

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.

Features

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

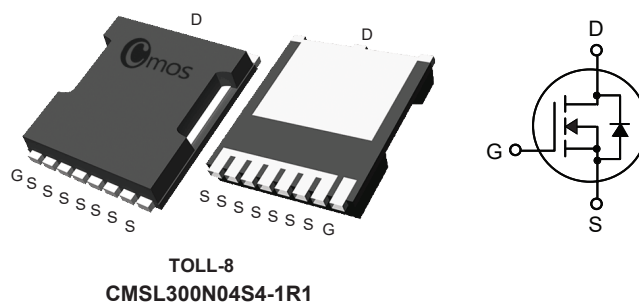
Product Summary

BVDSS	RDSON	ID
40V	1m Ω	400A

Applications

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

TOLL-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	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
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation	600	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	175	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient ³	---	32.8	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction -Case ³	---	0.45	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=29A$	---	0.85	1	$m\Omega$
		$V_{GS}=4.5V$, $I_D=20A$	---	1.2	1.65	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1	---	3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=32V$, $V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Q_g	Total Gate Charge	$V_{DS}=20V$, $I_D=50A$ $V_{GS}=10V$ (Note 5)	---	148	---	nC
Q_{gs}	Gate-Source Charge		---	26	---	
Q_{gd}	Gate-Drain Charge		---	25	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=20V$, $V_{GS}=10V$, $R_G=4.5\Omega$ $R_L=0.4\Omega$, $I_{DS}=50A$ (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	$V_{DS}=20V$, $V_{GS}=0V$, $f=1MHz$ (Note 5)	---	8300	---	pF
C_{oss}	Output Capacitance		---	3300	---	
C_{rss}	Reverse Transfer Capacitance		---	60	---	

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	$V_{GS}=0V$, $I_S=25A$, $T_J=25^{\circ}\text{C}$	---	0.75	1.3	V

Notes:

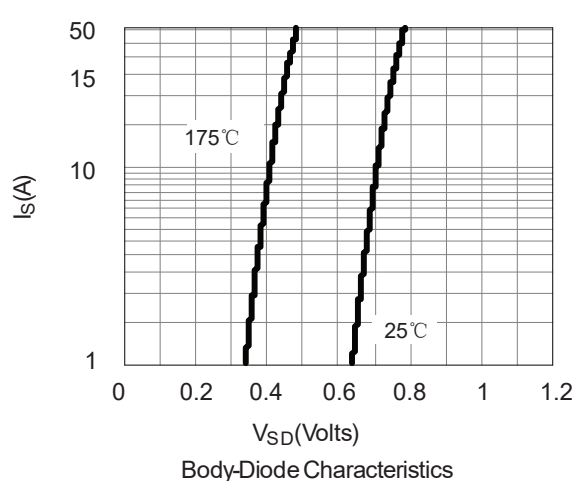
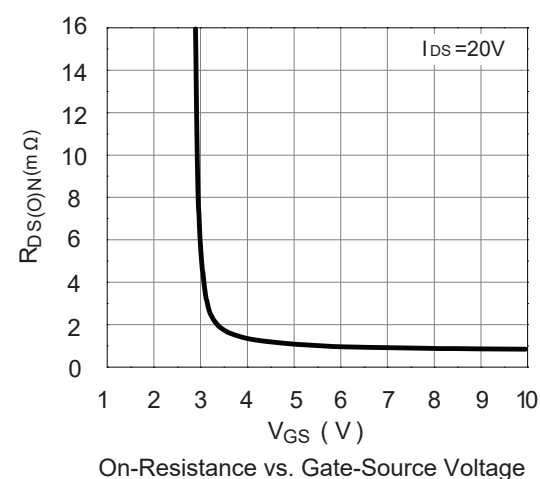
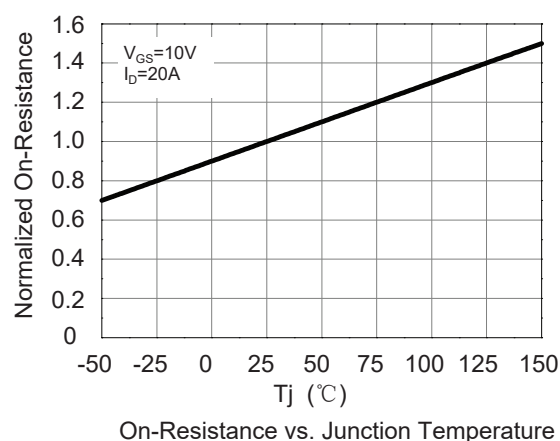
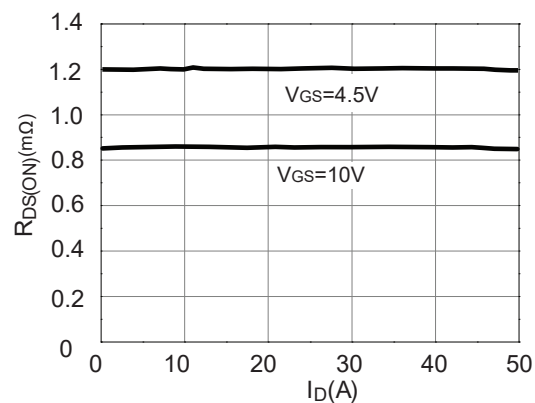
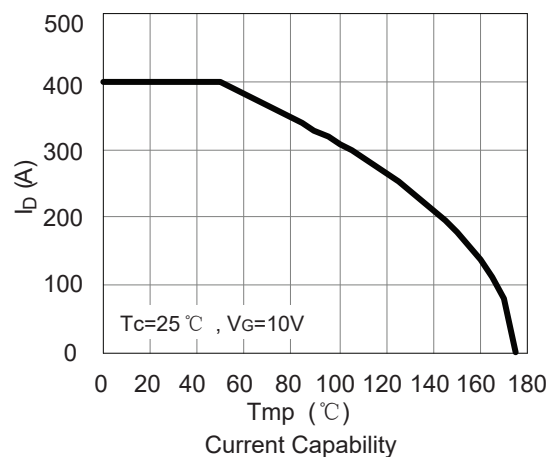
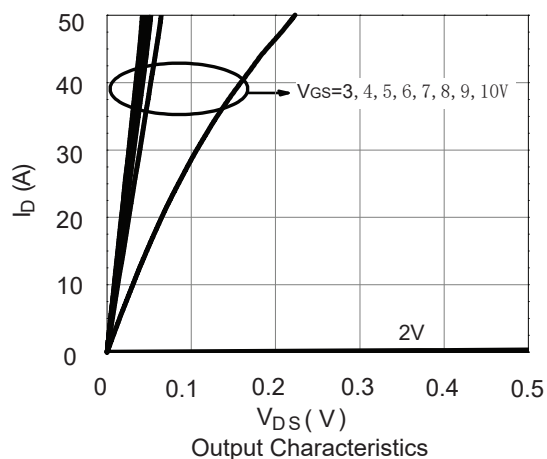
- 1.Surface Mounted on minimum footprint pad area.
- 2.Maximum current rating is package limited.
- 3.Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 4.The EAS data shows Max. rating . The test condition is $V_{DD}=40V$, $V_{GS}=10V$, $L=1mH$, $I_{AS}=52A$.
- 5.Guaranteed by design, not subject to production testing.

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

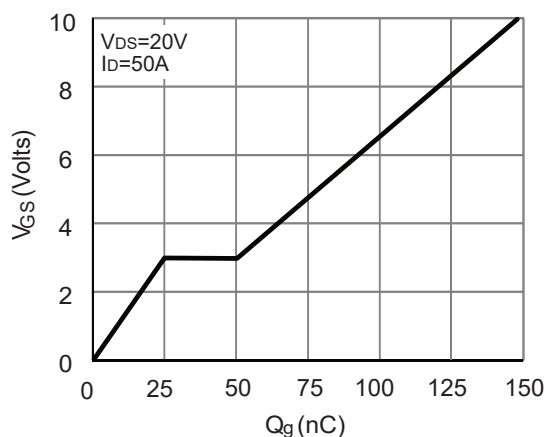
Cmos assumes no liability for customers' product design or applications.

Cmos reserves the right to improve product design ,functions and reliability without notice.

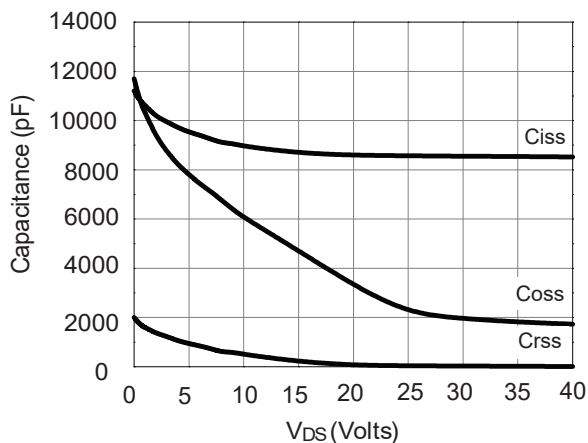
Typical Characteristics



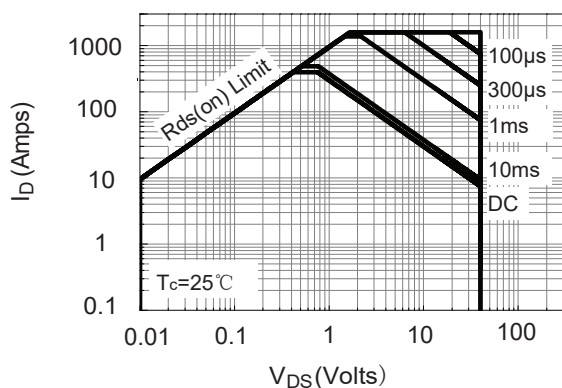
Typical Characteristics



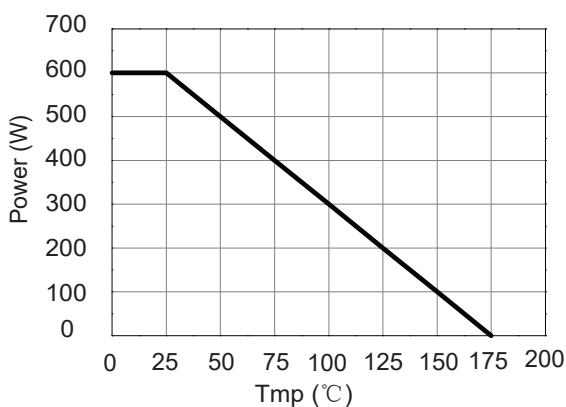
Gate-Charge Characteristics



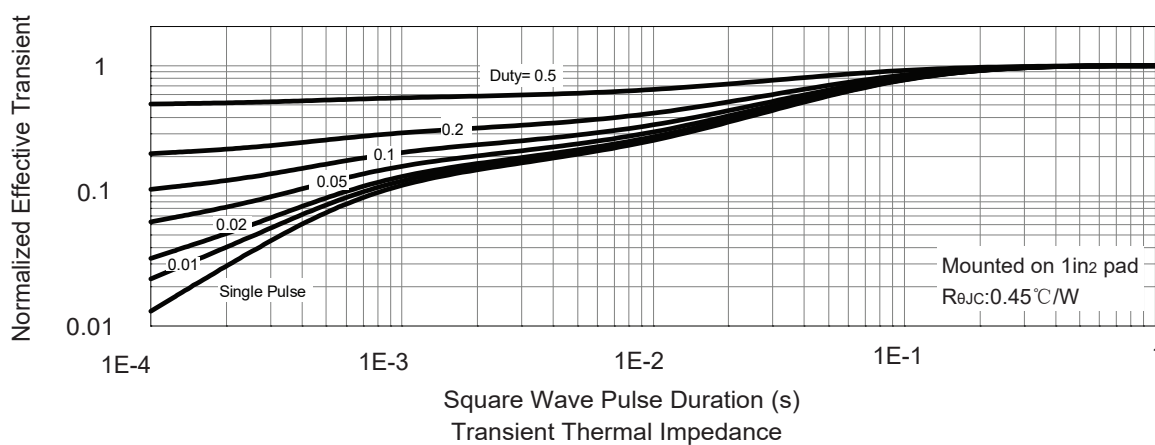
Capacitance Characteristics



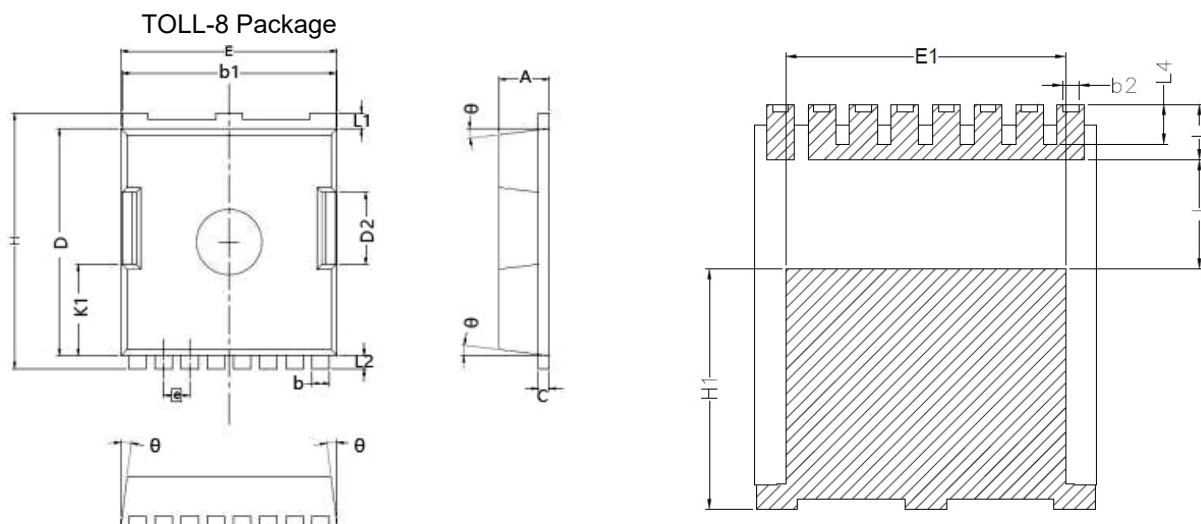
Safe Operating Area



Power Capability



Package Dimensions



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°