PFB6000

N-CHANNEL TRENCH MOSFET

APPLICATION

- DC motor control
- UPS
- Class D Amplifier

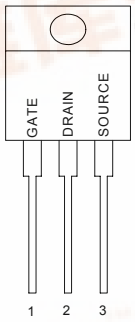
FEATURES

- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves

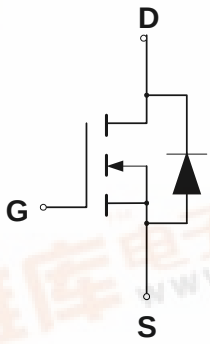
V_{DSS}	$R_{DS(ON)}$ Typ.	I_D
60V	15.8mΩ	60A

PIN CONFIGURATION

TO-220
Front View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Source Voltage (Note 1)	V_{DSS}	60	V
Drain to Current — Continuous Tc = 25℃, V_{GS}@10V	I_D	60	A
— Continuous Tc = 100℃, V_{GS}@10V	I_D	43	
— Pulsed Tc = 25℃, V_{GS}@10V (Note 2)	I_{DM}	241	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
Total Power Dissipation	P_D	150	W
Derating Factor above 25℃		1.0	W/℃
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	℃
Single Pulse Avalanche Energy L=144 μH,I_D=40 Amps	E_{AS}	500	mJ
Maximum Lead Temperature for Soldering Purposes	T_L	300	℃
Maximum Package Body for 10 seconds	T_{PKG}	260	℃
Pulsed Avalanche Rating	I_{AS}	60	A

THERMAL RESISTANCE

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
$R_{\theta JC}$	Junction-to-case			1.0	℃/W	Water cooled heatsink, P_D adjusted for a peak junction temperature of +175℃
$R_{\theta JA}$	Junction-to-ambient			62	℃/W	1 cubic foot chamber, free air

ORDERING INFORMATION

Part Number	Package
PFB6000	TO-220

ELECTRICAL CHARACTERISTICS

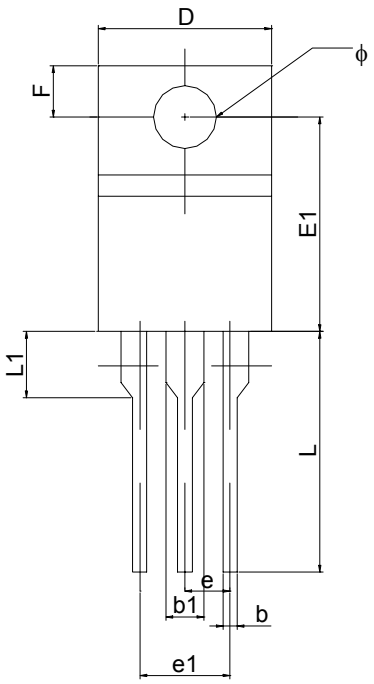
Unless otherwise specified, T_J = 25℃.

			CMP60N03LD13			
Characteristic		**Symbol**	**Min**	**Typ**	**Max**	**Units**
OFF Characteristics						
Drain-to-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		V_{DSS}	60			V
Breakdown Voltage Temperature Coefficient (Reference to 25℃, I_D = 250 μA)		$\Delta V_{DSS}/\Delta T_J$		0.069		mV/℃
Drain-to-Source Leakage Current (V_{DS} = 60 V, V_{GS} = 0 V, T_J = 25℃) (V_{DS} = 48 V, V_{GS} = 0 V, T_J = 150℃)		I_{DSS}			25 250	μA
Gate-to-Source Forward Leakage (V_{GS} = 20 V)		I_{GSS}			100	nA
Gate-to-Source Reverse Leakage (V_{GS} = -20 V)		I_{GSS}			-100	nA
ON Characteristics						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	1.0	2.0	3.0	V
Static Drain-to-Source On-Resistance (Note 4) (V_{GS} = 10 V, I_D = 60A)		$R_{DS(on)}$		15.8	18	mΩ
Forward Transconductance (V_{DS} = 15 V, I_D = 60A) (Note 4)		g_{FS}		36		S
Dynamic Characteristics						
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		1430		pF
Output Capacitance		C_{oss}		420		pF
Reverse Transfer Capacitance		C_{rss}		88		pF
Total Gate Charge (V_{GS} = 10 V)	(V_{DS} = 30 V, I_D = 60 A, V_{GS} = 10 V) (Note 5)	Q_g		37.7		nC
Gate-to-Source Charge		Q_{gs}		8.4		nC
Gate-to-Drain (“Miller”) Charge		Q_{gd}		9.8		nC
Resistive Switching Characteristics						
Turn-On Delay Time	(V_{DD} = 30 V, I_D = 60 A, V_{GS} = 10 V, R_G = 9.1Ω) (Note 5)	$t_{d(on)}$		12.1		ns
Rise Time		t_{rise}		64		ns
Turn-Off Delay Time		$t_{d(off)}$		69		ns
Fall Time		t_{fall}		39		ns
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	Integral pn-diode in MOSFET	I_S			60	A
Pulse Source Current (Body Diode)		I_{SM}			241	A
Diode Forward On-Voltage	(I_S = 60 A, V_{GS} = 0 V)	V_{SD}			1.5	V
Reverse Recovery Time	(I_F = 60A, V_{GS} = 0 V, d_i/d_t = 100A/μs)	t_{rr}		55		ns
Reverse Recovery Charge		Q_{rr}		110		nC

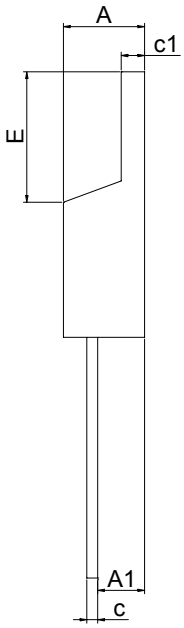
Note 1: T_J = +25℃ to +175℃
Note 2: Repetitive rating; pulse width limited by maximum junction temperature.
Note 3: I_{SD} = 60A, di/dt ≤100A/μs, V_{DD} ≤ BV_{DSS}, T_J = +175℃
Note 4: Pulse width ≤ 250μs; duty cycle≤2%
Note 5: Essentially independent of operating temerpature.

PACKAGE DIMENSION

TO-220



Front View



Side View

PIN 1: GATE
PIN 2: DRAIN
PIN 3: SOURCE

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.47	---	4.67	0.176	---	0.184
A1	2.52	---	2.82	0.099	---	0.111
b	0.71	---	0.91	0.028	---	0.036
b1	1.17	---	1.37	0.046	---	0.054
c	0.31	---	0.53	0.012	---	0.021
c1	1.17	---	1.37	0.046	---	0.054
D	10.01	---	10.31	0.394	---	0.406
E	8.50	---	8.90	0.335	---	0.350
E1	12.06	---	12.46	0.475	---	0.491
e	---	2.54	---	---	0.100	---
e1	4.98	---	5.18	0.196	---	0.204
F	2.59	---	2.89	0.102	---	0.114
L	13.40	---	13.80	0.528	---	0.543
L1	3.56	---	3.96	0.140	---	0.156
ϕ	3.79	---	3.89	0.149	---	0.153