ADVANCED POWER TECHNOLOGY®

APT8020B2FLL
APT8020LFLL

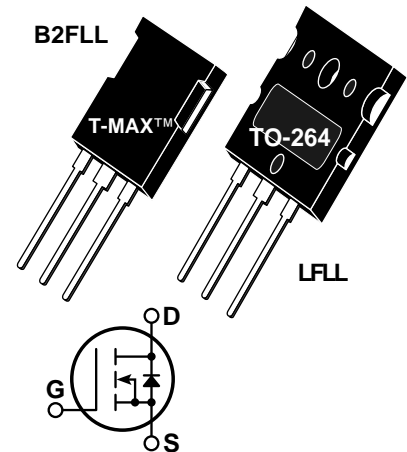**800V   38A   0.200Ω**

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, Qg**
- **Increased Power Dissipation**
- **Easier To Drive**
- **Popular T-MAX™ or TO-264 Package**
- **FAST RECOVERY BODY DIODE**

B2FLL

T-MAX™   **TO-264**

LFLL

MAXIMUM RATINGS

All Ratings: $T_C = 25°C$ unless otherwise specified.

Symbol	Parameter	APT8020	UNIT
V_{DSS}	Drain-Source Voltage	800	Volts
I_D	Continuous Drain Current @ T_C = 25°C	38	Amps
I_{DM}	Pulsed Drain Current ①	132	
V_{GS}	Gate-Source Voltage Continuous	±30	Volts
V_{GSM}	Gate-Source Voltage Transient	±40	
P_D	Total Power Dissipation @ T_C = 25°C	690	Watts
	Linear Derating Factor	5.52	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 ① (Repetitive and Non-Repetitive)	38	Amps
E_{AR}	Repetitive Avalanche Energy ①	50	mJ
E_{AS}	Single Pulse Avalanche Energy ④	3000	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V$, $I_D = 250μA$)	800			Volts
$I_{D(on)}$	On State Drain Current ② ($V_{DS} > I_{D(on)}$ x $R_{DS(on)}$ Max, $V_{GS} = 10V$)	38			Amps
$R_{DS(on)}$	Drain-Source On-State Resistance ② ($V_{GS} = 10V$, 0.5 $I_{D[Cont.]}$)			0.200	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}$, $V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8\ V_{DSS}$, $V_{GS} = 0V$, $T_C = 125°C$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = ±30V$, $V_{DS} = 0V$)			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 2.5mA$)	3		5	Volts

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

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V		5320		
C_{oss}	Output Capacitance	V_{DS} = 25V		1020		pF
C_{rss}	Reverse Transfer Capacitance	f = 1 MHz		168		
Q_g	Total Gate Charge ③	V_{GS} = 10V		196		
Q_{gs}	Gate-Source Charge	V_{DD} = 0.5 V_{DSS}		26		nC
Q_{gd}	Gate-Drain ("Miller") Charge	I_D = I_D [Cont.] @ 25°C		111		
t_d(on)	Turn-on Delay Time	V_{GS} = 15V		19		
t_r	Rise Time	V_{DD} = 0.5 V_{DSS}		17		
t_d(off)	Turn-off Delay Time	I_D = I_D [Cont.] @ 25°C		57		ns
t_f	Fall Time	R_G = 0.6Ω		11		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)				38	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)				132	
V_{SD}	Diode Forward Voltage ② (V_{GS} = 0V, I_S = -I_D [Cont.])				1.3	Volts
dv/dt	Peak Diode Recovery dv/dt ⑤				18	V/ns
t_{rr}	Reverse Recovery Time	T_j = 25°C			320	ns
	(I_S = -I_D [Cont.], di/dt = 100A/µs)	T_j = 125°C			650	
Q_{rr}	Reverse Recovery Charge	T_j = 25°C		2.2		µC
	(I_S = -I_D [Cont.], di/dt = 100A/µs)	T_j = 125°C		7.5		
I_{RRM}	Peak Recovery Current	T_j = 25°C		14		Amps
	(I_S = -I_D [Cont.], di/dt = 100A/µs)	T_j = 125°C		24		

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.18	°C/W
$R_{\theta JA}$	Junction to Ambient			40	

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

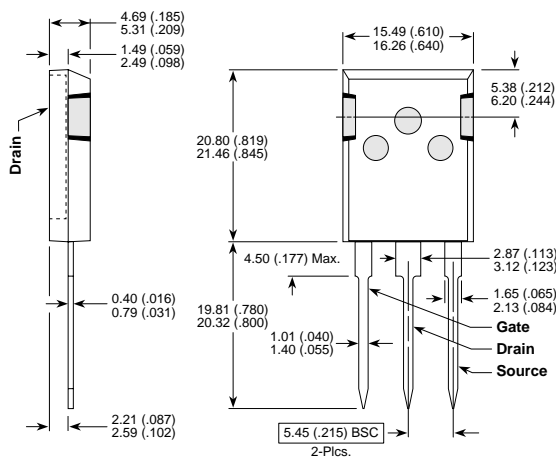② Pulse Test: Pulse width < 380 µs, Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

④ Starting T_j = +25°C, L = 4.16mH, R_G = 25Ω, Peak I_L = 38A

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S ≤ -I_{D[Cont.]}$ $di/dt ≤ 700A/µs$ $V_R ≤ V_{DSS}$ $T_J ≤ 150°C$

APT Reserves the right to change, without notice, the specifications and information contained herein.
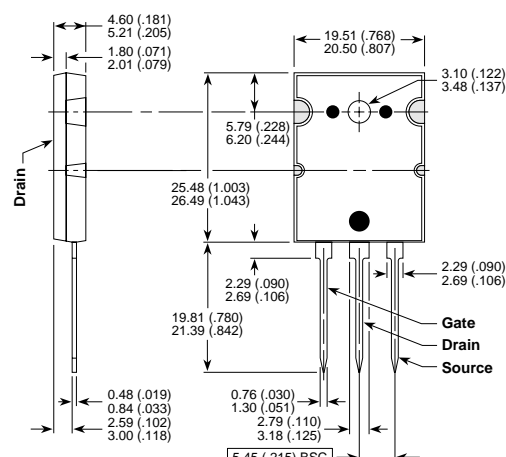
T-MAX™ (B2) Package Outline

These dimensions are equal to the TO-247 without the mounting hole.

Dimensions in Millimeters and (Inches)

TO-264 (L) Package Outline

Dimensions in Millimeters and (Inches)

APT's devices are covered by one or more of the following U.S.patents: 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058