

**ADVANCED
POWER
TECHNOLOGY®**

APT801R2BNR 800V 9.0A 1.20Ω
APT801R4BNR 800V 8.5A 1.40Ω

POWER MOS IV®

UIS RATED

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT801R2BNR	APT801R4BNR	UNIT
V _{DSS}	Drain-Source Voltage	800	800	Volts
I _D	Continuous Drain Current @ T _C = 25°C	9	8.5	Amps
I _{DM}	Pulsed Drain Current ①	36	34	
V _{GS}	Gate-Source Voltage Continuous	±20		Volts
V _{GSM}	Gate-Source Voltage Transient	±30		
P _D	Total Power Dissipation @ T _C = 25°C	240		Watts
	Linear Derating Factor	1.9		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)	9		Amps
E _{AR}	Repetitive Avalanche Energy ①	20		mJ
E _{AS}	Single Pulse Avalanche Energy ④	800		

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu A$)	800			Volts
$I_{D(ON)}$	On State Drain Current ^② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT801R2BNR	9		Amps
		APT801R4BNR	8.5		
$R_{DS(ON)}$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_D$ [Cont.])	APT801R2BNR		1.20	Ohms
		APT801R4BNR		1.40	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			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			0.51	°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

APT801R2/801R4BNR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		1875		pF
C_{oss}	Output Capacitance			240		
C_{rss}	Reverse Transfer Capacitance			92		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$		88		nC
Q_{gs}	Gate-Source Charge			8.4		
Q_{gd}	Gate-Drain ("Miller") Charge			46		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$ $R_G = 1.8\Omega$		15		ns
t_r	Rise Time			15		
$t_{d(off)}$	Turn-off Delay Time			75		
t_f	Fall Time			23		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT801R2BNR		9	Amps
		APT801R4BNR		8.5	
I_{SM}	Pulsed Source Current ① (Body Diode)	APT801R2BNR		36	
		APT801R4BNR		34	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_{D[Cont.]}$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_{D[Cont.]}, dI_S/dt = 100A/\mu s$)	240	480	960	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_{D[Cont.]}, dI_S/dt = 100A/\mu s$)	1.7	3.4	7	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	$I_{DS} = I_{D[Cont.]}, V_{DS} = P_D / I_{D[Cont.]}, t = 1 \text{ Sec.}$	240			
I_{LM}	Inductive Current Clamped	APT801R2BNR	36			Amps
		APT801R4BNR	34			

① Repetitive Rating: Pulse width limited by maximum junction temperature.

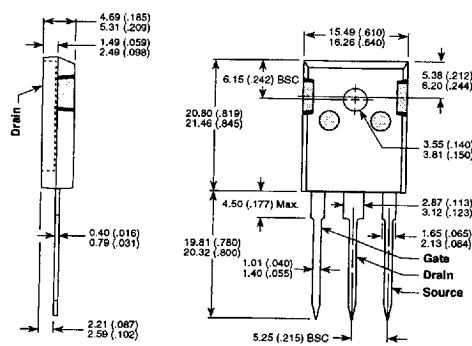
② Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting $T_J = +25^\circ C$, $L = 19.7mH$, $R_G = 25\Omega$, Peak $I_L = 9A$

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

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)

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