

GENERAL DESCRIPTION

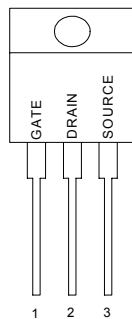
This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURES

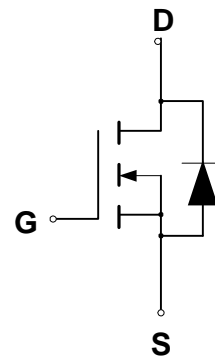
- ◆ Higher Current Rating
- ◆ Lower $R_{ds(on)}$
- ◆ Lower Capacitances
- ◆ Lower Total Gate Charge
- ◆ Tighter VSD Specifications
- ◆ Avalanche Energy Specified

PIN CONFIGURATION

TO-220/TO-220FP
Top View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current – Continuous	I_D	4.0	A
– Pulsed	I_{DM}	14	
Gate-to-Source Voltage – Continue	V_{GS}	± 20	V
– Non-repetitive	V_{GSM}	± 40	V
Total Power Dissipation	P_D		W
TO-220		96	
TO-220FP		38	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^{\circ}C$
Single Pulse Drain-to-Source Avalanche Energy – $T_J = 25^{\circ}C$ ($V_{DD} = 100V, V_{GS} = 10V, I_L = 4A, L = 10mH, R_G = 25\Omega$)	E_{AS}	80	mJ
Thermal Resistance – Junction to Case	θ_{JC}	1.30	$^{\circ}C/W$
– Junction to Ambient	θ_{JA}	100	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	$^{\circ}C$

ORDERING INFORMATION

Part Number	Package
CMT04N60N220	TO-220
CMT04N60N220FP	TO-220 Full Package

ELECTRICAL CHARACTERISTICS

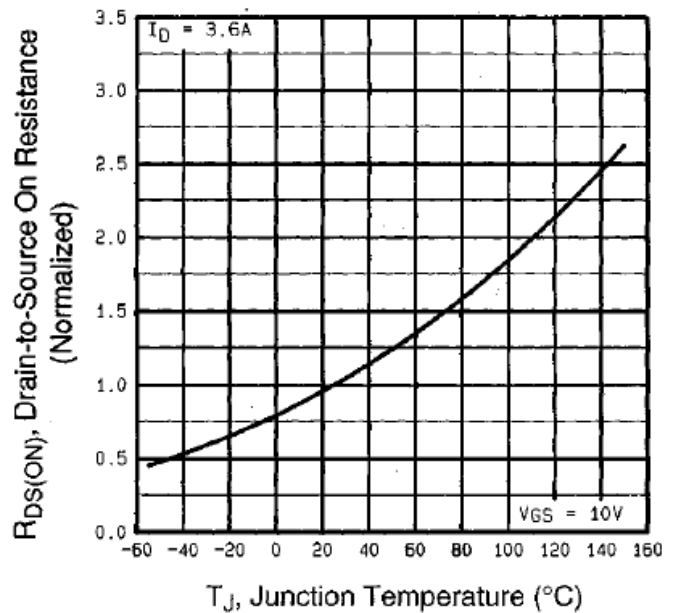
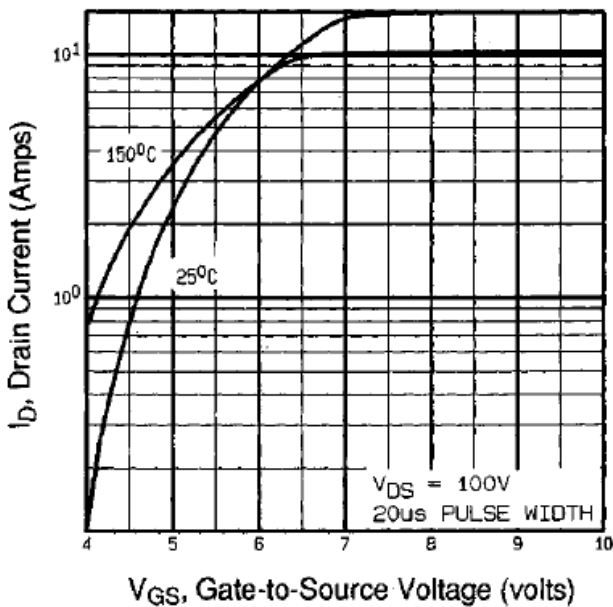
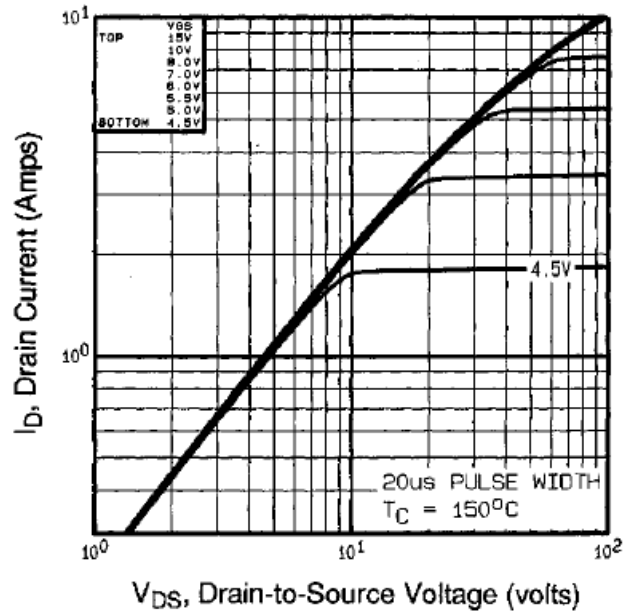
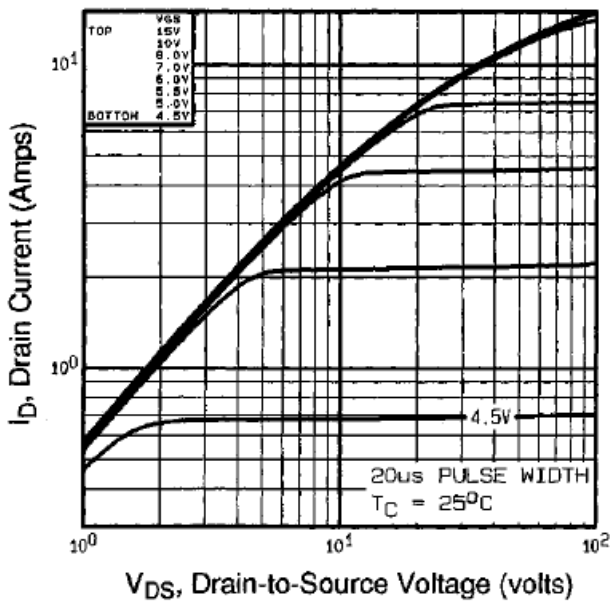
Unless otherwise specified, $T_J = 25^\circ\text{C}$.

Characteristic	Symbol	CMT04N60			Units
		Min	Typ	Max	
Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$)	$V_{(BR)DSS}$	600			V
Drain-Source Leakage Current ($V_{DS} = 600\text{ V}$, $V_{GS} = 0\text{ V}$)	I_{DSS}			0.1	mA
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 ($V_{GS} = 10\text{ V}$, $I_D = 2.0\text{ A}$) *	$R_{DS(on)}$			2.4	Ω
Forward Transconductance ($V_{DS} = 50\text{ V}$, $I_D = 2.0\text{ A}$) *	g_{FS}	2.5			mhos
Input Capacitance	$(V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{iss}	540	760	pF
Output Capacitance		C_{oss}	125	180	pF
Reverse Transfer Capacitance		C_{rss}	8.0	20	pF
Turn-On Delay Time	$(V_{DD} = 300\text{ V}$, $I_D = 4.0\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 9.1\Omega$) *	$t_{d(on)}$	12	20	ns
Rise Time		t_r	7.0	10	ns
Turn-Off Delay Time		$t_{d(off)}$	19	40	ns
Fall Time		t_f	10	20	ns
Total Gate Charge	$(V_{DS} = 480\text{ V}$, $I_D = 4.0\text{ A}$, $V_{GS} = 10\text{ V}$) *	Q_g	5.0	10	nC
Gate-Source Charge		Q_{gs}	2.7		nC
Gate-Drain Charge		Q_{gd}	2.0		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					
Forward On-Voltage(1)	$(I_S = 4.0\text{ A}$, $dI_S/dt = 100\text{ A}/\mu\text{s}$)	V_{SD}		1.5	V
Forward Turn-On Time		t_{on}	**		ns
Reverse Recovery Time		t_{rr}		655	ns

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

** Negligible, Dominated by circuit inductance

TYPICAL CHARACTERISTICS



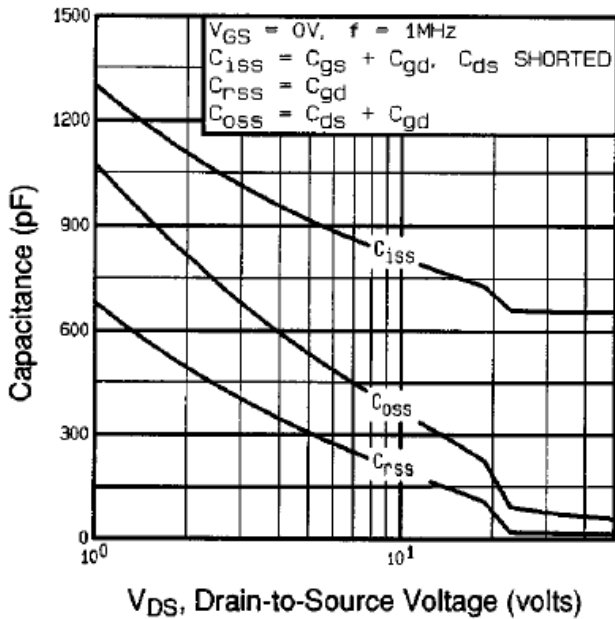


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

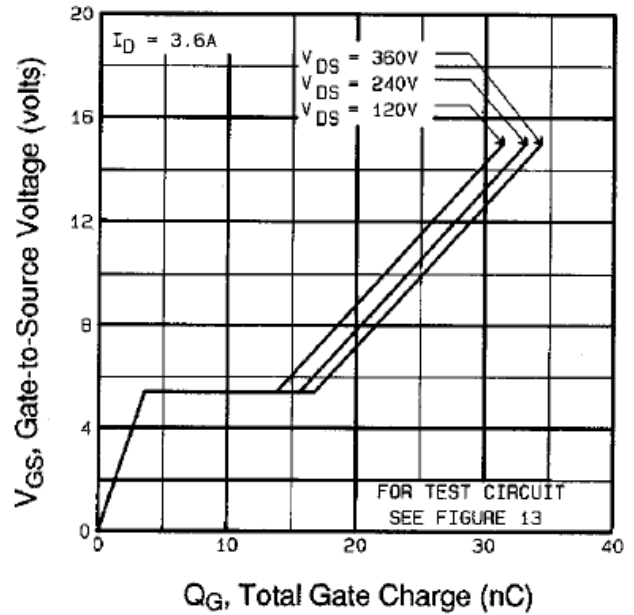


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

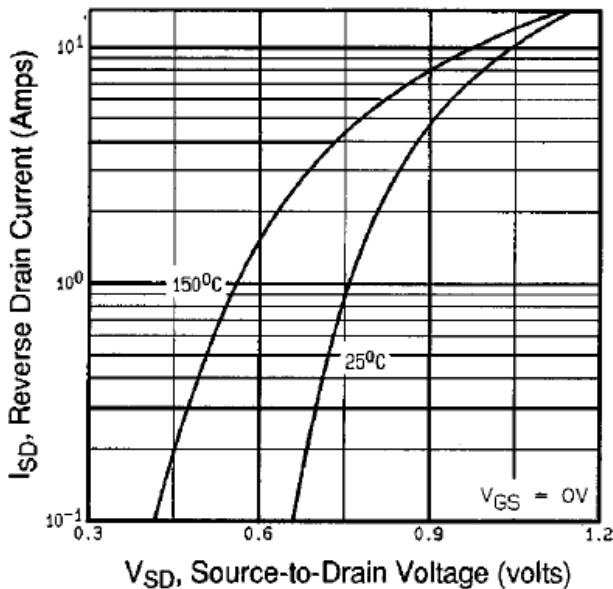


Fig 7. Typical Source-Drain Diode Forward Voltage

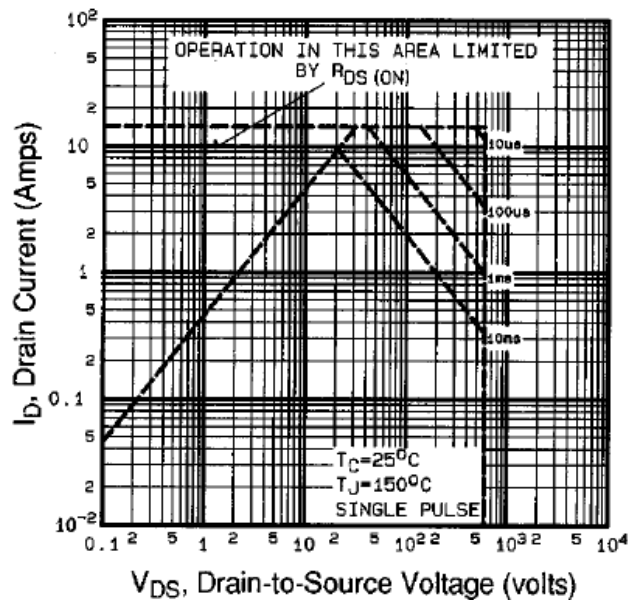
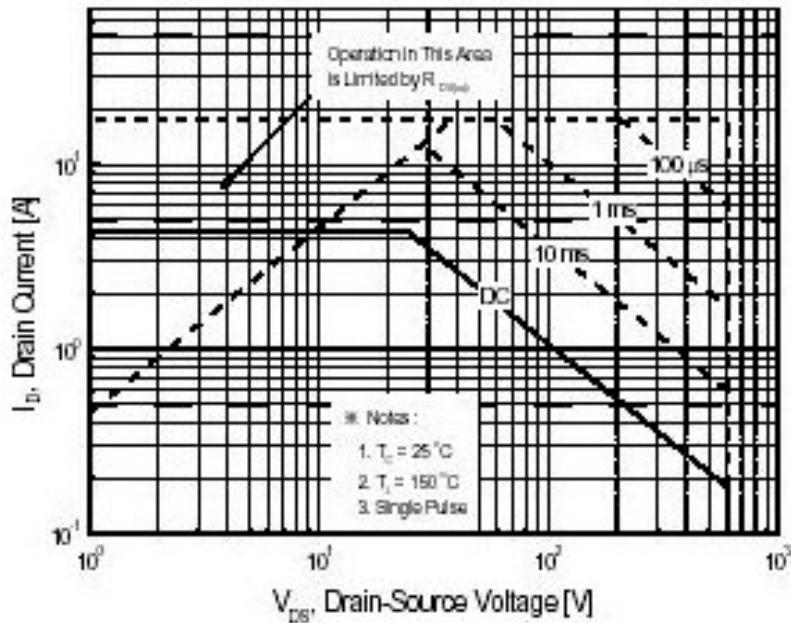
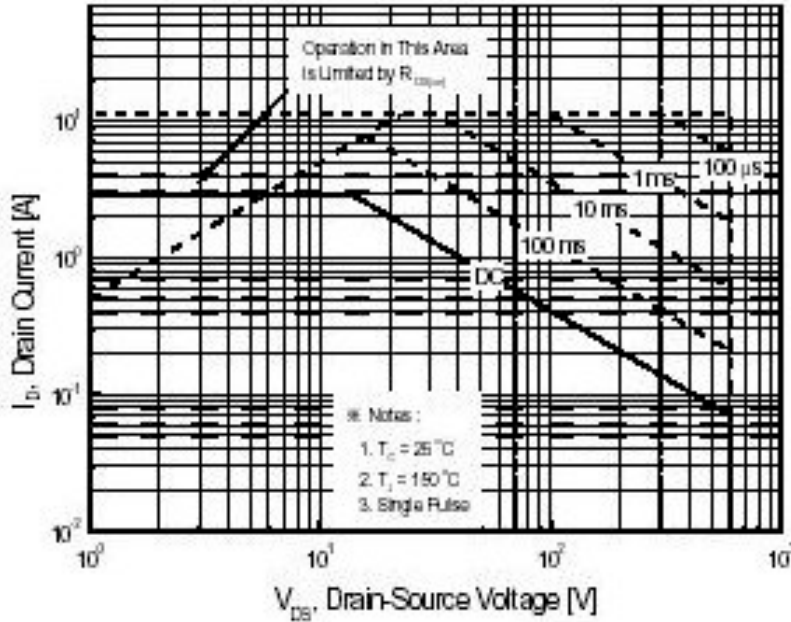


Fig 8. Maximum Safe Operating Area



Maximum Safe Operating Area

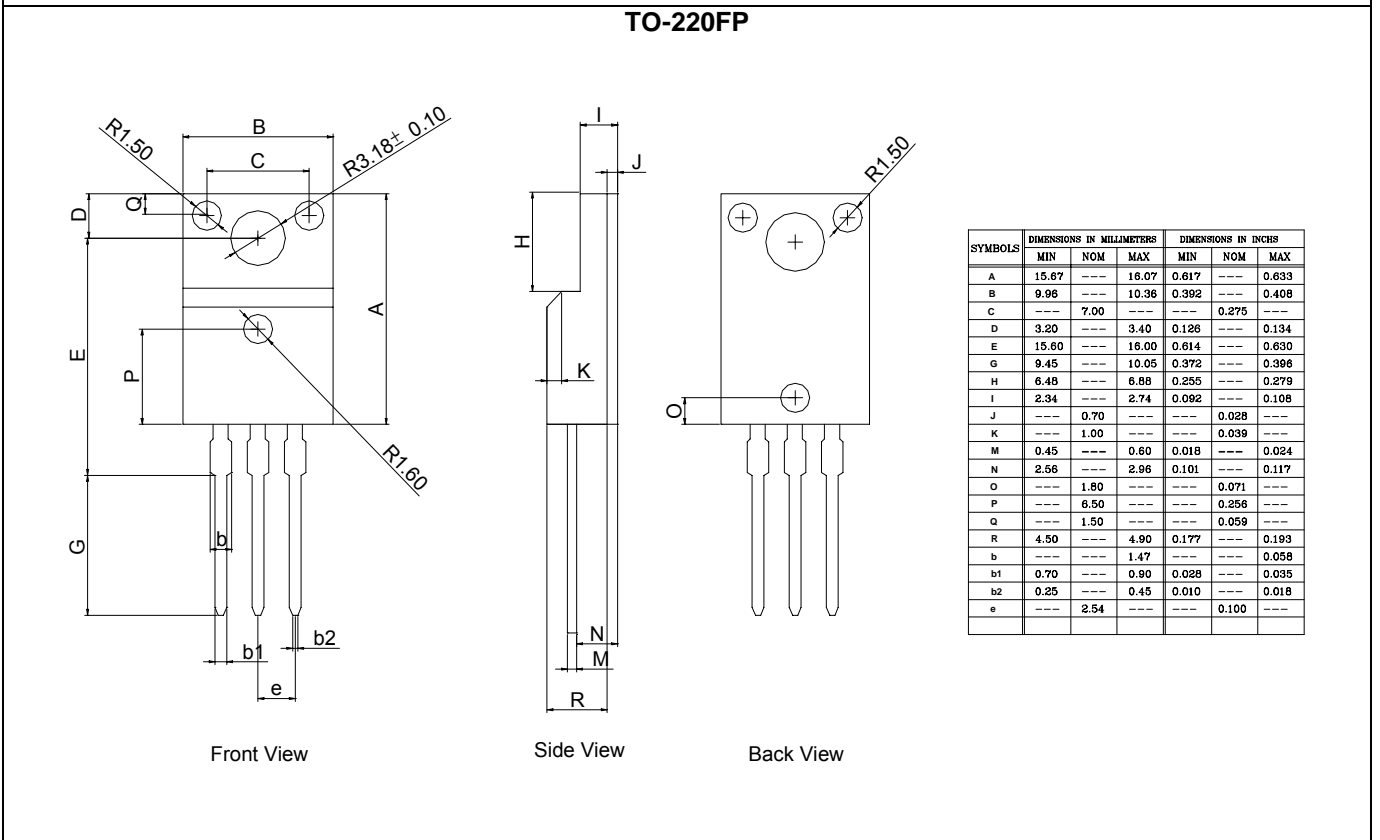
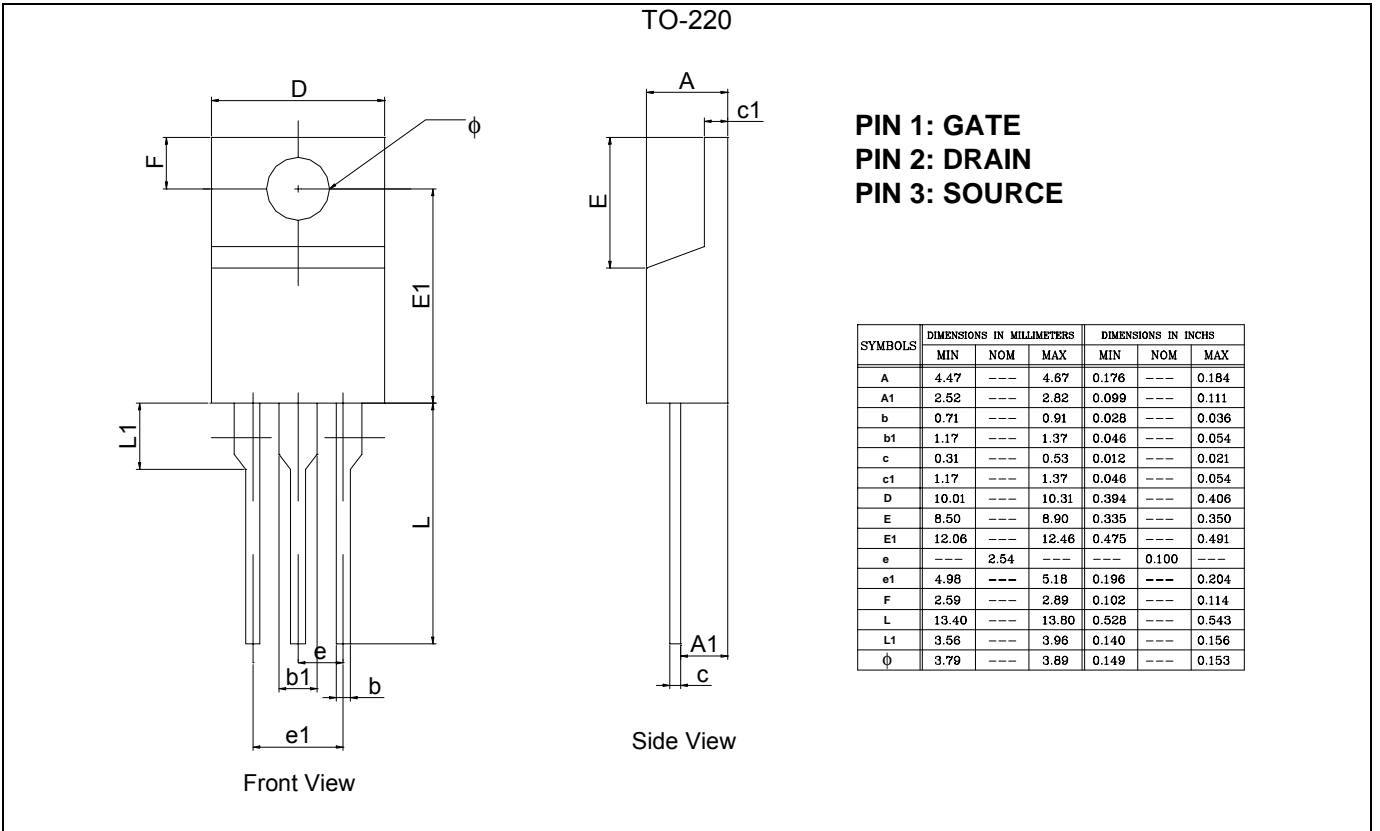
TO-220



Maximum Safe Operating Area

TO-220FP

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, 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
