GENERAL DESCRIPTION

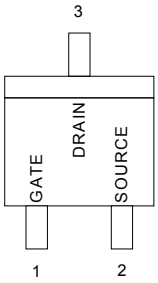
This N-Channel enhancement mode field effect transistor is produced using high cell density, DMOS technology. These products have been designed to minimize on-state resistance while provide rugged, reliable, and fast switching performance. This product is particularly suited for low voltage, low current applications such as small servo motor control, power MOSFET gate drivers, and other switching applications.

FEATURES

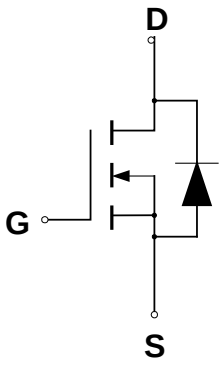
- Low On-Resistance: 3Ω
- Low Threshold: 2V (typ.)
- Low Input Capacitance: 25pF
- Fast Switching Speed: 7.5ns
- Low Input and Output Leakage

PIN CONFIGURATION

SOT-23
Top View



SYMBOL



N-Channel MOSFET

ORDERING INFORMATION

Part Number	Package
CMT2N7002E	SOT-23
CMT2N7002EG*	SOT-23

***Note:** G : Suffix for Pb Free Product

ABSOLUTE MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Drain Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage (R_{GS} = 1.0MΩ)		V_{DGR}	60	V
Continuous Drain Current (T_J = 150℃)	T_A = 25℃	I_D	240	mA
	T_A = 70℃		190	
Pulsed Drain Current (Note 1)		I_{DM}	1300	mA
Gate-to-Source Voltage		V_{GS}	±20	V
Total Power Dissipation	T_A = 25℃	P_D	0.35	W
	T_A = 70℃		0.22	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to 150	℃
Thermal Resistance — Junction to Ambient		θ_{JA}	357	℃/W

Note1: Pulse Width limited by maximum junction temperature.

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

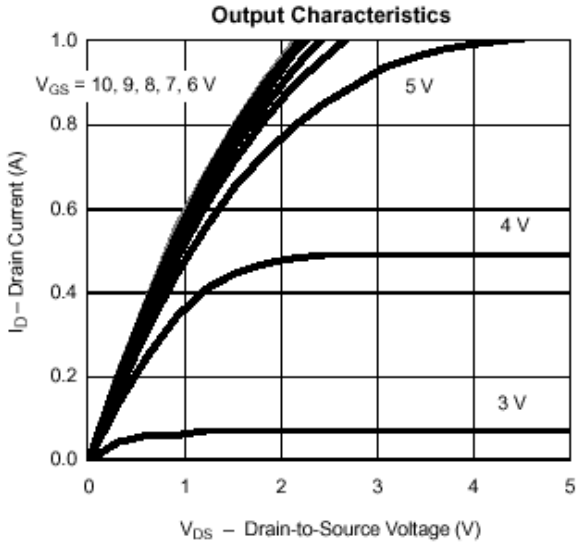
Characteristic		Symbol	CMT2N7002E Min	Typ	Max	Units
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 10 μA)		$V_{(BR)DSS}$	60	68		V
Zero Gate Voltage Drain Current		I_{DSS}				
(V_{DS} = 60 V, V_{GS} = 0 V)					1.0	μA
(V_{DS} = 60 V, V_{GS} = 0 V, T_C = 125℃)					500	μA
Gate Body Leakage (V_{DS} = 0 V, V_{GS} = ±15 V)		I_{GSS}			±10	nA
Gate Threshold Voltage * (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	1.0	2.0	2.5	V
On-State Drain Current (Note 2)		$I_{d(on)}$				
(V_{DS} = 7.5 V, V_{GS} = 10V)			800	1900		mA
(V_{DS} = 10 V, V_{GS} = 4.5V)			350	450		
Static Drain-Source On-Resistance (Note 2)		$R_{DS(on)}$				
(V_{GS} = 10 V, I_D = 0.25A)				1.9	3	Ω
(V_{GS} = 4.5 V, I_D = 0.2A)				3.5	4	
Diode Forward On-Voltage (I_S = 200 mA, VGS = 0V)		V_{SD}		0.85	1.2	V
Forward Transconductance (V_{DS} = 15 V, I_D = 200mA) (Note 2)		g_{FS}	150	260		mmhos
Total Gate Charge	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz) (Note 1)	Q_g		0.4	0.6	nC
Gate-Source Charge		Q_{gs}		0.06		nC
Gate-Drain Charge		Q_{gd}		0.06		nC
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz) (Note 1)	C_{iss}		21		pF
Output Capacitance		C_{oss}		7		pF
Reverse Transfer Capacitance		C_{rss}		2.5		pF
Turn-On Delay Time (Note 1,3)	(V_{DD} = 10 V, I_D = 250 mA, V_{GEN} = 10 V, R_G = 10Ω, R_L = 40Ω)	$t_{d(on)}$		13	20	ns
Turn-Off Delay Time (Note 1,3)		$t_{d(off)}$		18	25	ns

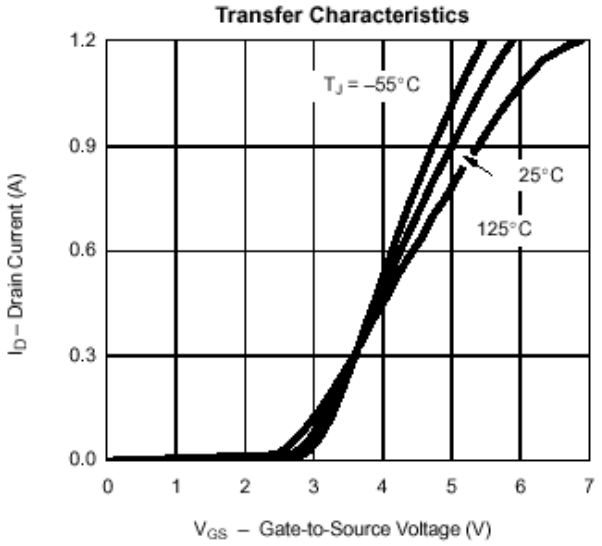
Note 1: For Design Aid Only, not subject to production testing.

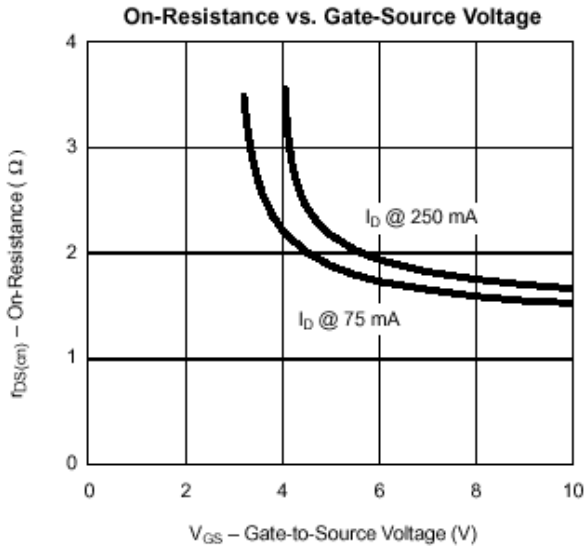
Note 2: Pulse test: PW <= 300μs duty cycle <=2%

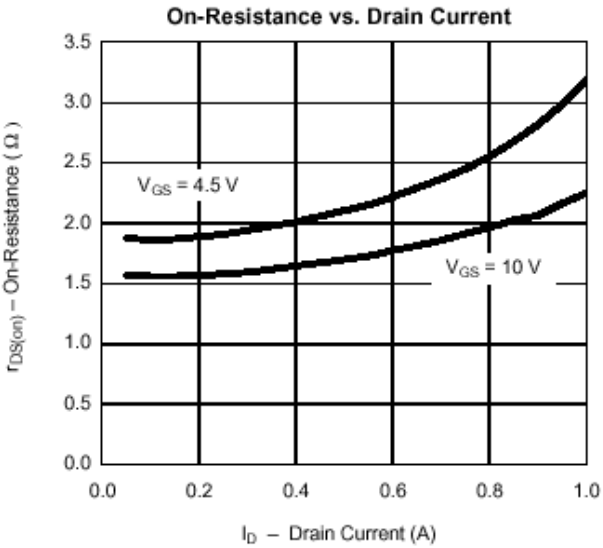
Note 3: Switching time is essentially independent of operating temperature.

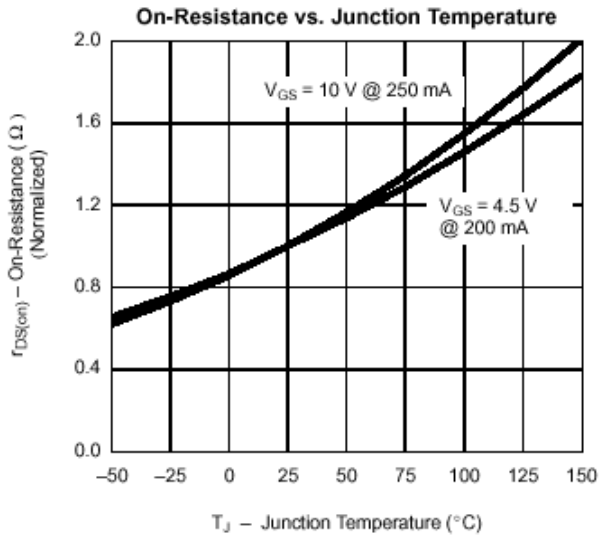
TYPICAL ELECTRICAL CHARACTERISTICS

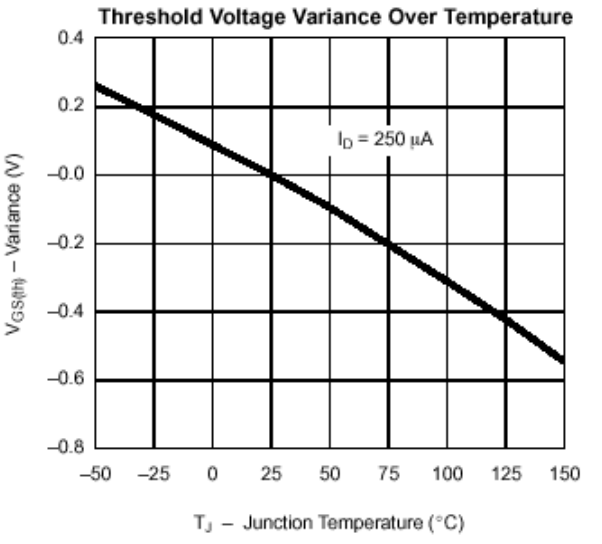


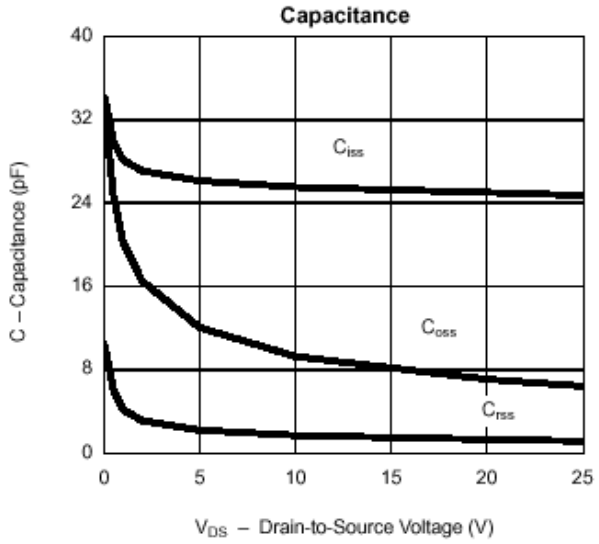


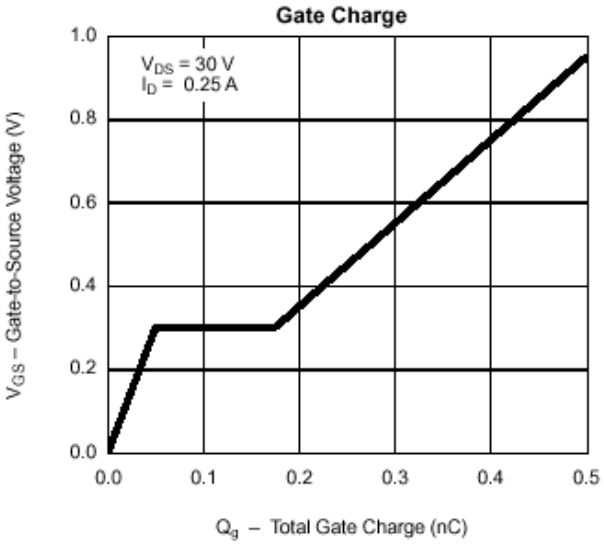


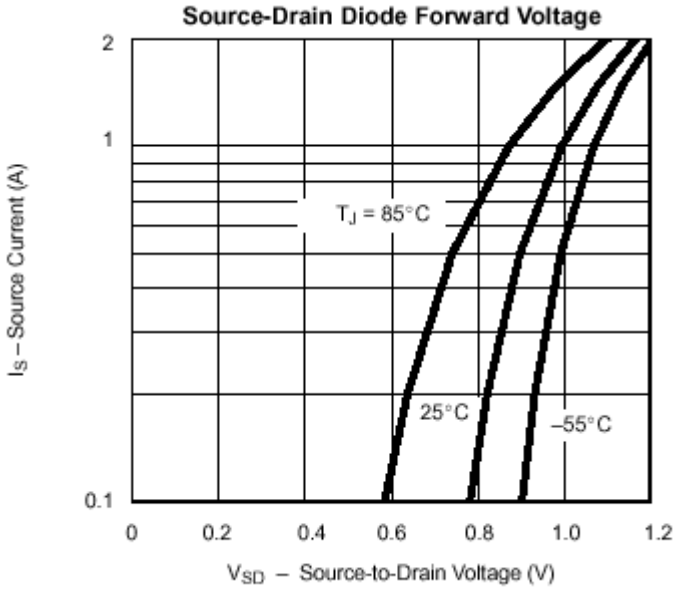






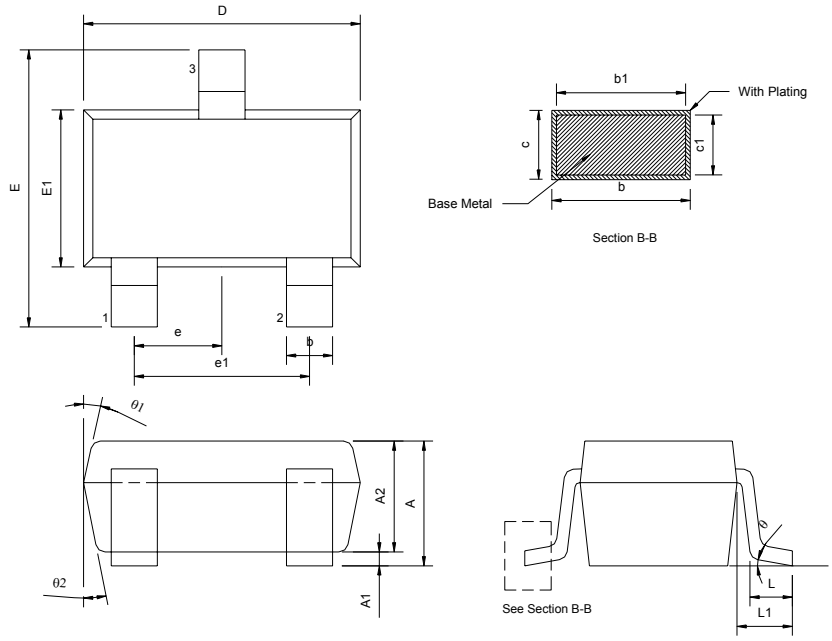

Capacitance
C – Capacitance (pF)
40
32
24
16
8
0
0
5
10
15
20
25
C_{iss}
C_{oss}
C_{rss}
V_{DS} – Drain-to-Source Voltage (V)


Gate Charge
V_{DS} = 30 V
I_D = 0.25 A
V_{GS} – Gate-to-Source Voltage (V)
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.1
0.2
0.3
0.4
0.5
Q_g – Total Gate Charge (nC)


Source-Drain Diode Forward Voltage
I_S – Source Current (A)
2
1
0.1
T_J = 85°C
25°C
–55°C
0
0.2
0.4
0.6
0.8
1.0
1.2
V_{SD} – Source-to-Drain Voltage (V)

PACKAGE DIMENSION

SOT-23



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.05	---	1.35	0.041	---	0.053
A1	0.05	---	0.15	0.002	---	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	---	0.50	0.010	---	0.020
b1	0.25	0.40	0.45	0.010	0.016	0.018
c	0.08	---	0.20	0.003	---	0.008
c1	0.08	0.11	0.15	0.003	0.004	0.006
D	2.70	2.90	3.00	0.106	0.114	0.118
E	2.60	2.80	3.00	0.102	0.110	0.118
E1	1.50	1.60	1.70	0.059	0.063	0.067
L	0.35	0.45	0.55	0.014	0.018	0.022
L1	0.60 REF			0.024 REF		
e	0.95 BSC			0.037 BSC		
e1	1.90 BSC			0.075 BSC		
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°

IMPORTANT NOTICE

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