

ADVANCED POWER TECHNOLOGY T-39-15

APT10021DFN 1000V 40.0A 0.21
 APT9021DFN 900V 40.0A 0.21

POWER MOS IV™

N - CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT9021DFN	APT10021DFN	UNIT
V_{DSS}	Drain-Source Voltage	900	1000	Volt
I_D	Continuous Drain Current	40		Amps
I_{DM}	Pulsed Drain Current ¹	160		Amps
V_{GS}	Gate-Source Voltage	±30		Volt
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$, Derate Above 25°C	830		Watts
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150		$^\circ\text{C}$

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	APT10021DFN	1000		Volt
		APT9021DFN	900		Volt
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			250	μA
	($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	μA
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			±100	nA
$I_D(ON)$	On State Drain Current ² ($V_{DS} > I_D(ON) \times R_{DS}(ON)$ Max, $V_{GS} = 10V$)	40			Amps
$V_{GS}(TH)$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$)	2		4	Volt
$R_{DS}(ON)$	Static Drain-Source On-State Resistance ² ($V_{GS} = 10V, I_D = 0.5 I_D(\text{Cont.})$)			0.21	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.15	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			20	$^\circ\text{C/W}$
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	$^\circ\text{C}$

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Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		11560	13000	pF
C_{oss}	Output Capacitance			1610	2260	pF
C_{rss}	Reverse Transfer Capacitance			454	675	pF
Q_g	Total Gate Charge ³	$V_{GS} = 10V, I_D = I_D [\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$		454	675	nC
Q_{gs}	Gate-Source Charge			50	75	nC
Q_{gd}	Gate-Drain ("Miller") Charge			243	365	nC
$t_d(\text{on})$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}], V_{GS} = 15V$ $R_G = 0.6$		21	42	ns
t_r	Rise Time			25	50	ns
$t_d(\text{off})$	Turn-off Delay Time			130	195	ns
t_f	Fall Time			40	80	ns

T-39-15

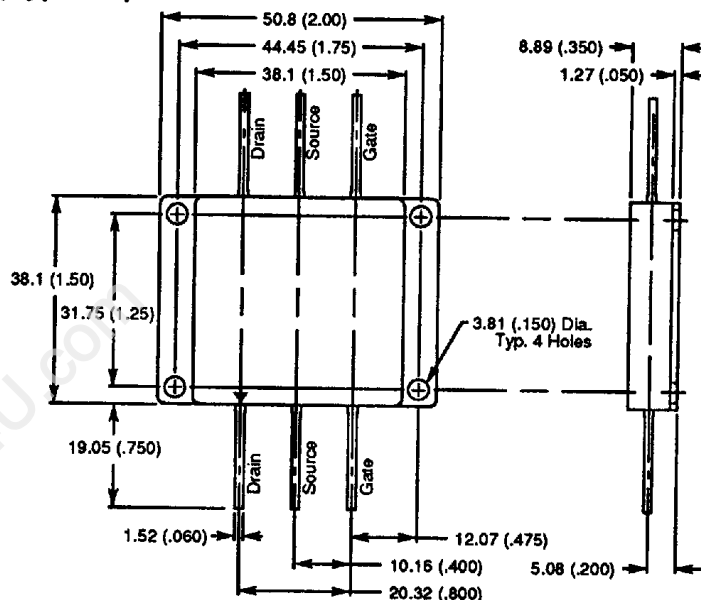
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)			40	Amps
I_{SM}	Pulsed Source Current ¹ (Body Diode)			160	Amps
V_{SD}	Diode Forward Voltage ² ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$)	490	980	1800	ns
Q_{rr}	Reverse Recovery Charge	13	26	52	μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1\text{ Sec.}$	830			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}], V_{DS} = P_D / I_D [\text{Cont.}], t = 1\text{ Sec.}$	830			Watts
I_{LM}	Inductive Current Clamped		160			Amps

F-Pack Package Outline (Type DF)



Dimensions in Millimeters and (Inches)

- 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