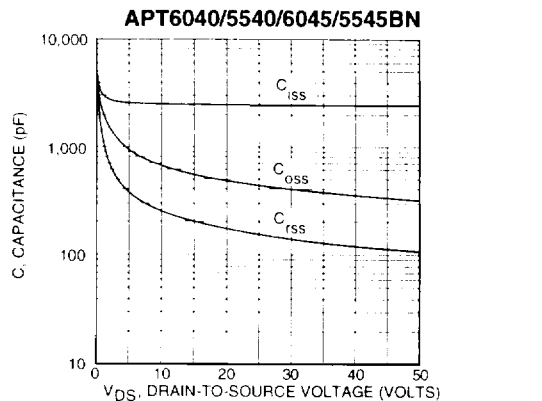


FIGURE 11. TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

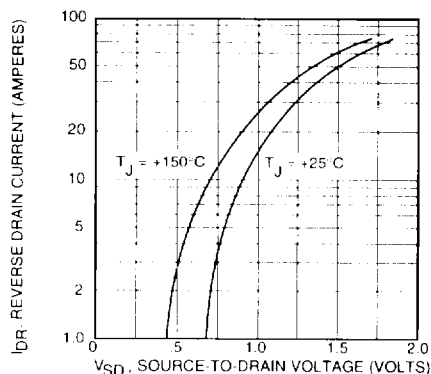


FIGURE 13. TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline

