

**ADVANCED  
POWER  
TECHNOLOGY®**  
APT8018JNFR 800V 40A 0.18Ω

**UL** "UL Recognized" File No. E145592 (S)

**POWER MOS IV®**

**AVALANCHE RATED FREDFET**

**N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER FREDFETS**

**MAXIMUM RATINGS**

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

Symbol	Parameter	APT8018JNFR	UNIT
$V_{DSS}$	Drain-Source Voltage	800	Volts
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	40	Amps
$I_{DM}$	Pulsed Drain Current ①	160	
$V_{GS}$	Gate-Source Voltage Continuous	±20	Volts
$V_{GSM}$	Gate-Source Voltage Transient	±30	
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	690	Watts
	Linear Derating Factor	5.52	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)	40	Amps
$E_{AR}$	Repetitive Avalanche Energy ①	30	mJ
$E_{AS}$	Single Pulse Avalanche Energy ④	3600	

**STATIC ELECTRICAL CHARACTERISTICS**

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
$BV_{DSS}$	Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 8.0\text{ mA}$ )	800			Volts
$I_D(\text{ON})$	On State Drain Current ② ( $V_{DS} > I_D(\text{ON}) \times R_{DS}(\text{ON})$ Max, $V_{GS} = 10V$ )	APT8018JNFR	40		Amps
$R_{DS}(\text{ON})$	Drain-Source On-State Resistance ② ( $V_{GS} = 10V, 0.5 I_D(\text{Cont.})$ )	APT8018JNFR		0.18	Ohms
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )			8.0	mA
	Zero Gate Voltage Drain Current ( $V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$ )			8.0	
$I_{GSS}$	Gate-Source Leakage Current ( $V_{GS} = \pm 20V, V_{DS} = 0V$ )			±100	nA
$V_{GS}(\text{TH})$	Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 5.0\text{mA}$ )	2		4	Volts

**THERMAL CHARACTERISTICS**

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.18	°C/W
$R_{\theta CS}$	Case to Sink (Use High Efficiency Thermal Joint Compound and Planer Heat Sink Surface.)		0.08		

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

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**DYNAMIC CHARACTERISTICS**

**APT8018JNFR**

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		19500	24000	pF
C <sub>OSS</sub>	Output Capacitance	V <sub>DS</sub> = 25V		1700	2380	
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1 MHz		530	800	
Q <sub>g</sub>	Total Gate Charge ③	V <sub>GS</sub> = 10V		700	1000	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DD</sub> = 0.5 V <sub>DSS</sub>		65	100	
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		260	390	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> = 15V		25	38	ns
t <sub>r</sub>	Rise Time	V <sub>DD</sub> = 0.5 V <sub>DSS</sub>		20	30	
t <sub>d(off)</sub>	Turn-off Delay Time	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		110	220	
t <sub>f</sub>	Fall Time	R <sub>G</sub> = 0.6Ω		15	25	

**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I <sub>S</sub>	Continuous Source Current (Body Diode)	APT8018JNFR		40	Amps
I <sub>SM</sub>	Pulsed Source Current ① (Body Diode)	APT8018JNFR		160	
V <sub>SD</sub>	Diode Forward Voltage ② (V <sub>GS</sub> = 0V, I <sub>S</sub> = -I <sub>D</sub> [Cont.])			1.8	Volts
dv/dt	Peak Diode Recovery dv/dt ④			5	V/ns
t <sub>rr</sub>	Reverse Recovery Time (I <sub>S</sub> = -I <sub>D</sub> [Cont.], di/dt = 100A/μs)	T <sub>j</sub> = 25°C	300	375	ns
		T <sub>j</sub> = 125°C	600	775	
Q <sub>rr</sub>	Reverse Recovery Charge (I <sub>S</sub> = -I <sub>D</sub> [Cont.], di/dt = 100A/μs)	T <sub>j</sub> = 25°C	3.8		μC
		T <sub>j</sub> = 125°C	12.1		
I <sub>RRM</sub>	Peak Recovery Current (I <sub>S</sub> = -I <sub>D</sub> [Cont.], di/dt = 100A/μs)	T <sub>j</sub> = 25°C	21		Amps
		T <sub>j</sub> = 125°C	37		

**PACKAGE CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
L <sub>D</sub>	Internal Drain Inductance (Measured From Drain Terminal to Center of Die.)		3		nH
L <sub>S</sub>	Internal Source Inductance (Measured From Source Terminals to Source Bond Pads)		5		
V <sub>isolation</sub>	RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.)	2500			Volts
C <sub>isolation</sub>	Drain-to-Mounting Base Capacitance (f = 1MHz)		38		pF
Torque	Maximum Torque for Device Mounting Screws and Electrical Terminations.			13	lb*in.

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

R<sub>G</sub> = 1.8Ω, V<sub>R</sub> = 50V.

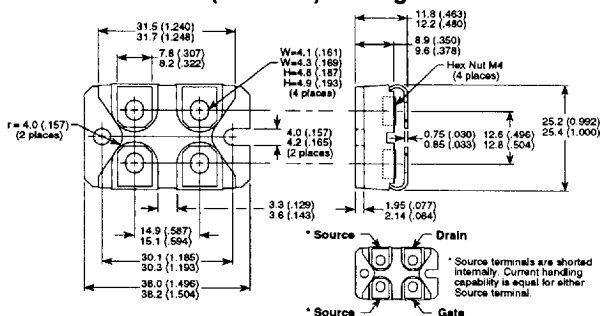
③ Starting T<sub>j</sub> = 25°C, L = 4.5mH, R<sub>G</sub> = 25Ω, Peak I<sub>L</sub> = 40A

② I<sub>S</sub> ≤ -I<sub>D</sub> [Cont.], di/dt = 100A/μs, V<sub>DD</sub> ≤ V<sub>DSS</sub>, T<sub>j</sub> ≤ 150°C,

④ Pulse Test: Pulse width < 380 μs, Duty Cycle < 2%

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

**SOT-227 (ISOTOP®) Package Outline**



\* Source terminals are shorted internally. Current handling capability is equal for either Source terminal.

Dimensions in Millimeters and (Inches)

050-8057 Rev A

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