

APT4020BNR 400V 26.0A 0.20Ω
APT4025BNR 400V 23.0A 0.25Ω

POWER MOS IV®

AVALANCHE RATED

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT4020BNR	APT4025BNR	UNIT
V_{DSS}	Drain-Source Voltage	400	400	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	26	23	Amps
I_{DM}	Pulsed Drain Current ^①	104	92	
V_{GS}	Gate-Source Voltage Continuous	±20		Volts
V_{GSM}	Gate-Source Voltage Transient	±30		
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	310		Watts
	Linear Derating Factor	2.5		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)	26		Amps
E_{AR}	Repetitive Avalanche Energy ^①	25		mJ
E_{AS}	Single Pulse Avalanche Energy ^④	1210		

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	400			Volts
$I_D(ON)$	On State Drain Current ^② ($V_{DS} > I_D(ON) \times R_{DS}(ON)$ Max, $V_{GS} = 10V$)	APT4020BNR	26		Amps
		APT4025BNR	23		
$R_{DS}(ON)$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_D(Cont.)$)	APT4020BNR		0.20	Ohms
		APT4025BNR		0.25	
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 ($V_{DS} = V_{GS}, I_D = 1.0\text{mA}$)	2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.40	°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

APT4020/4025BNR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		2975		pF
C_{oss}	Output Capacitance			574		
C_{rss}	Reverse Transfer Capacitance			224		
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		122		nC
Q_{gs}	Gate-Source Charge			12		
Q_{gd}	Gate-Drain ("Miller") Charge			66		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 1.8\Omega$		16		ns
t_r	Rise Time			29		
$t_{d(off)}$	Turn-off Delay Time			84		
t_f	Fall Time			46		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT4020BNR		26	Amps
		APT4025BNR		23	
I_{SM}	Pulsed Source Current ① (Body Diode)	APT4020BNR		104	Amps
		APT4025BNR		92	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$)	180	360	720	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$)	3	6	12	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			
I_{LM}	Inductive Current Clamped	APT4020BNR	104			Amps
		APT4025BNR	92			

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

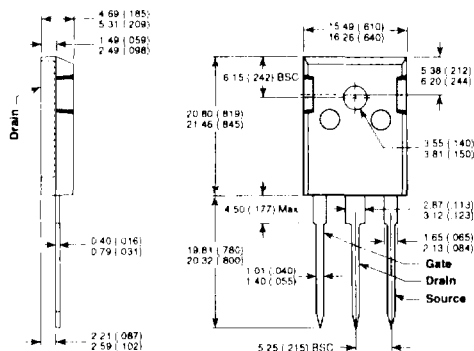
② Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting $T_j = +25^\circ\text{C}$, $L = 3.58\text{mH}$, $R_G = 25\Omega$, Peak $I_L = 26A$

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

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)