

APT40M80AFN 400V 58.0A 0.08  
 APT35M80AFN 350V 58.0A 0.08

# POWER MOS IV™

## N - CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFET

### MAXIMUM RATINGS

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

Symbol	Parameter	APT35M80AFN	APT40M80AFN	UNIT
$V_{DSS}$	Drain-Source Voltage	350	400	V
$I_D$	Continuous Drain Current	58		A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	232		A
$V_{GS}$	Gate-Source Voltage	±30		V
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$ , Derate Above $25^\circ\text{C}$	595		W
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 150		°C

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{DSS}$	Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250 \mu\text{A}$ )	APT40M80AFN	400		V
		APT35M80AFN	350		V
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ ) ( $V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 25^\circ\text{C}$ )			250	$\mu\text{A}$
				1000	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )			±100	nA
$I_D(ON)$	On State Drain Current ( $V_{DS} > I_D(ON) \times R_{DS(ON)} \text{ Max}, V_{GS} = 10V$ )	58			A
$V_{GS(TH)}$	Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 1\text{mA}$ )	2		4	V
$R_{DS(ON)}$	Static Drain-Source On-State Resistance <sup>2</sup> ( $V_{GS} = 10V, I_D = 0.5 I_D(\text{Cont.})$ )			0.08	$\Omega$

### THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.21	°C/W
$R_{\theta JA}$	Junction to Ambient			20	°C/W
$T_L$	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	°C

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28  
64

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$		5375	6500	pF
$C_{oss}$	Output Capacitance			1477	2068	pF
$C_{rss}$	Reverse Transfer Capacitance			584	876	pF
$Q_g$	Total Gate Charge <sup>3</sup>	$V_{GS} = 10V, I_D = I_D [\text{Cont}]$ $V_{DD} = 0.5 V_{DSS}$		238	370	nC
$Q_{gs}$	Gate-Source Charge			37	56	nC
$Q_{gd}$	Gate-Drain ("Miller") Charge			148	222	nC
$t_d(\text{on})$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}], V_{GS} = 15V$ $R_G = 0.6$		17	34	ns
$t_r$	Rise Time			35	70	ns
$t_d(\text{off})$	Turn-off Delay Time			49	74	ns
$t_f$	Fall Time			75	150	ns

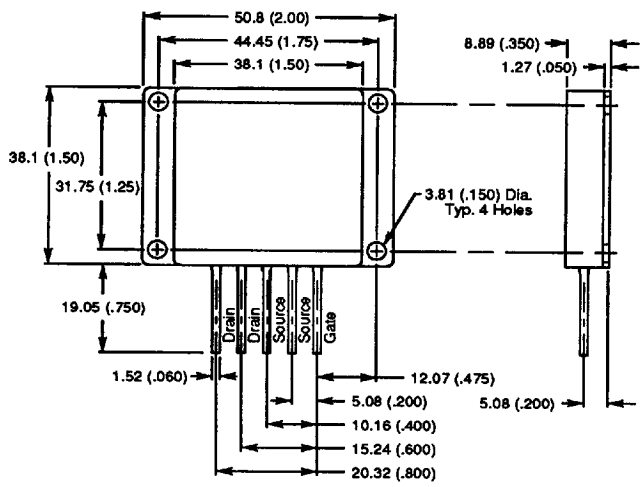
**SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode)			58	Amps
$I_{SM}$	Pulsed Source Current <sup>1</sup> (Body Diode)			232	Amps
$V_{SD}$	Diode Forward Voltage <sup>2</sup> ( $V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$ )			1.8	Volts
$t_{rr}$	Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}] \text{ } dI_S/dt = 100A/\mu s$ )	190	380	760	ns
$Q_{rr}$	Reverse Recovery Charge	5	10	20	$\mu C$

**SAFE OPERATING AREA CHARACTERISTICS**

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1 \text{ Sec.}$	595			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [\text{Cont.}], V_{DS} = P_D / I_D [\text{Cont.}], t = 1 \text{ Sec.}$	595			Watts
$I_{LM}$	Inductive Current Clamped		232			Amps

**F-Pack Package Outline (Type AF)**



Dimensions in Millimeters and (Inches)

- 1.) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.) Pulse Test: Pulse width < 380  $\mu s$   
Duty Cycle < 2%
- 3.) See MIL-STD-750 Method 3471