

**ADVANCED
POWER
TECHNOLOGY** T-39-15

APT601R3BN 600V 7.5A 1.30 Ω
APT551R3BN 550V 7.5A 1.30 Ω
APT601R6BN 600V 6.5A 1.60 Ω
APT551R6BN 550V 6.5A 1.60 Ω

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
		551R3BN	601R3BN	551R6BN	601R6BN	
V _{DSS}	Drain-Source Voltage	550	600	550	600	Volts
I _D	Continuous Drain Current	7.5		6.5		Amps
I _{DM}	Pulsed Drain Current ¹	30		26		Amps
V _{GS}	Gate-Source Voltage	±30				Volts
P _D	Total Power Dissipation @ T _C = 25°C, Derate Above 25°C	180				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 ($V_{GS} = 0V, I_D = 250 \mu A$)	APT601R3BN / APT601R6BN	600			Volts
		APT551R3BN / APT551R6BN	550			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 ($V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}, V_{GS} = 10V$)	APT601R3BN / APT551R3BN	7.5			Amps
		APT601R6BN / APT551R6BN	6.5			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 ($V_{GS} = 10V, I_D = 0.5 I_D [\text{Cont.}]$)	APT601R3BN / APT551R3BN			1.30	Ohms
		APT601R6BN / APT551R6BN			1.60	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.68	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	$^\circ\text{C/W}$
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	$^\circ\text{C}$

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Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		764	950	pF
C_{oss}	Output Capacitance			153	214	pF
C_{rss}	Reverse Transfer Capacitance			54	81	pF
Q_g	Total Gate Charge ³	$V_{GS} = 10V, I_D = I_D [\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$		34	55	nC
Q_{gs}	Gate-Source Charge			4.6	7	nC
Q_{gd}	Gate-Drain ("Miller") Charge			15	23	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}], V_{GS} = 15V$ $R_G = 1.8\Omega$		10	20	ns
t_r	Rise Time			12	24	ns
$t_{d(off)}$	Turn-off Delay Time			36	49	ns
t_f	Fall Time			11	22	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT601R3BN / APT551R3BN		7.5	Amps
		APT601R6BN / APT551R6BN		6.5	Amps
I_{SM}	Pulsed Source Current ¹ (Body Diode)	APT601R3BN / APT551R3BN		30	Amps
		APT601R6BN / APT551R6BN		26	Amps
V_{SD}	Diode Forward Voltage ² ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], dI_S/dt = 100A/\mu s$)	130	260	520	ns
Q_{rr}	Reverse Recovery Charge	1.3	2.6	5.2	μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1 \text{ Sec.}$	180			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}], V_{DS} = P_D / I_D [\text{Cont.}], t = 1 \text{ Sec.}$	180			Watts
I_{LM}	Inductive Current Clamped	APT601R3BN / APT551R3BN	30			Amps
		APT601R6BN / APT551R6BN	26			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

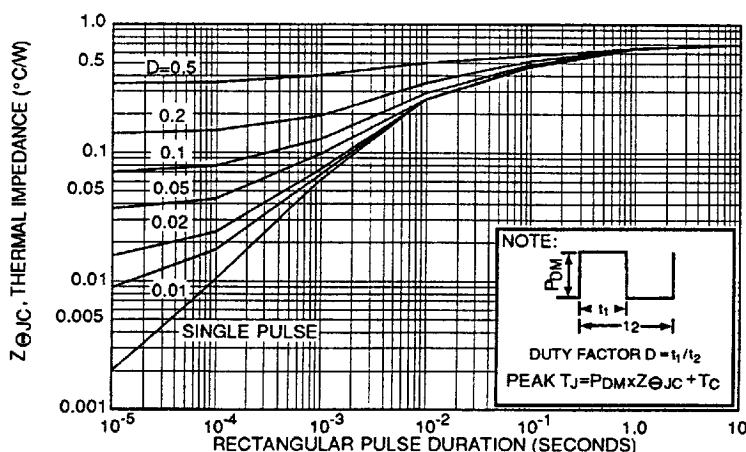
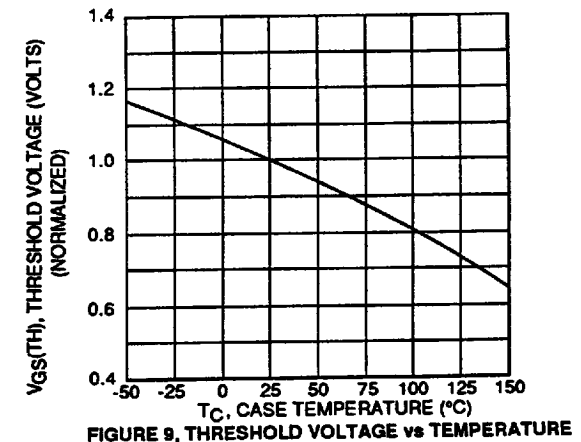
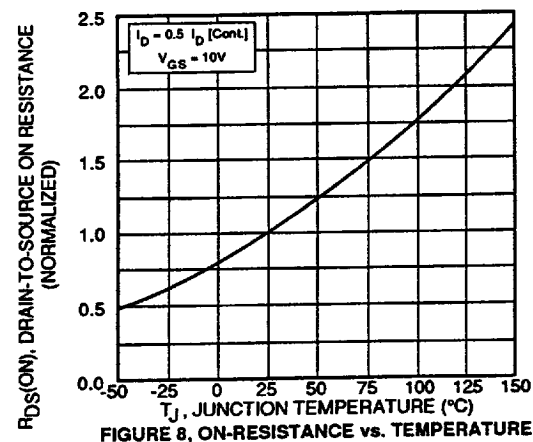
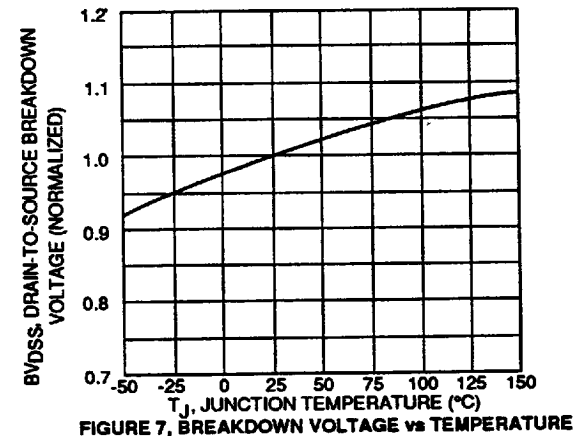
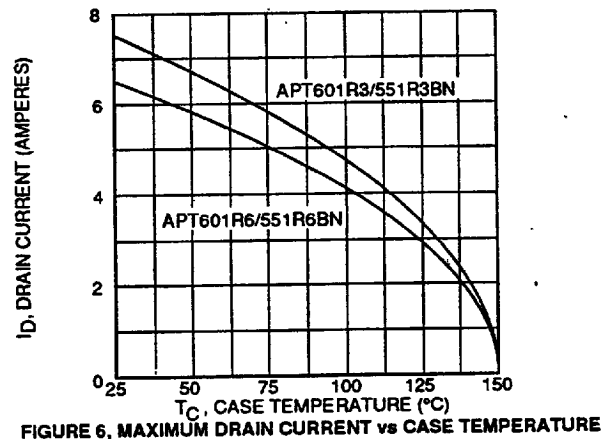
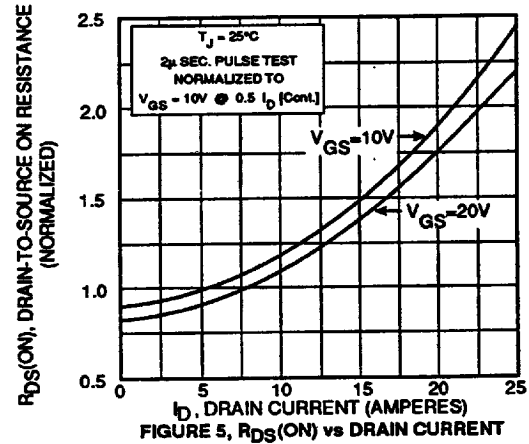
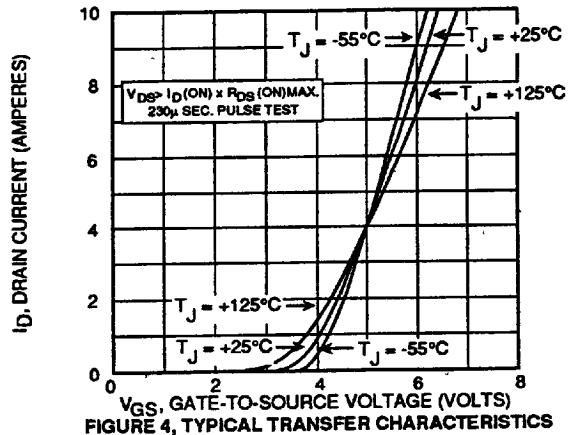
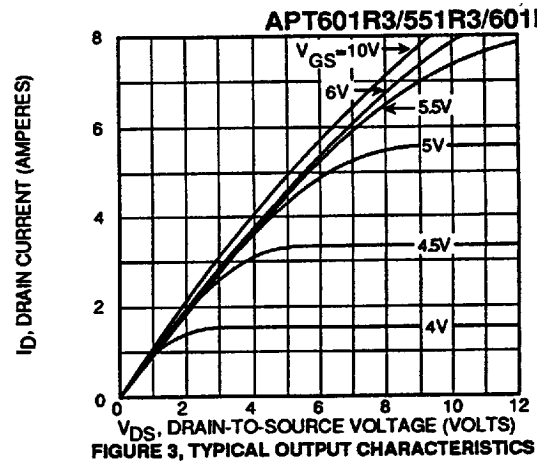
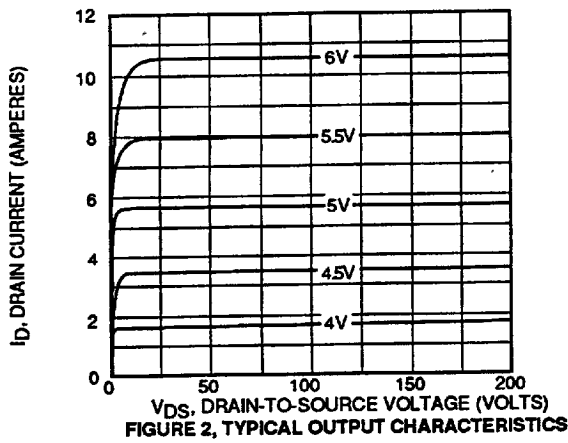
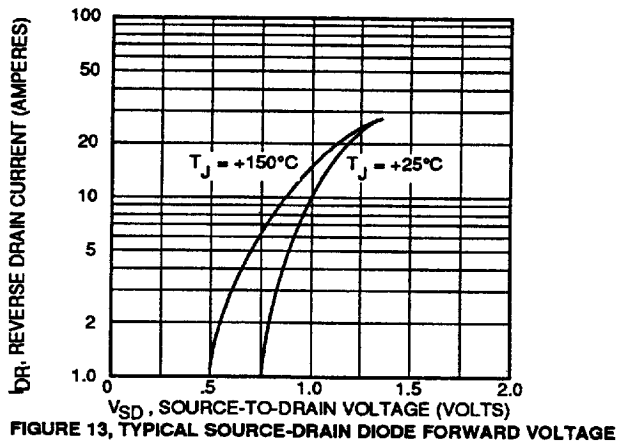
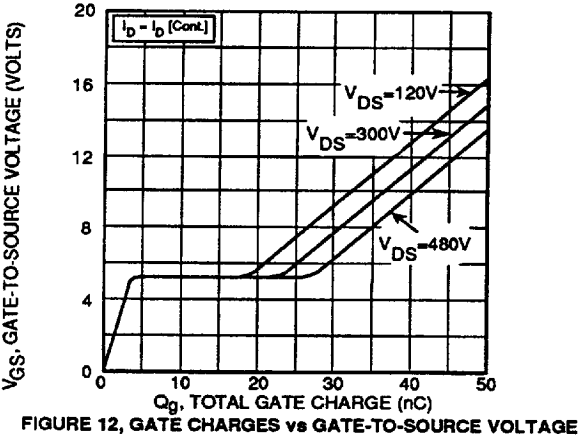
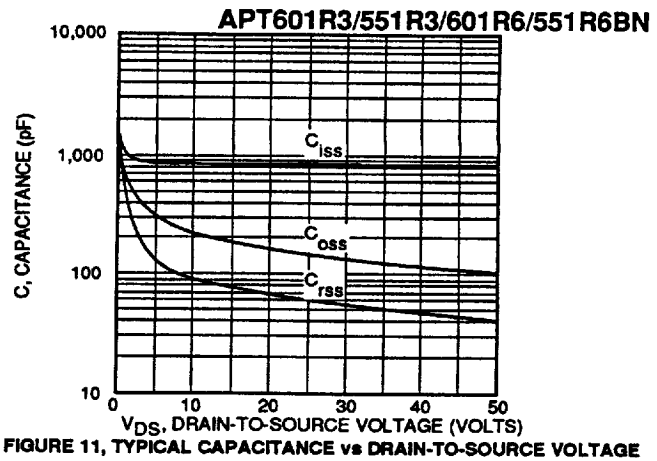
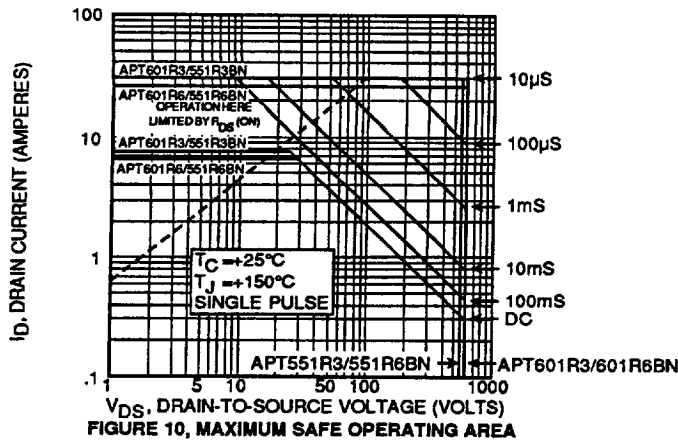
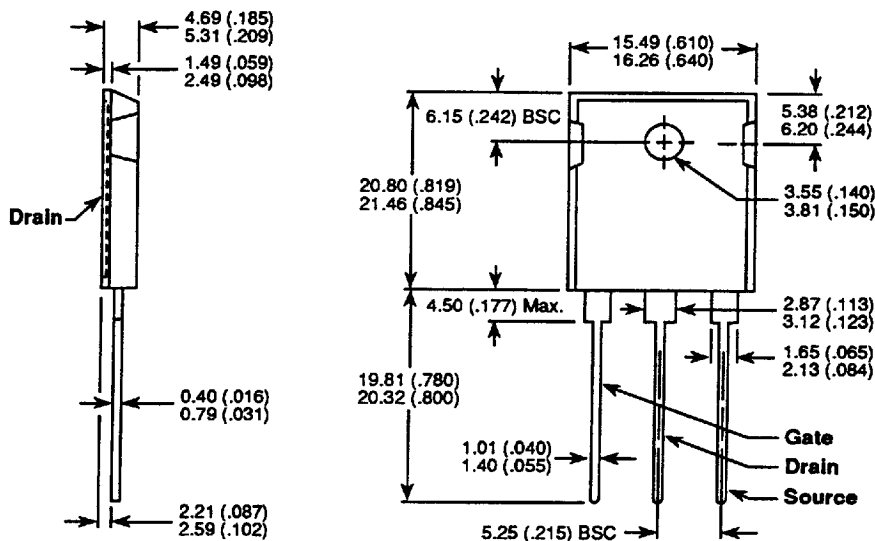


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION





TO-247AD Package Outline



Dimensions in Millimeters and (Inches)