GENERAL DESCRIPTION

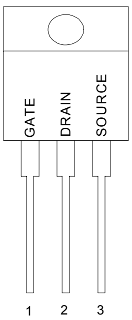
This advanced MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power supplies, converters and PWM motor controls,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

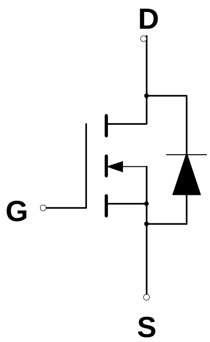
- Avalanche Energy Specified
- Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- Diode is Characterized for Use in Bridge Circuits
- I_{DSS} and V_{DS}(on) Specified at Elevated Temperature

PIN CONFIGURATION

TO-220
Front View



SYMBOL



N-Channel MOSFET

ORDERING INFORMATION

Part Number	Package
CMT10N10N220	TO-220

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	I_D	10	A
— Pulsed	I_{DM}	35	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
— Non-repetitive	V_{GSM}	±40	V
Total Power Dissipation	P_D	40	W
Derate above 25℃		0.32	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 = 10A, L = 1.38mH, R_G = 25Ω)	E_{AS}	69	mJ
Thermal Resistance — Junction to Case	θ_{JC}	3.13	℃/W
— Junction to Ambient	θ_{JA}	100	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	℃

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

			CMT10N10			
Characteristic		Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	100			V
Drain-Source Leakage Current (V_{DS} = 100 V, V_{GS} = 0 V) (V_{DS} = 100 V, V_{GS} = 0 V, T_J = 125℃)		I_{DSS}			25 100	μA
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)		$V_{GS(th)}$	1.0	1.45	2.0	V
Static Drain-Source On-Resistance (V_{GS} = 5.0 V, I_D = 5.0A) *		$R_{DS(on)}$			0.18	Ω
Drain-Source On-Voltage (V_{GS} = 5.0 V) (I_D = 10 A)		$V_{DS(on)}$		1.85	2.6	V
Forward Transconductance (V_{DS} = 50 V, I_D = 5.0A) *		g_{FS}	3.5			mhos
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		741	1040	pF
Output Capacitance		C_{oss}		175	250	pF
Reverse Transfer Capacitance		C_{rss}		18.9	40	pF
Turn-On Delay Time	(V_{DD} = 50 V, I_D = 10 A, V_{GS} = 5.0 V, R_G = 9.1Ω) *	$t_{d(on)}$		11	20	ns
Rise Time		t_r		74	150	ns
Turn-Off Delay Time		$t_{d(off)}$		17	30	ns
Fall Time		t_f		38	80	ns
Total Gate Charge	(V_{DS} = 80 V, I_D = 10 A, V_{GS} = 5.0 V)*	Q_g		9.3	15	nC
Gate-Source Charge		Q_{gs}		2.56		nC
Gate-Drain Charge		Q_{gd}		4.4		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 = 10 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}		124.7		ns

* Pulse Test: Pulse Width ≦300μs, Duty Cycle ≦2%
** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

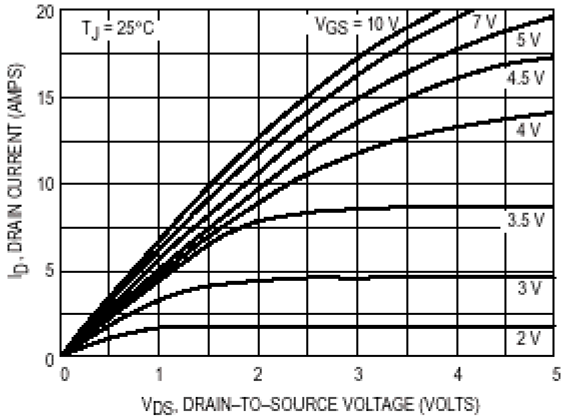


Figure 1. On–Region Characteristics

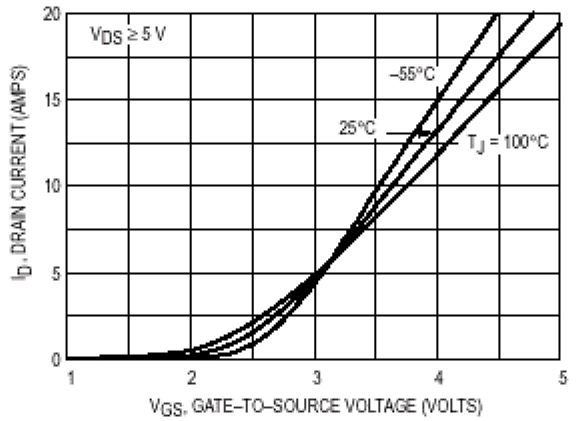


Figure 2. Transfer Characteristics

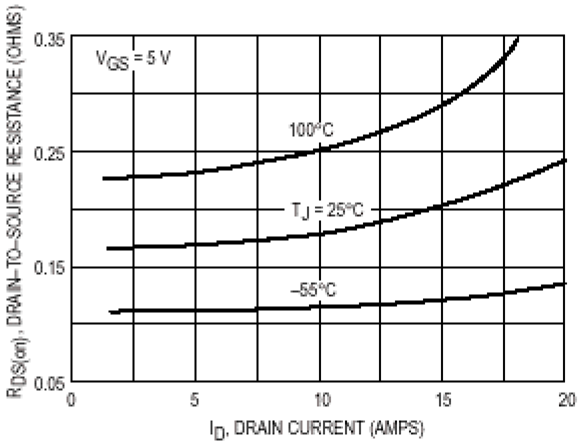


Figure 3. On–Resistance versus Drain Current and Temperature

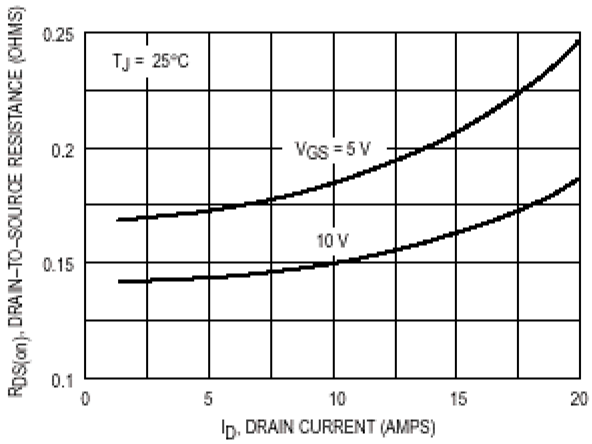


Figure 4. On–Resistance versus Drain Current and Gate Voltage

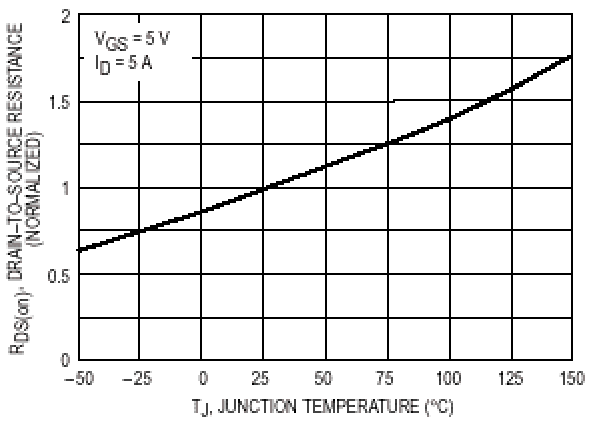


Figure 5. On–Resistance Variation with Temperature

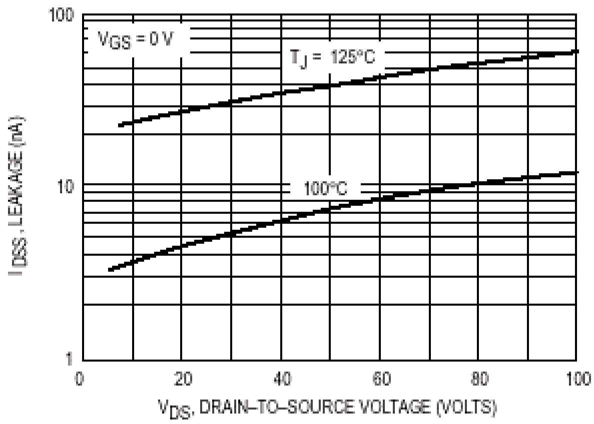
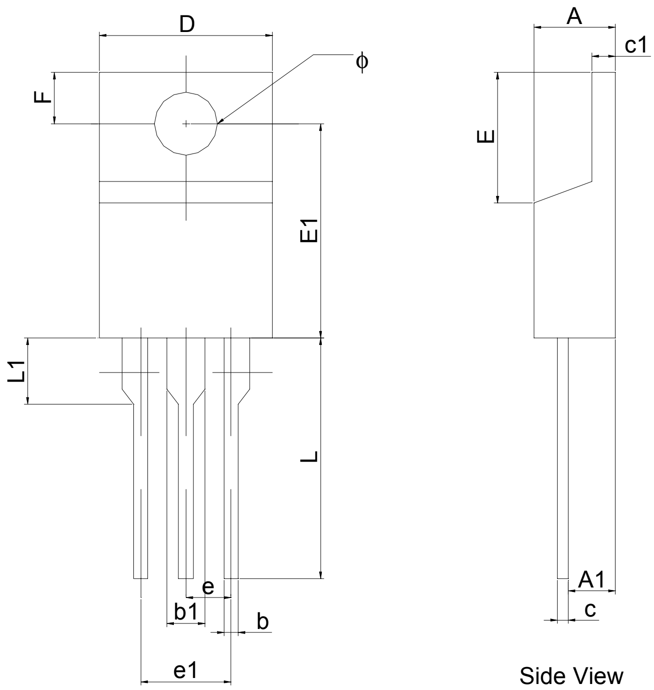


Figure 6. Drain–To–Source Leakage Current versus Voltage

PACKAGE DIMENSION

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

IMPORTANT NOTICE

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