

# APT50M65JFLL

**500V 60A 0.065**Ω

# POWER MOS 7™



Power MOS  $7^{\text{TM}}$  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  $7^{\text{TM}}$  by significantly lowering  $R_{\text{DS(ON)}}$  and  $Q_g$ . Power MOS  $7^{\text{TM}}$  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, Qg
- Increased Power Dissipation
- Easier To Drive
- Popular SOT-227 Package
- FAST RECOVERY BODY DIODE





#### **MAXIMUM RATINGS**

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

Symbol	Parameter	APT50M65JFLL	UNIT	
V <sub>DSS</sub>	Drain-Source Voltage	500	Volts	
I <sub>D</sub>	Continuous Drain Current @ T <sub>C</sub> = 25°C	60	Amno	
I <sub>DM</sub>	Pulsed Drain Current ①	240	Amps	
V <sub>GS</sub>	Gate-Source Voltage Continuous	±30	\/-It-	
V <sub>GSM</sub>	Gate-Source Voltage Transient	±40	Volts	
P <sub>D</sub>	Total Power Dissipation @ T <sub>C</sub> = 25°C	540	Watts	
, D	Linear Derating Factor	4.32	W/°C	
$T_J, T_{STG}$	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 (Repetitive and Non-Repetitive)	60	Amps	
E <sub>AR</sub>	Repetitive Avalanche Energy <sup>①</sup>	50	ml	
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>④</sup>	3000	- mJ	

#### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage $(V_{GS} = 0V, I_D = 250\mu\text{A})$	500			Volts
I <sub>D(on)</sub>	On State Drain Current ② $(V_{DS} > I_{D(on)} \times R_{DS(on)} Max, V_{GS} = 10V)$	60			Amps
R <sub>DS(on)</sub>	Drain-Source On-State Resistance ② (V <sub>GS</sub> = 10V, 0.5 I <sub>D[Cont.]</sub> )			0.065	Ohms
I <sub>DSS</sub>	Zero Gate Voltage Drain Current $(V_{DS} = V_{DSS}, V_{GS} = 0V)$			250	μA
	Zero Gate Voltage Drain Current $(V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_{C} = 125^{\circ}C)$			1000	
I <sub>GSS</sub>	Gate-Source Leakage Current $(V_{GS} = \pm 30V, V_{DS} = 0V)$			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage $(V_{DS} = V_{GS}, I_{D} = 2.5 \text{mA})$	3		5	Volts

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

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

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Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		6940		
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		1430		pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1 MHz		108		
$Q_g$	Total Gate Charge <sup>③</sup>	V <sub>GS</sub> = 10V		174		
$Q_{gs}$	Gate-Source Charge	$V_{DD} = 0.5 V_{DSS}$		45		nC
$Q_{gd}$	Gate-Drain ("Miller") Charge	$I_D = I_D [Cont.] @ 25°C$		79		
t <sub>d</sub> (on)	Turn-on Delay Time	V <sub>GS</sub> = 15V		19		
t <sub>r</sub>	Rise Time	$V_{DD} = 0.5 V_{DSS}$		15		ns
t <sub>d</sub> (off)	Turn-off Delay Time	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		43		115
t <sub>f</sub>	Fall Time	$R_G = 0.6\Omega$		6		

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I <sub>S</sub>	Continuous Source Current (Body Diode)				60	Amna
I <sub>SM</sub>	Pulsed Source Current (Body Diode)				240	Amps
V <sub>SD</sub>	Diode Forward Voltage (V <sub>GS</sub> = 0V, I <sub>S</sub> = -I <sub>D</sub> [Cont.])				1.3	Volts
dv/ <sub>dt</sub>	Peak Diode Recovery dv/ <sub>dt</sub> (\$\sqrt{5})				5	V/ns
	Reverse Recovery Time	T <sub>j</sub> = 25°C			270	20
t <sub>rr</sub>	$(I_S = -I_D [Cont.], \frac{di}{dt} = 100A/\mu s)$	T <sub>j</sub> = 125°C			540	ns
	Reverse Recovery Charge	T <sub>j</sub> = 25°C		1.8		
Q <sub>rr</sub>	$(I_S = -I_D [Cont.], di/_{dt} = 100A/\mu s)$	T <sub>j</sub> = 125°C		6.2		μC
	Peak Recovery Current $(I_S = -I_D [Cont.], \frac{di}{dt} = 100A/\mu s)$	T <sub>j</sub> = 25°C		16		A
IRRM		T <sub>j</sub> = 125°C		29		Amps

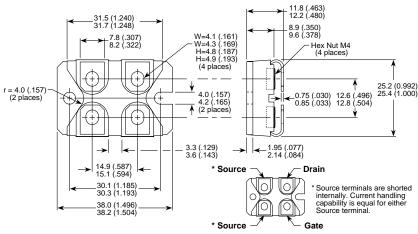
### THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{ heta JC}$	Junction to Case			0.23	
$R_{\theta JA}$	Junction to Ambient			40	°C/W

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

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

### SOT-227 (ISOTOP®) Package Outline



③ See MIL-STD-750 Method 3471

 $<sup>\</sup>textcircled{4}$  Starting T<sub>i</sub> = +25°C, L = 1.67mH, R<sub>G</sub> = 25 $\Omega$ , Peak I<sub>L</sub> = 60A

 $<sup>^{\</sup>circ}$  Pulse Test: Pulse width < 380  $\mu$ S, Duty Cycle < 2%