



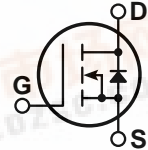
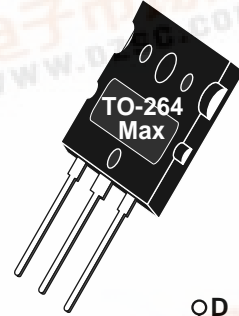
# APT50M50L2FLL

500V 89A 0.050Ω

## POWER MOS 7™

FREDFET

Power MOS 7™ is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7™ by significantly lowering  $R_{DS(ON)}$  and  $Q_g$ . Power MOS 7™ combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with APT's patented metal gate structure.



- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge,  $Q_g$
- Increased Power Dissipation
- Easier To Drive
- Popular TO-264 MAX Package

### MAXIMUM RATINGS

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

Symbol	Parameter	APT50M50L2FLL	UNIT
$V_{DSS}$	Drain-Source Voltage	500	Volts
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	89	Amps
$I_{DM}$	Pulsed Drain Current <sup>①</sup>	356	Amps
$V_{GS}$	Gate-Source Voltage Continuous	±30	Volts
$V_{GSM}$	Gate-Source Voltage Transient	±40	
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	890	Watts
	Linear Derating Factor	7.12	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 <sup>①</sup> (Repetitive and Non-Repetitive)	89	Amps
$E_{AR}$	Repetitive Avalanche Energy <sup>①</sup>	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy <sup>④</sup>	3200	

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$BV_{DSS}$	Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu A$ )	500			Volts
$I_{D(on)}$	On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$ )	89			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D[Cont.]}$ )			0.050	Ohms
$I_{DSS}$	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 ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 5mA$ )	3		5	Volts

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

APT Website - <http://www.advancedpower.com>

## DYNAMIC CHARACTERISTICS

APT50M50L2FLL

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		9840		pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		2030		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1\text{ MHz}$		153		
$Q_g$	Total Gate Charge <sup>③</sup>	$V_{GS} = 10V$		246		nC
$Q_{gs}$	Gate-Source Charge	$V_{DD} = 0.5 V_{DSS}$		65		
$Q_{gd}$	Gate-Drain ("Miller") Charge	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		112		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		24		ns
$t_r$	Rise Time	$V_{DD} = 0.5 V_{DSS}$		22		
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		56		
$t_f$	Fall Time	$R_G = 0.6\Omega$		8		

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode)			89	Amps
$I_{SM}$	Pulsed Source Current <sup>①</sup> (Body Diode)			356	
$V_{SD}$	Diode Forward Voltage <sup>②</sup> ( $V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$ )			1.3	Volts
$dv/dt$	Peak Diode Recovery $dv/dt$ <sup>⑤</sup>			15	V/ns
$t_{rr}$	Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		300	ns
		$T_j = 125^\circ\text{C}$		600	
$Q_{rr}$	Reverse Recovery Charge ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$	2.6		$\mu\text{C}$
		$T_j = 125^\circ\text{C}$	10		
$I_{RRM}$	Peak Recovery Current ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$	17		Amps
		$T_j = 125^\circ\text{C}$	34		

## THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.14	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	

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  $T_j = +25^\circ\text{C}$ ,  $L = 0.81\text{mH}$ ,  $R_G = 25\Omega$ , Peak  $I_L = 89\text{A}$

⑤  $dv/dt$  numbers reflect the limitations of the test circuit rather than the device itself.  $I_S \leq -I_D [\text{Cont.}]$   $di/dt \leq 700\text{A}/\mu\text{s}$   $V_R \leq V_{DSS}$   $T_j \leq 150^\circ\text{C}$

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

### TO-264 MAX™(L2) Package Outline

