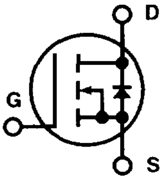
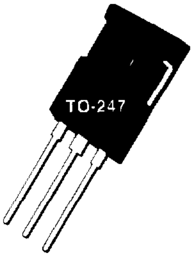




ADVANCED POWER TECHNOLOGY®

APT1002RBNR 1000V 7.0A 2.00Ω
APT1002R4BNR 1000V 6.5A 2.40Ω

POWER MOS IV®

UIS RATED

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT1002RBNR	APT1002R4BNR	UNIT
V_{DSS}	Drain-Source Voltage	1000	1000	Volts
I_D	Continuous Drain Current @ $T_C = 25°C$	7	6.5	Amps
I_{DM}	Pulsed Drain Current ①	28	26	
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)	7		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 ($V_{GS} = 0V$, $I_D = 250\mu A$)		1000			Volts
$I_D(ON)$	On State Drain Current ② ($V_{DS} > I_D(ON) \times R_{DS}(ON)$ Max, $V_{GS} = 10V$)	APT1002RBNR	7			Amps
		APT1002R4BNR	6.5			
$R_{DS}(ON)$	Drain-Source On-State Resistance ② ($V_{GS} = 10V$, $0.5\ I_D$ [Cont.])	APT1002RBNR			2.00	Ohms
		APT1002R4BNR			2.40	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}$, $V_{GS} = 0V$)				250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8\ V_{DSS}$, $V_{GS} = 0V$, $T_C = 125°C$)				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.

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ f = 1 MHz		1915		pF
C_{oss}	Output Capacitance			235		
C_{rss}	Reverse Transfer Capacitance			87		
Q_g	Total Gate Charge③	$V_{GS} = 10V$ $V_{DD} = 0.5\ V_{DSS}$ $I_D = I_D$ [Cont.] @ 25°C		86		nC
Q_{gs}	Gate-Source Charge			7.2		
Q_{gd}	Gate-Drain ("Miller") Charge			50		
t_d(on)	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5\ V_{DSS}$ $I_D = I_D$ [Cont.] @ 25°C $R_G = 1.8\Omega$		16		ns
t_r	Rise Time			13		
t_d(off)	Turn-off Delay Time			77		
t_f	Fall Time			22		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT1002RBNR			7	Amps
		APT1002R4BNR			6.5	
I_{SM}	Pulsed Source Current① (Body Diode)	APT1002RBNR			28	
		APT1002R4BNR			26	
V_{SD}	Diode Forward Voltage② ($V_{GS} = 0V$, $I_S = -I_D$ [Cont.])				1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D$ [Cont.], $dI_S/dt = 100A/\mu s$)		225	450	910	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D$ [Cont.], $dI_S/dt = 100A/\mu s$)		1.2	2.5	5	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 Sec.	240			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D$ [Cont.], $V_{DS} = P_D / I_D$ [Cont.], t = 1 Sec.	240			
I_{LM}	Inductive Current Clamped	APT1002RBNR	28			Amps
		APT1002R4BNR	26			

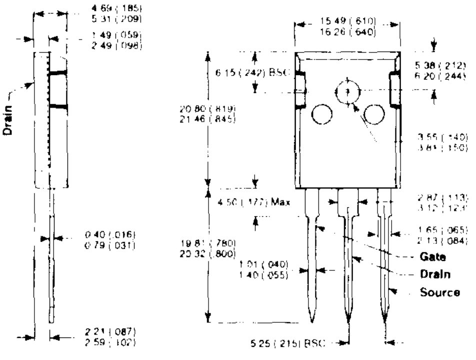
① Repetitive Rating: Pulse width limited by maximum junction temperature.

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

③ See MIL-STD-750 Method 3471

④ Starting $T_j = +25°C$, L = 32.6mH, $R_G = 25\Omega$, Peak $I_L = 7A$

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)