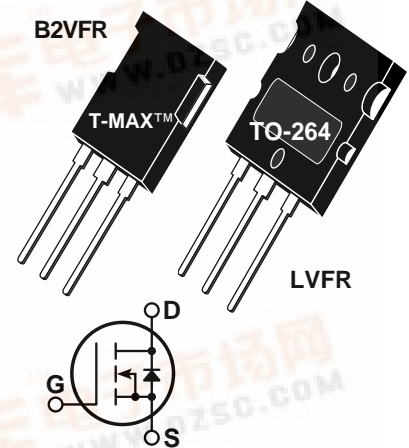




# APT50M85B2VFR APT50M85LVFR

500V 56A 0.085Ω

## POWER MOS V<sup>®</sup>



Power MOS V<sup>®</sup> is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimizes the JFET effect, increases packing density and reduces the on-resistance. Power MOS V<sup>®</sup> also achieves faster switching speeds through optimized gate layout.

- Identical Specifications: T-MAX™ or TO-264 Package
- Lower Leakage
- Fast Recovery Body Diode
- Faster Switching
- 100% Avalanche Tested

### MAXIMUM RATINGS

All Ratings: T<sub>C</sub> = 25°C unless otherwise specified.

Symbol	Parameter	APT50M85	UNIT
V <sub>DSS</sub>	Drain-Source Voltage	500	Volts
I <sub>D</sub>	Continuous Drain Current @ T <sub>C</sub> = 25°C	56	Amps
I <sub>DM</sub>	Pulsed Drain Current <sup>①</sup>	224	
V <sub>GS</sub>	Gate-Source Voltage Continuous	±30	Volts
V <sub>GSM</sub>	Gate-Source Voltage Transient	±40	
P <sub>D</sub>	Total Power Dissipation @ T <sub>C</sub> = 25°C	625	Watts
	Linear Derating Factor	5.0	W/°C
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range	-55 to 150	°C
T <sub>L</sub>	Lead Temperature: 0.063" from Case for 10 Sec.	300	
I <sub>AR</sub>	Avalanche Current <sup>①</sup> (Repetitive and Non-Repetitive)	56	Amps
E <sub>AR</sub>	Repetitive Avalanche Energy <sup>①</sup>	50	mJ
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>④</sup>	3000	

### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage (V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA)	500			Volts
I <sub>D(on)</sub>	On State Drain Current <sup>②</sup> (V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)</sub> Max, V <sub>GS</sub> = 10V)	56			Amps
R <sub>DS(on)</sub>	Drain-Source On-State Resistance <sup>②</sup> (V <sub>GS</sub> = 10V, 0.5 I <sub>D(Cont.)</sub> )			0.085	Ohms
I <sub>DSS</sub>	Zero Gate Voltage Drain Current (V <sub>DS</sub> = V <sub>DSS</sub> , V <sub>GS</sub> = 0V)			250	μA
	Zero Gate Voltage Drain Current (V <sub>DS</sub> = 0.8 V <sub>DSS</sub> , V <sub>GS</sub> = 0V, T <sub>C</sub> = 125°C)			1000	
I <sub>GSS</sub>	Gate-Source Leakage Current (V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V)			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 2.5mA)	2		4	Volts

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

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

## DYNAMIC CHARACTERISTICS

## APT50M85 B2VFR - LVFR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		8630		pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		1160		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1\text{ MHz}$		440		
$Q_g$	Total Gate Charge <sup>③</sup>	$V_{GS} = 10V$		360		nC
$Q_{gs}$	Gate-Source Charge	$V_{DD} = 0.5 V_{DSS}$		57		
$Q_{gd}$	Gate-Drain ("Miller") Charge	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		151		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		16		ns
$t_r$	Rise Time	$V_{DD} = 0.5 V_{DSS}$		18		
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$		60		
$t_f$	Fall Time	$R_G = 0.6\Omega$		6		

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode)		56		Amps
$I_{SM}$	Pulsed Source Current <sup>①</sup> (Body Diode)		224		
$V_{SD}$	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>			5	V/ns
$t_{rr}$	Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		270	ns
		$T_j = 125^\circ\text{C}$		540	
$Q_{rr}$	Reverse Recovery Charge ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		1.8	$\mu\text{C}$
		$T_j = 125^\circ\text{C}$		6.2	
$I_{RRM}$	Peak Recovery Current ( $I_S = -I_D [\text{Cont.}], di/dt = 100A/\mu s$ )	$T_j = 25^\circ\text{C}$		16	Amps
		$T_j = 125^\circ\text{C}$		29	

## THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.20	$^\circ\text{C/W}$
$R_{\theta JA}$	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  $T_j = +25^\circ\text{C}$ ,  $L = 1.91\text{mH}$ ,  $R_G = 25\Omega$ , Peak  $I_L = 56\text{A}$

⑤  $I_S \leq -I_D [\text{Cont.}]$ ,  $di/dt = 100A/\mu s$ ,  $T_j \leq 150^\circ\text{C}$ ,  $R_G = 2.0\Omega$ ,  $V_R = 200V$ .

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

