



**ADVANCED  
POWER  
TECHNOLOGY®**

**APT6018LNR 600V 35.0A 0.18Ω**

**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	APT6018LNR	UNIT
$V_{DSS}$	Drain-Source Voltage	600	Volts
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	35	Amps
$I_{DM}$	Pulsed Drain Current ①	140	
$V_{GS}$	Gate-Source Voltage Continuous	$\pm 20$	Volts
$V_{GSM}$	Gate-Source Voltage Transient	$\pm 30$	
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	520	Watts
	Linear Derating Factor	4.16	
$T_J, T_{STG}$	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)	35	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 ( $V_{GS} = 0V, I_D = 250 \mu\text{A}$ )	600			Volts
$I_{D(ON)}$	On State Drain Current ②	APT6018LNR	35		Amps
	( $V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$ )				
$R_{DS(ON)}$	Drain-Source On-State Resistance ②	APT6018LNR		0.18	Ohms
	( $V_{GS} = 10V, 0.5 I_D$ [Cont.])				
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )			250	$\mu\text{A}$
	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 ( $V_{GS} = \pm 20V, V_{DS} = 0V$ )			$\pm 100$	nA
$V_{GS(TH)}$	Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 2.5\text{mA}$ )	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**

**APT6018LNR**

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		7800		pF
$C_{oss}$	Output Capacitance			850		
$C_{rss}$	Reverse Transfer Capacitance			525		
$Q_g$	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			35		
$Q_{gd}$	Gate-Drain ("Miller") Charge			125		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 1.8\Omega$		20		ns
$t_r$	Rise Time			40		
$t_{d(off)}$	Turn-off Delay Time			130		
$t_f$	Fall Time			75		

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode) APT6018LNR			35	Amps
$I_{SM}$	Pulsed Source Current ① (Body Diode) APT6018LNR			140	
$V_{SD}$	Diode Forward Voltage ② ( $V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$ )			1.3	Volts
$t_{rr}$	Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )		650		ns
$Q_{rr}$	Reverse Recovery Charge ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )		18		$\mu\text{C}$

**SAFE OPERATING AREA CHARACTERISTICS**

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} \leq 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1\text{ Sec.}$	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	APT6018LNR	140			Amps

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

② Pulse Test: Pulse width < 380  $\mu\text{s}$ , Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting  $T_J = +25^\circ\text{C}$ ,  $L = 4.08\text{mH}$ ,  $R_G = 25\Omega$ , Peak  $I_L = 35\text{A}$

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

**TO-264AA Package Outline**

