GENERAL DESCRIPTION

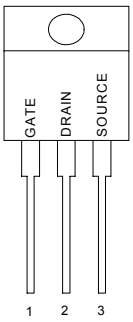
This Power MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power supplies, converters and PWM motor controls, 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

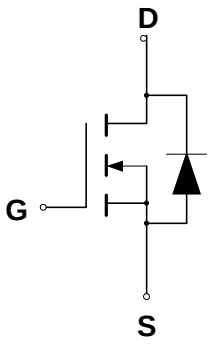
- Robust High Voltage Termination
- Avalanche Energy Specified
- Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- Diode is Characterized for Use in Bridge Circuits
- I_{DSS} and V_{DS}(on) Specified at Elevated Temperature

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}	±20	V
— Non-repetitive	V_{GSM}	±32	V
Total Power Dissipation	P_D	112	W
Derate above 25℃		0.9	W/℃
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Single Pulse Drain-to-Source Avalanche Energy — T_J = 25℃ (V_{DD} = 100V, V_{GS} = 10V, I_L = 16A, L = 1.38mH, R_G = 25Ω)	E_{AS}	177	mJ
Thermal Resistance — Junction to Case	θ_{JC}	1.1	℃/W
— Junction to Ambient	θ_{JA}	62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	℃

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

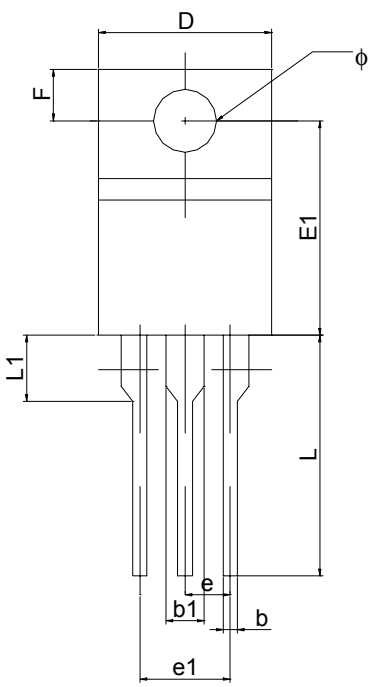
Characteristic		Symbol	CMT20N15 Min	Typ	Max	Units
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	150			V
Drain-Source Leakage Current (V_{DS} = 150 V, V_{GS} = 0 V)		I_{DSS}			25	μA
(V_{DS} = 150 V, V_{GS} = 0 V, T_J = 125℃)					100	
Gate-Source Leakage Current-Forward (V_{gsf} = 20 V, V_{DS} = 0 V)		I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V_{gsr} = 20 V, V_{DS} = 0 V)		I_{GSSR}			100	nA
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2.0		4.0	V
Static Drain-Source On-Resistance (V_{GS} = 10 V, I_D = 10A) *		$R_{DS(on)}$			0.13	Ω
Drain-Source On-Voltage (V_{GS} = 10 V) (I_D = 10.0 A)		$V_{DS(on)}$			2.8	V
Forward Transconductance (V_{DS} = 50 V, I_D = 10A) *		g_{FS}	4.2			mhos
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 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 V, I_D = 20 A, V_{GS} = 10 V, R_G = 9.1Ω) *	$t_{d(on)}$		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 V, I_D = 20 A, V_{GS} = 10 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
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I_S = 20 A, V_{GS} = 0 V, d_{IS}/d_t = 100A/μs)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		160		ns

* Pulse Test: Pulse Width ≦300μs, Duty Cycle ≦2%

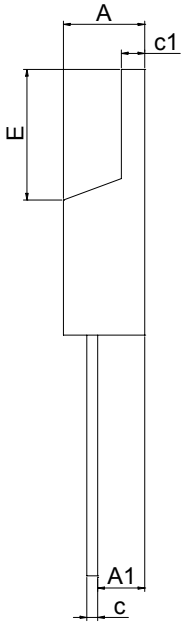
** Negligible, Dominated by circuit inductance

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

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