CMSL300N04S4-1R1

40V, 0.85mΩ typ., 400A N-Channel MOSFET

General Description

The CMSL300N04S4-1R1 uses advanced Super Trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
40V	1mΩ	400A

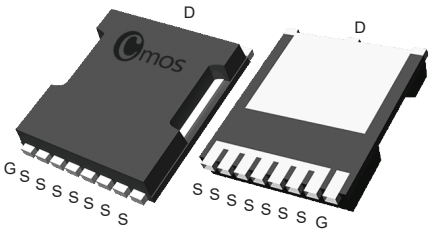
Applications

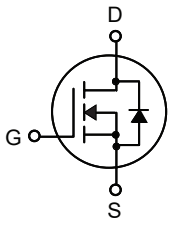
- Power appliances
- E-Tool appliances
- High power inverter system

Features

- Surface-mounted package
- Advanced trench cell design
- Super Trench
- MSL1

TOLL-8 Pin Configuration





TOLL-8
CMSL300N04S4-1R1

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current (DC) [1,2]	400	A
I_{DM}	Pulsed Drain Current (Pulsed) [2,3]	1600	A
EAS	Single Pulse Avalanche Energy [4]	1352	mJ
P_D@T_C=25℃	Total Power Dissipation	600	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient [3]	---	32.8	℃/W
$R_{\theta JC}$	Thermal Resistance Junction -Case [3]	---	0.45	℃/W

Electrical Characteristics (T_J=25℃ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=29A	---	0.85	1	mΩ
		V_{GS}=4.5V , I_D=20A	---	1.2	1.65	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250μA	1	---	3	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge	V_{DS}=20V , I_D=50A V_{GS}=10 V (Note 5)	---	148	---	nC
Q_{gs}	Gate-Source Charge		---	26	---	
Q_{gd}	Gate-Drain Charge		---	25	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=20V , V_{GS}=10V , R_G =4.5Ω R_L=0.4Ω , I_{DS}=50A (Note 5)	---	20	---	ns
T_r	Rise Time		---	85	---	
$T_{d(off)}$	Turn-Off Delay Time		---	150	---	
T_f	Fall Time		---	130	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz (Note 5)	---	7100	---	pF
C_{oss}	Output Capacitance		---	1400	---	
C_{rss}	Reverse Transfer Capacitance		---	450	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Diode continuous forward current	V_G=V_D=0V , Force Current	---	---	400	A
$I_{S,pulse}$	Diode pulse current		---	---	1600	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_s=25A , Tj=25℃	---	0.75	1.3	V

Notes:

1.Surface Mounted on minimum footprint pad area.

2.Maximum current rating is package limited.

3.Pulse width ≤300μs, duty cycle ≤2%.

4.The EAS data shows Max. rating . The test condition is V_{DD}=40V , V_{GS}=10V , L=1mH , I_{AS}=52A.

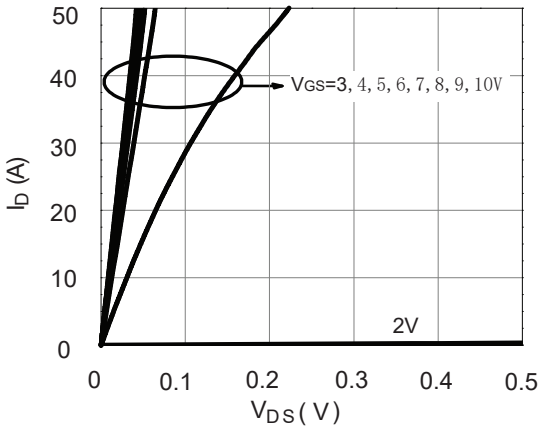
5.Guaranteed by design, not subject to production testing.

This product has been designed and qualified for the counsumer market.

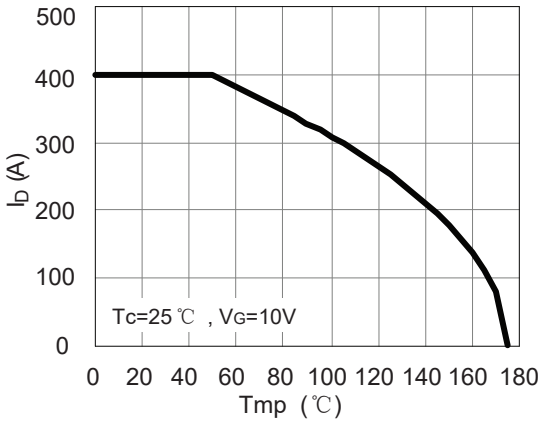
Cmos assumes no liability for customers' product design or applications.

Cmos reserver the right to improve product design ,functions and reliability wihtout notice.Please refer to the latest version of specification.

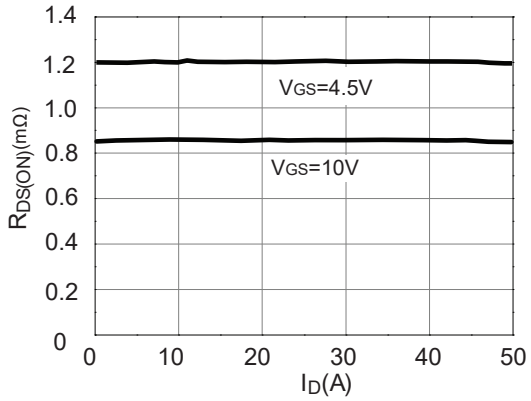
Typical Characteristics



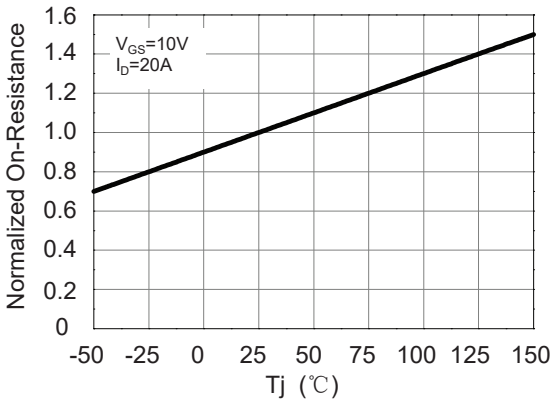
Output Characteristics



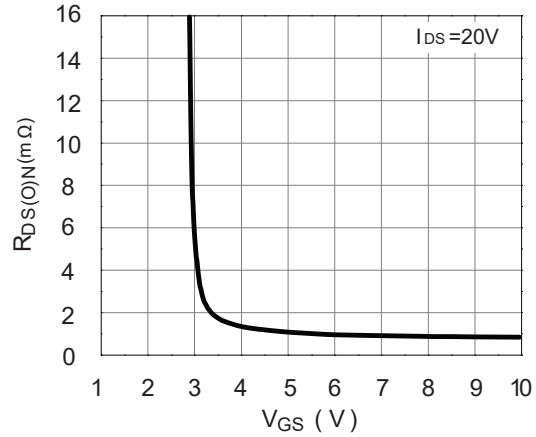
Current Capability



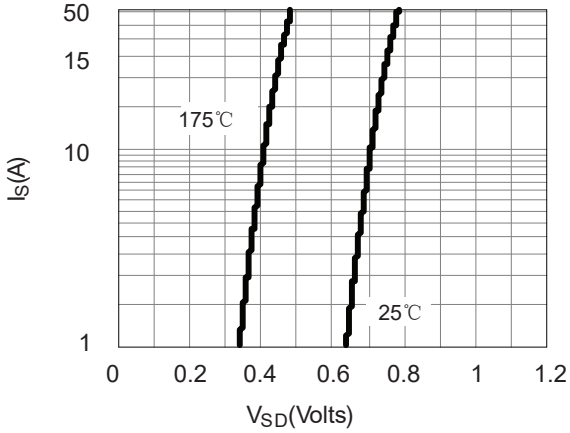
On-Resistance vs. Drain Current and Gate Voltage



On-Resistance vs. Junction Temperature

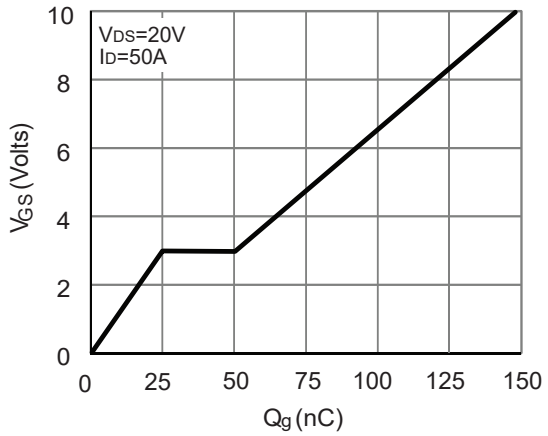


On-Resistance vs. Gate-Source Voltage

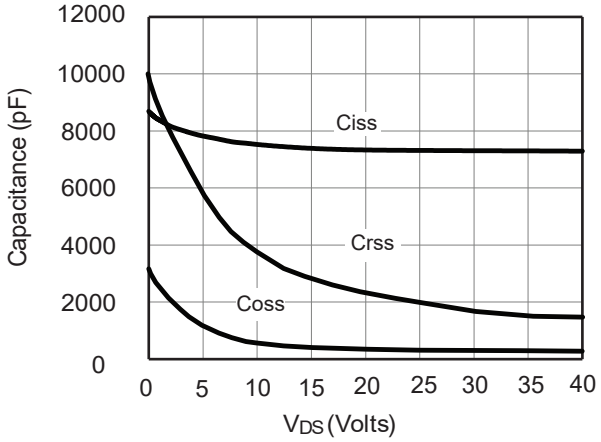


Body-Diode Characteristics

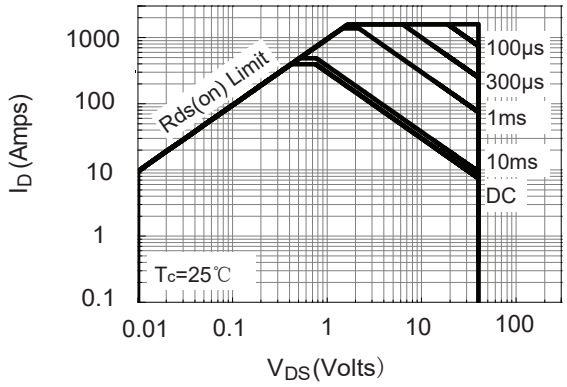
Typical Characteristics



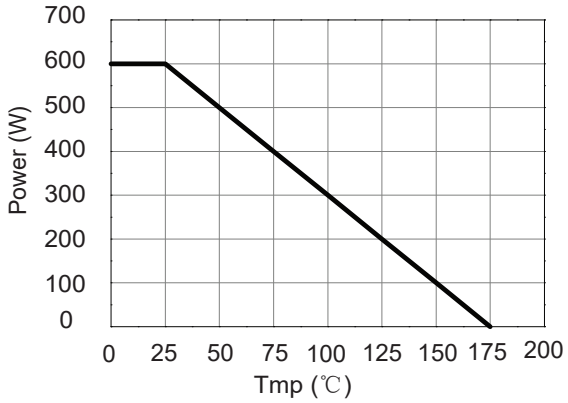
Gate-Charge Characteristics



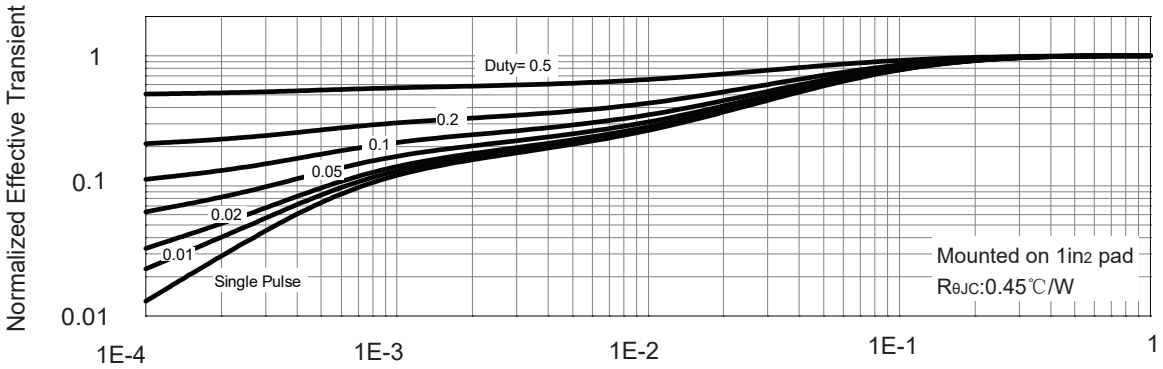
Capacitance Characteristics



Safe Operating Area



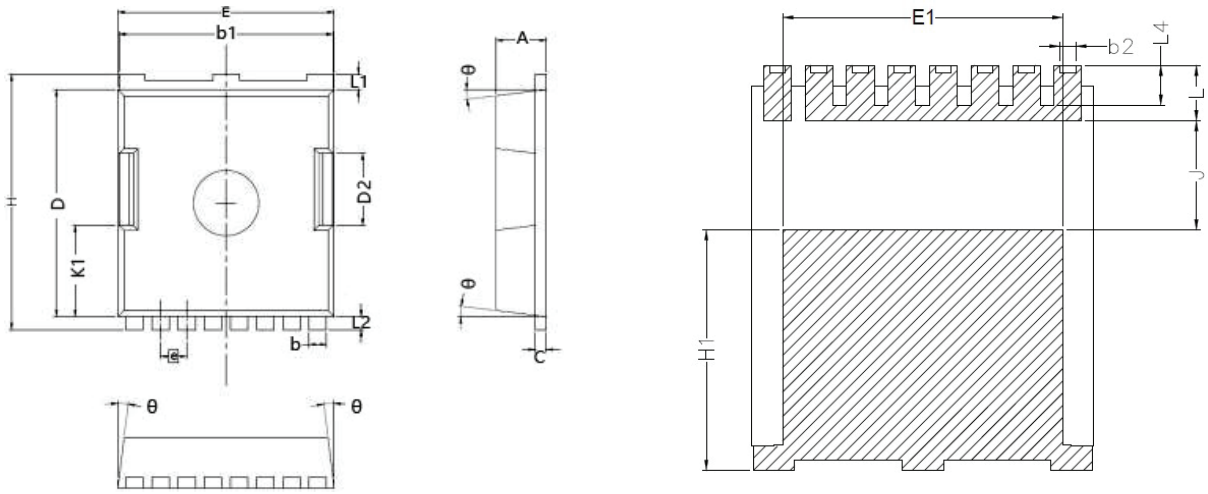
Power Capability



Transient Thermal Impedance

Package Dimensions

TOLL-8 Package



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.20	2.40
b	0.70	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D2	3.10	3.50
E	9.70	10.10
E1	7.90	8.30
e	1.20BSC	
H	11.48	11.88
H1	6.75	7.15
N	8	
J	3.00	3.30
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L4	1.00	1.30
θ	4°	10°