

# 虹冠電子工業股份有限公司 Champion Microelectronic Corporation

Specialized in Integrated High Efficient Switching Power Management Solutions  
高整合高效率交換型電源管理方案之專業IC設計

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### GENERAL DESCRIPTION

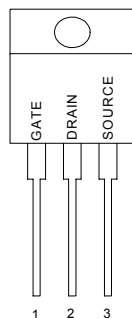
This Power MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power supplies, converters and PWM motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional and safety margin against unexpected voltage transients.

### FEATURES

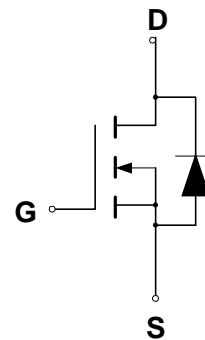
- ◆ Robust High Voltage Termination
- ◆ Avalanche Energy Specified
- ◆ Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- ◆ Diode is Characterized for Use in Bridge Circuits
- ◆  $I_{DSS}$  and  $V_{DS(on)}$  Specified at Elevated Temperature

### PIN CONFIGURATION

TO-220  
Front View



### SYMBOL



N-Channel MOSFET

### ORDERING INFORMATION

Part Number	Package
CMT20N15N220	TO-220

### ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current – Continuous	$I_D$	20	A
– Pulsed	$I_{DM}$	60	
Gate-to-Source Voltage – Continue	$V_{GS}$	$\pm 20$	V
– Non-repetitive	$V_{GSM}$	$\pm 32$	V
Total Power Dissipation	$P_D$	112	W
Derate above 25°C		0.9	W/°C
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy – $T_J = 25^\circ\text{C}$ ( $V_{DD} = 100\text{V}, V_{GS} = 10\text{V}, I_L = 20\text{A}, L = 10\text{mH}, R_G = 25\Omega$ )	$E_{AS}$	60	mJ
Thermal Resistance – Junction to Case	$\theta_{JC}$	1.1	°C/W
– Junction to Ambient	$\theta_{JA}$	62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	$T_L$	260	°C

### ELECTRICAL CHARACTERISTICS

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

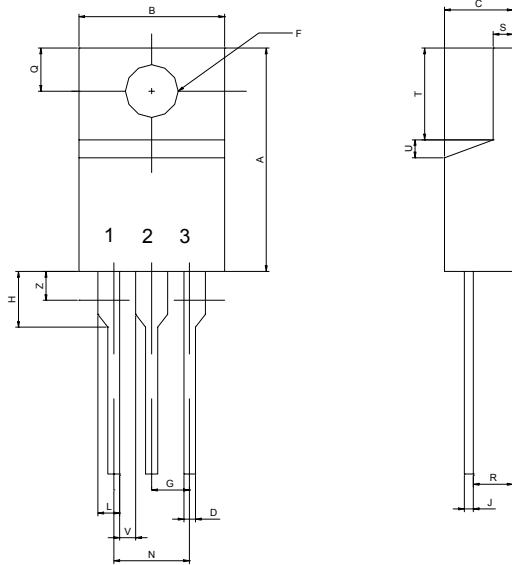
Characteristic	Symbol	CMT20N15			Units
		Min	Typ	Max	
Drain-Source Breakdown Voltage ( $V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$ )	$V_{(BR)DSS}$	150			V
Drain-Source Leakage Current ( $V_{DS} = 150\text{ V}$ , $V_{GS} = 0\text{ V}$ ) ( $V_{DS} = 150\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 125^\circ\text{C}$ )	$I_{DSS}$			10 100	$\mu\text{A}$
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 ( $V_{GS} = 10\text{ V}$ , $I_D = 10\text{A}$ ) *	$R_{DS(on)}$		0.12	0.13	$\Omega$
Drain-Source On-Voltage ( $V_{GS} = 10\text{ V}$ ) ( $I_D = 10.0\text{ A}$ )	$V_{DS(on)}$			2.8	V
Forward Transconductance ( $V_{DS} = 13\text{ V}$ , $I_D = 10\text{A}$ ) *	$g_{FS}$	8.0	11		mhos
Input Capacitance	$(V_{DS} = 25\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{iss}$	1133	1627	pF
Output Capacitance		$C_{oss}$	332	474	pF
Reverse Transfer Capacitance		$C_{rss}$	105	174	pF
Turn-On Delay Time	$(V_{DD} = 75\text{ V}$ , $I_D = 20\text{ A}$ , $V_{GS} = 10\text{ V}$ , $R_G = 9.1\Omega$ ) *	$t_{d(on)}$	11	25	ns
Rise Time		$t_r$	77	153	ns
Turn-Off Delay Time		$t_{d(off)}$	33	67	ns
Fall Time		$t_f$	49	97	ns
Total Gate Charge	$(V_{DS} = 120\text{ V}$ , $I_D = 20\text{ A}$ , $V_{GS} = 10\text{ V}$ ) *	$Q_g$	39.1	55.9	nC
Gate-Source Charge		$Q_{gs}$	7.5		nC
Gate-Drain Charge		$Q_{gd}$	22		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
<b>SOURCE-DRAIN DIODE CHARACTERISTICS</b>					
Forward On-Voltage(1)	$(I_S = 20\text{ A}$ , $V_{GS} = 0\text{ V}$ , $d_i/d_t = 100\text{A}/\mu\text{s}$ )	$V_{SD}$		1.5	V
Forward Turn-On Time		$t_{on}$	**		ns
Reverse Recovery Time		$t_{rr}$	160		ns

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

\*\* Negligible, Dominated by circuit inductance

### PACKAGE DIMENSION

TO-220



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

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	14.48	---	15.75	0.570	---	0.620
B	9.66	---	10.28	0.380	---	0.405
C	4.07	---	4.82	0.160	---	0.190
D	0.64	---	0.66	0.025	---	0.035
F	3.61	---	3.73	0.142	---	0.147
G	2.42	---	2.66	0.095	---	0.105
H	2.80	---	3.93	0.110	---	0.155
J	0.46	---	0.64	0.018	---	0.025
K	12.70	---	14.27	0.500	---	0.562
L	1.15	---	1.52	0.045	---	0.060
N	4.83	---	5.33	0.190	---	0.210
Q	2.54	---	3.04	0.100	---	0.120
R	2.04	---	2.79	0.080	---	0.110
S	1.15	---	1.39	0.045	---	0.055
T	5.97	---	6.47	0.235	---	0.255
U	0.00	---	1.27	0.000	---	0.050
V	1.15	---	---	0.045	---	---
Z	---	---	2.04	---	---	0.080

# 上海台永商貿有限公司



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