

GENERAL DESCRIPTION

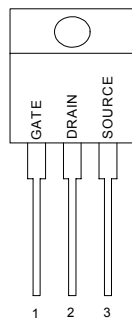
This Power MOSFET is designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

FEATURES

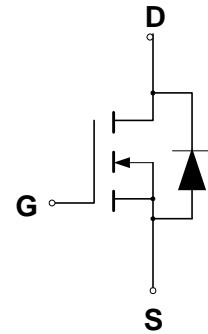
- ◆ Higher Current Rating
- ◆ Lower $r_{DS(ON)}$, Lower Capacitances
- ◆ Lower Total Gate Charge
- ◆ Tighter VSD Specifications
- ◆ Avalanche Energy Specified

PIN CONFIGURATION

TO-220/TO-220FP
Top View



SYMBOL



N-Channel MOSFET

ORDERING INFORMATION

Part Number	Package
CMT05N50N220	TO-220
CMT05N50N220FP	TO-220FP

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current – Continuous	I_D	5.0	A
– Pulsed (Note 1)	I_{DM}	18	
Gate-to-Source Voltage – Continue	V_{GS}	± 20	V
Total Power Dissipation	P_D	96	W
Derate above 25°C		0.77	W/°C
Single Pulse Avalanche Energy (Note 2)	E_{AS}	125	mJ
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance – Junction to Case	θ_{JC}	1.70	°C/W
– Junction to Ambient	θ_{JA}	62	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	300	°C

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25^\circ\text{C}$.

Characteristic	Symbol	CMT05N50			Units
		Min	Typ	Max	
Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$)	$V_{(BR)DSS}$	500			V
Drain-Source Leakage Current ($V_{DS} = 500\text{V}$, $V_{GS} = 0\text{ V}$)	I_{DSS}			25	μA
Gate-Source Leakage Current-Forward ($V_{gsf} = 20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse ($V_{gsr} = -20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSSR}			-100	nA
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$)	$V_{GS(th)}$	2.0		4.0	V
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ V}$, $I_D = 2.7\text{A}$) (Note 4)	$R_{DS(on)}$			1.5	Ω
Forward Transconductance ($V_{DS} = 15\text{V}$, $I_D = 2.5\text{ A}$) (Note 4)	g_{FS}	2.8			mhos
Input Capacitance	$(V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{iss}	520	730	pF
Output Capacitance		C_{oss}	170	240	pF
Reverse Transfer Capacitance		C_{rss}	11	20	pF
Turn-On Delay Time	$(V_{DD} = 250\text{ V}$, $I_D = 5\text{ A}$, $R_G = 9.1\Omega$, $V_{GS} = 10\text{ V}$) (Note 4)	$t_{d(on)}$	7.0	10	ns
Rise Time		t_r	9.0	20	ns
Turn-Off Delay Time		$t_{d(off)}$	20	40	ns
Fall Time		t_f	10	20	ns
Total Gate Charge	$(V_{DS} = 400\text{V}$, $I_D = 5\text{A}$, $V_{GS} = 10\text{ V}$) (Note 4)	Q_g	10		nC
Gate-Source Charge		Q_{gs}	2		nC
Gate-Drain Charge		Q_{gd}	3		nC
Internal Drain Inductance (Measured from the drain lead 0.25" from package to center of die)	L_D		4.5		nH
Internal Drain Inductance (Measured from the source lead 0.25" from package to source bond pad)	L_S		7.5		nH
SOURCE-DRAIN DIODE CHARACTERISTICS					
Reverse Recovery Charge	$I_F = 5\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$	Q_{rr}		1.8	μC
Forward Turn-On Time		t_{on}		**	
Reverse Recovery Time		t_{rr}		415	
Diode Forward Voltage	$I_S = 5\text{A}$, $V_{GS} = 0\text{ V}$	V_{SD}		1.5	V

Note

- (1) Repetitive rating; pulse width limited by max. junction temperature
- (2) $V_{DD} = 100\text{V}$, $V_{GS} = 10\text{V}$, $L = 10\text{mH}$, $I_{AS} = 5\text{A}$, $R_G = 25\Omega$
- (3) $I_{SD} \leq 4.5\text{A}$, $di/dt \leq 75\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$
- ** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

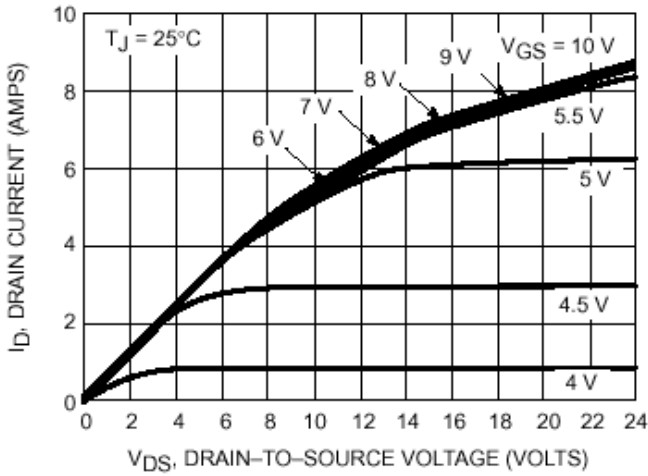


Figure 1. On-Region Characteristics

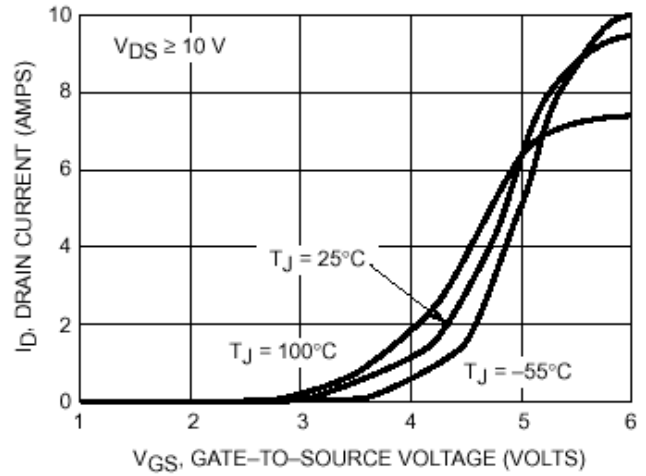


Figure 2. Transfer Characteristics

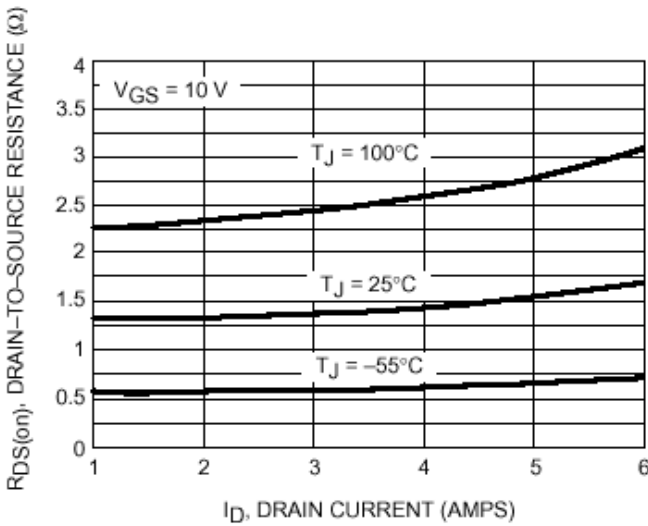


Figure 3. On-Resistance versus Drain Current and Temperature

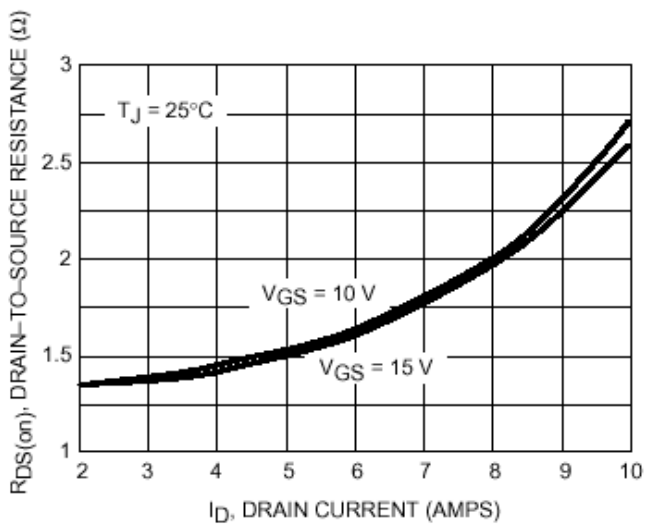


Figure 4. On-Resistance versus Drain Current and Gate Voltage

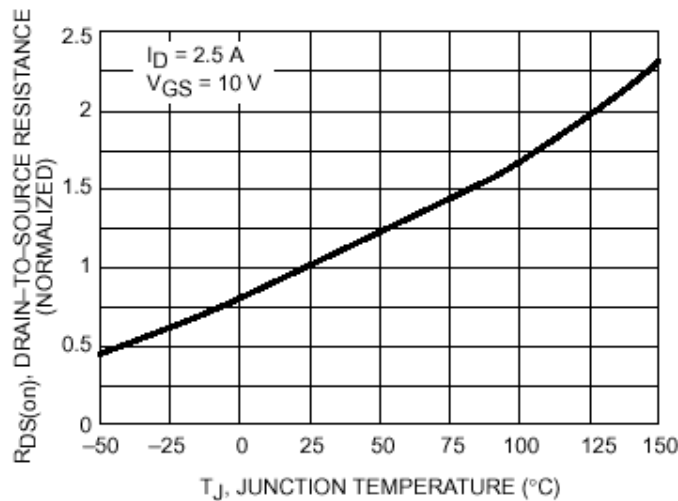


Figure 5. On-Resistance Variation with Temperature

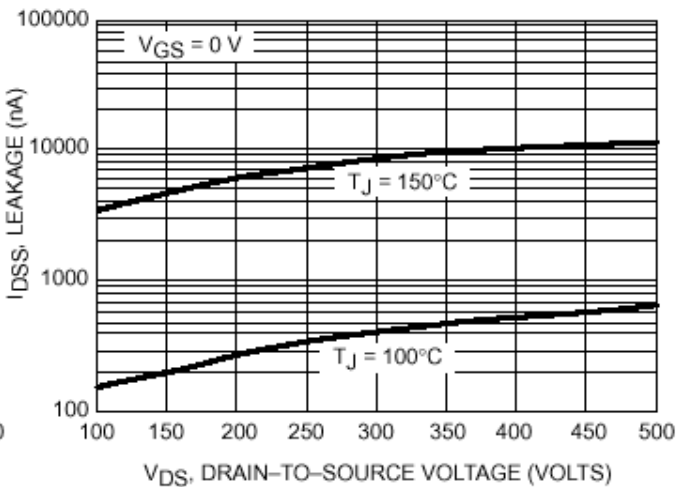
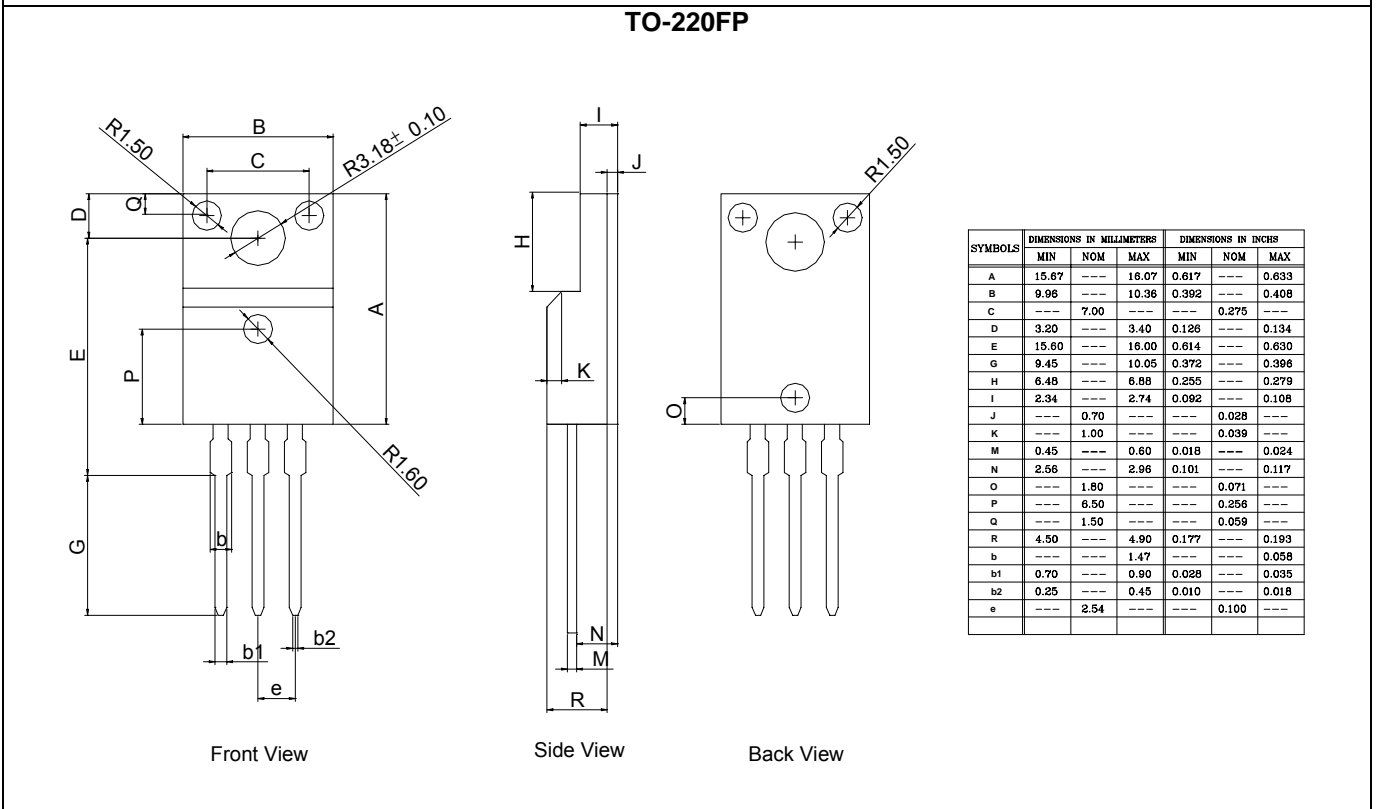
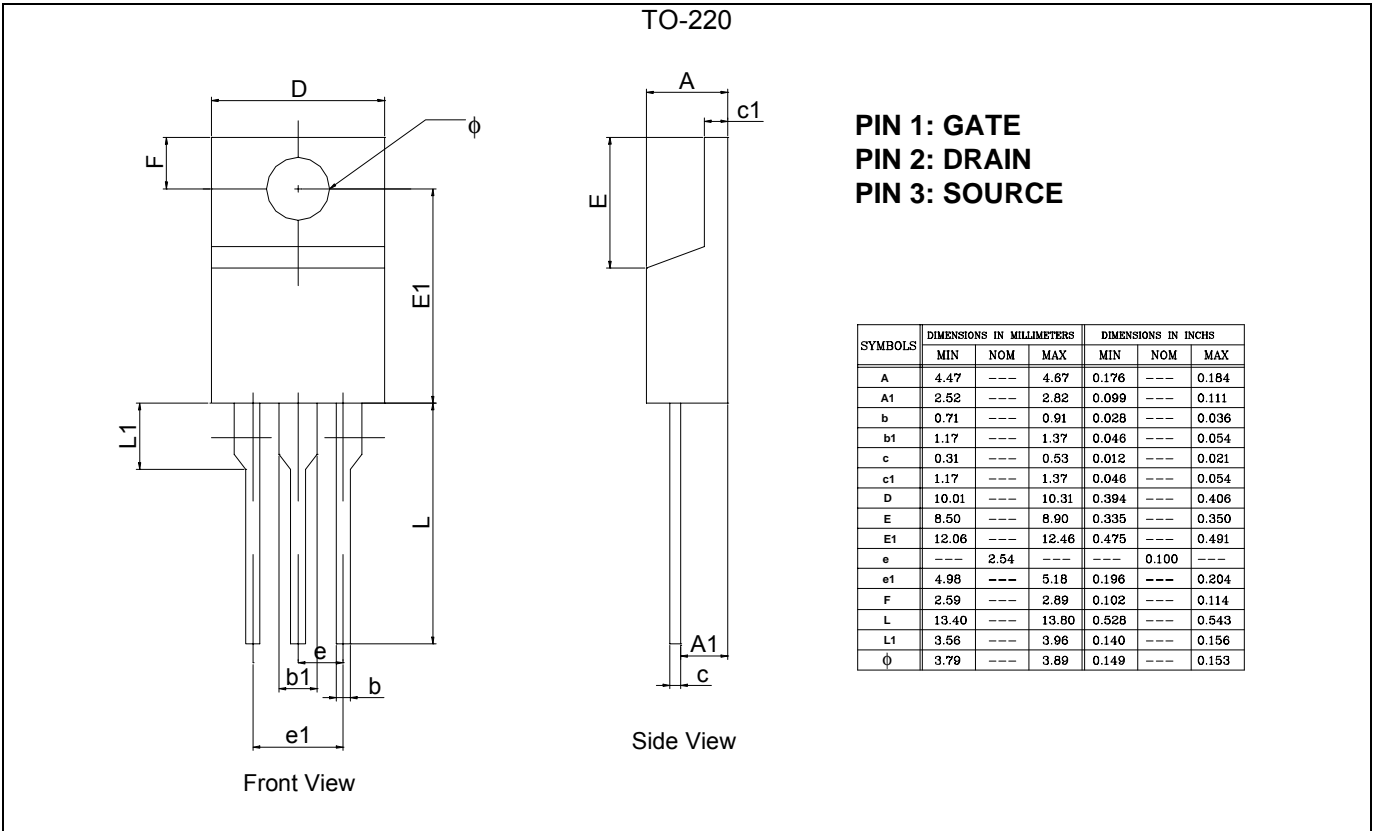


Figure 6. Drain-to-Source Leakage Current versus Voltage

PACKAGE DIMENSION



IMPORTANT NOTICE

Champion Microelectronic Corporation (CMC) reserves the right to make changes to its products or to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

A few applications using integrated circuit products may involve potential risks of death, personal injury, or severe property or environmental damage. CMC integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life-support applications, devices or systems or other critical applications. Use of CMC products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

HsinChu Headquarter

5F-1, No. 11, Park Avenue II,
Science-Based Industrial Park,
HsinChu City, Taiwan
TEL: +886-3-567 9979
FAX: +886-3-567 9909

Sales & Marketing

11F, No. 306-3, SEC. 1, Ta Tung Road,
Hsichih, Taipei Hsien 221, Taiwan
TEL: +886-2-8692 1591
FAX: +886-2-8692 1596
