
**ADVANCED
POWER
TECHNOLOGY®**
APT10053LNR 1000V 20.0A 0.53Ω
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		APT10053LNR	UNIT
V_{DSS}	Drain-Source Voltage		1000	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$		20	Amps
I_{DM}	Pulsed Drain Current ①		80	
V_{GS}	Gate-Source Voltage Continuous		± 20	Volts
V_{GSM}	Gate-Source Voltage Transient		± 30	
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$		520	Watts
	Linear Derating Factor		4.16	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-55 to 150	$^\circ\text{C}$
T_L	Lead Temperature: 0.063" from Case for 10 Sec.		300	
I_{AR}	Avalanche Current ① (Repetitive and Non-Repetitive)		20	Amps
E_{AR}	Repetitive Avalanche Energy ①		50	mJ
E_{AS}	Single Pulse Avalanche Energy ④		2500	

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				Amps
	($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)				
$R_{DS(ON)}$	Drain-Source On-State Resistance ②			0.53	Ohms
	($V_{GS} = 10V, 0.5 I_D$ [Cont.])				
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 ($V_{DS} = V_{GS}, I_D = 2.5mA$)	2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.24	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	


CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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DYNAMIC CHARACTERISTICS

APT10053LNR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		7700		pF
C_{oss}	Output Capacitance			625		
C_{rss}	Reverse Transfer Capacitance			210		
Q_g	Total Gate Charge ^③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		290		nC
Q_{gs}	Gate-Source Charge			30		
Q_{gd}	Gate-Drain ("Miller") Charge			125		
$t_d(\text{on})$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 1.8\Omega$		20		ns
t_r	Rise Time			30		
$t_d(\text{off})$	Turn-off Delay Time			130		
t_f	Fall Time			40		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT10053LNR			20	Amps
I_{SM}	Pulsed Source Current ^① (Body Diode)	APT10053LNR			80	
V_{SD}	Diode Forward Voltage ^② ($V_{GS} = 0V$, $I_S = -I_D [\text{Cont.}]$)				1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}]$, $dI_S/dt = 100A/\mu s$)			850		ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}]$, $dI_S/dt = 100A/\mu s$)			12		μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}$, $I_{DS} = P_D / 0.4 V_{DSS}$, $t = 1\text{ Sec.}$	520			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}]$, $V_{DS} = P_D / I_D [\text{Cont.}]$, $t = 1\text{ Sec.}$	520			
I_{LM}	Inductive Current Clamped	APT10053LNR	80			Amps

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

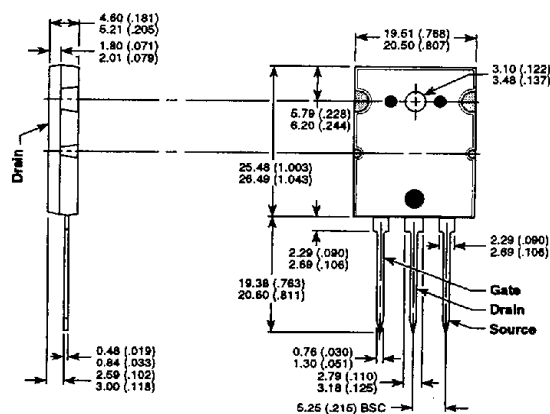
② Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting $T_J = +25^\circ\text{C}$, $L = 12.5\text{mH}$, $R_G = 25\Omega$, Peak $I_L = 20A$

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

TO-264AA Package Outline



Dimensions in Millimeters and (Inches)