

CMSLG65R045

650V, 45mΩ typ., 50A N-Channel Silicon Carbide Power MOSFET

General Description

This silicon carbide Power MOSFET device has been developed using Cmos's advanced SiC MOSFET technology. The device features a very low $R_{DS(on)}$ over the entire temperature range combined with low capacitances and very high switching operations, which improve application performance in frequency, energy efficiency, system size and weight reduction.

Features

- Wide Bandgap SiC MOSFET Technology
- High switching speed with a low gate charge
- Fast intrinsic diode with low reverse recovery
- RoHS Compliant

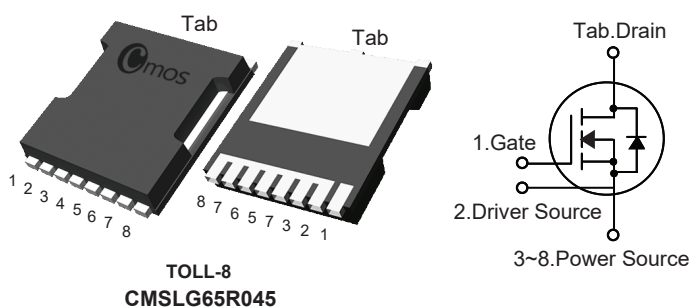
Product Summary

BVDSS	$R_{DS(on)}$ typ.	ID
650V	45mΩ	50A

Applications

- inverter
- EV charging infrastructure
- uninterruptable power supplies

TOLL-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Absolute maximum values	-10/+22	V
V_{GSop}	Recommended operational values	-5/+18	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current	50	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	35	A
I_{DM}	Pulsed Drain Current	135	A
EAS	Single Pulse Avalanche Energy (Note 1)	1653	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	220	W
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	40	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.68	$^{\circ}C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=1mA$	650	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=18V$, $I_D=20A$	---	45	63	mΩ
		$V_{GS}=18V$, $I_D=20A$, $T_J=175^{\circ}\text{C}$	---	62	---	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=7mA$ (tested after $V_{GS}=22V$, 1ms pulse)	1.6	2.1	4.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V$, $V_{GS}=0V$	---	1	100	μA
		$V_{DS}=650V$, $V_{GS}=0V$, $T_J=175^{\circ}\text{C}$	---	10	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=-10V$ to $22V$, $V_{DS}=0V$	---	---	±100	nA
g_{fs}	Forward Transconductance	$V_{DS}=20V$, $I_D=20A$	---	4	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	2.5	---	Ω
$Q_{g(tot)}$	Total Gate Charge	$V_{DS}=400V$, $I_D=20A$ $V_{GS}=-5V$ to $18V$	---	55	---	nC
Q_{gs}	Gate-Source Charge		---	16	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
E_{oss}	Stored Energy in Output Capacitance	$V_{GS}=0V$, $V_{DS}=0V$ to $400V$	---	13.6	---	μJ
$C_{o(er)}$	Energy Related Output Capacitance		---	169	---	pF
$C_{o(tr)}$	Time Related Output Capacitance		---	242	---	
E_{on}	Turn-on Switching Energy	$V_{DS}=400V$ $I_D=20A$ $V_{GS}=-5V$ / $18V$ $R_G=5.6\Omega$ FWD = 650V 20A SiC Diode Inductive load	---	33.6	---	μJ
E_{off}	Turn-off Switching Energy		---	22.8	---	
E_{tot}	Total Switching Energy		---	56.4	---	
$T_{d(on)}$	Turn-On Delay Time		---	14	---	ns
T_r	Rise Time		---	11	---	
$T_{d(off)}$	Turn-Off Delay Time		---	28	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	$V_{DS}=100V$, $V_{GS}=0V$, $f=250kHz$	---	1200	---	pF
C_{oss}	Output Capacitance		---	250	---	
C_{rss}	Reverse Transfer Capacitance		---	12	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	50	A
I_{SM}	Pulsed Source Current		---	---	135	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_{SD}=20A$, $T_J=25^{\circ}\text{C}$	---	4.3	---	V
t_{rr}	Reverse Recovery Time	$di/dt=1000A/\mu s$, $V_{GS}=0V$	---	18	---	ns
Q_{rr}	Reverse Recovery Charge	$V_{DD}=400V$, $I_F=20A$, $T_J=25^{\circ}\text{C}$	---	107	---	nC

Note :

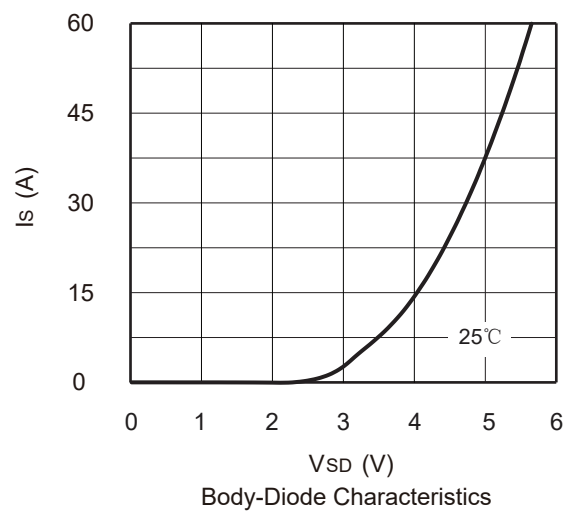
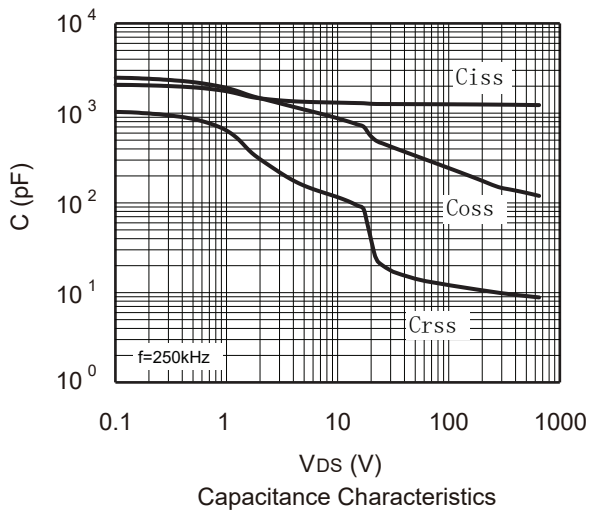
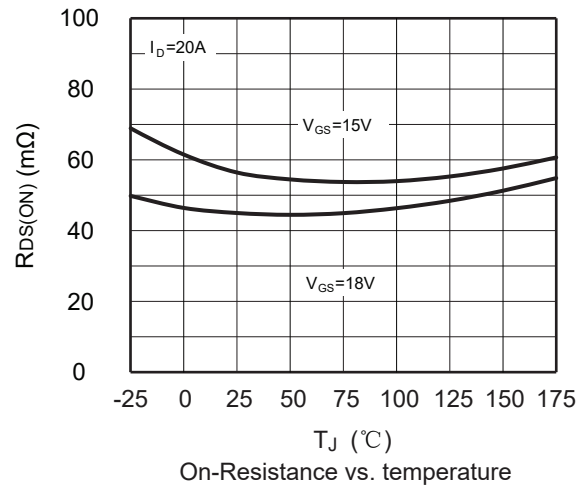
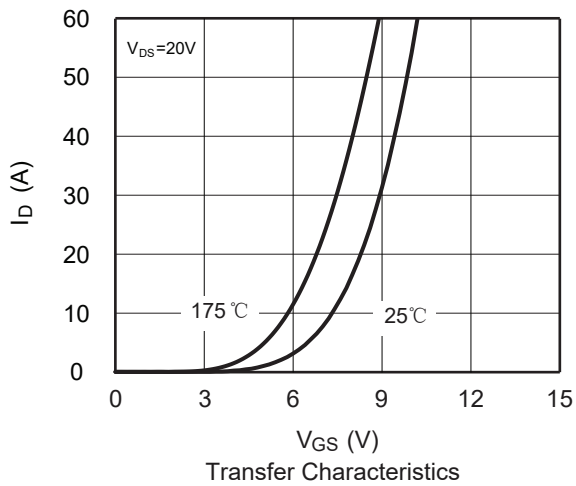
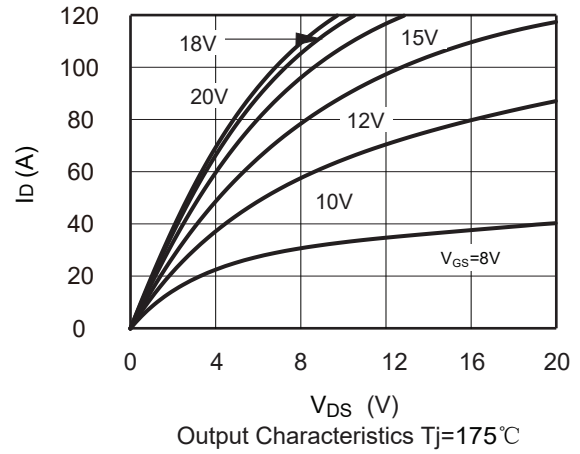
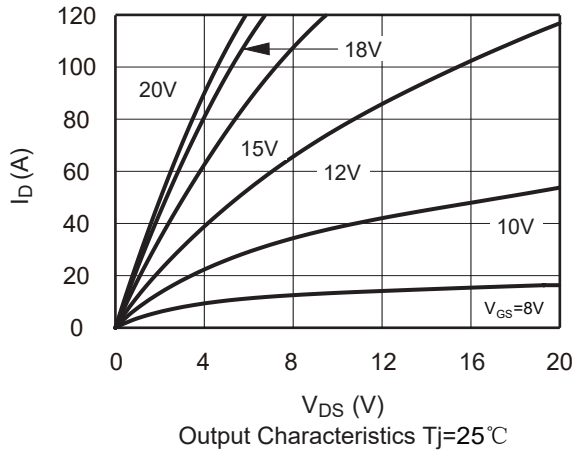
1. The EAS data shows Max. rating . The test condition is $V_{DD}=100V$, $V_{GS}=10V$, $L=30mH$, $I_{AS}=10.5A$.

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

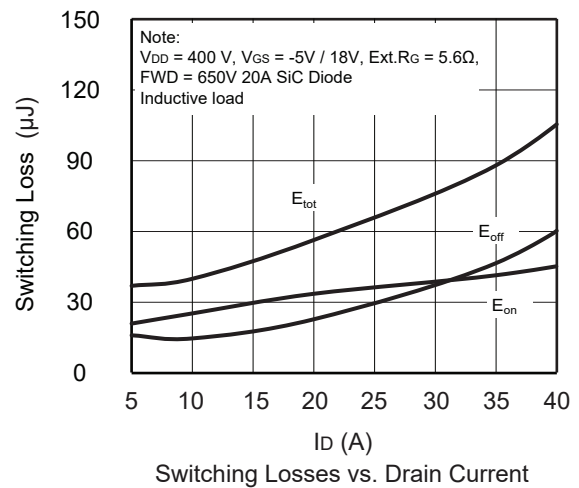
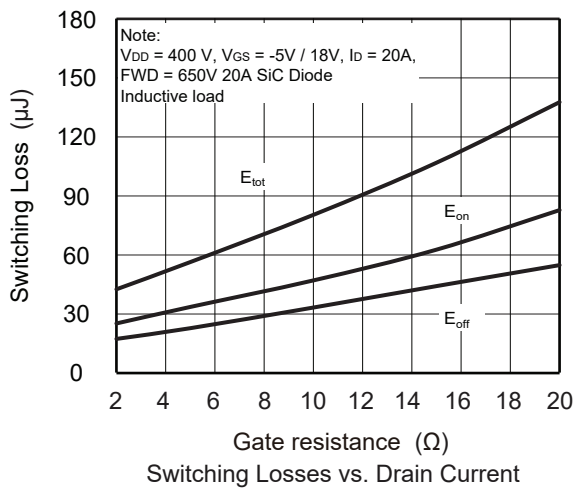
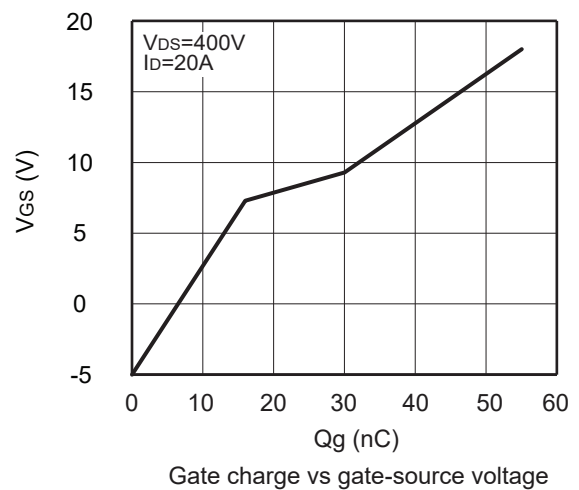
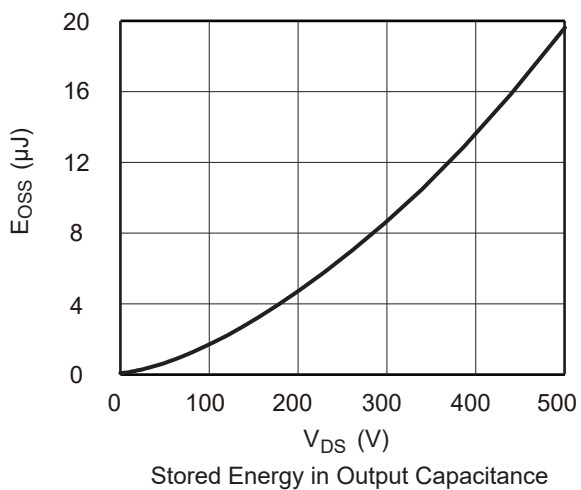
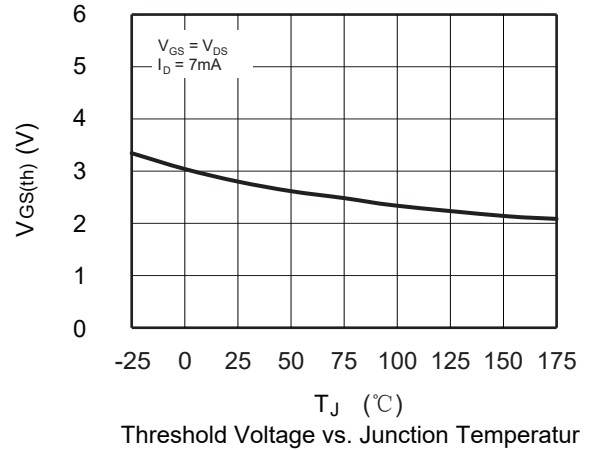
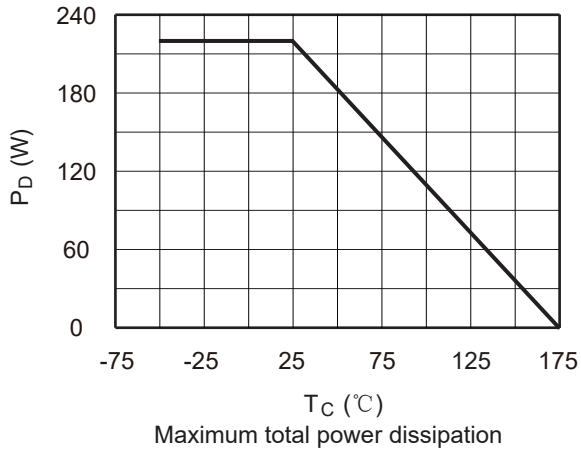
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Cmos reserves the right to improve product design ,functions and reliability without notice. Please refer to the latest version of specification.

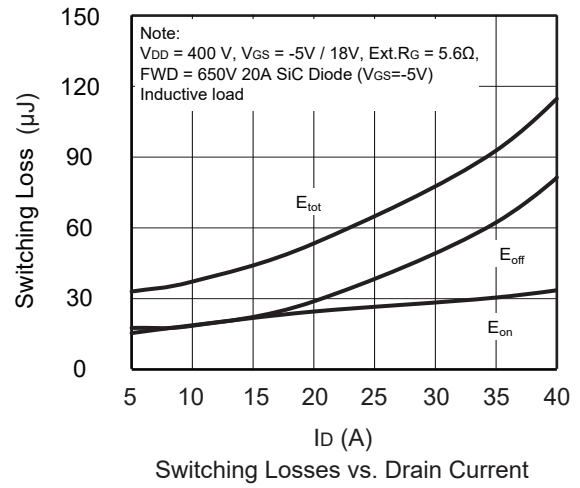
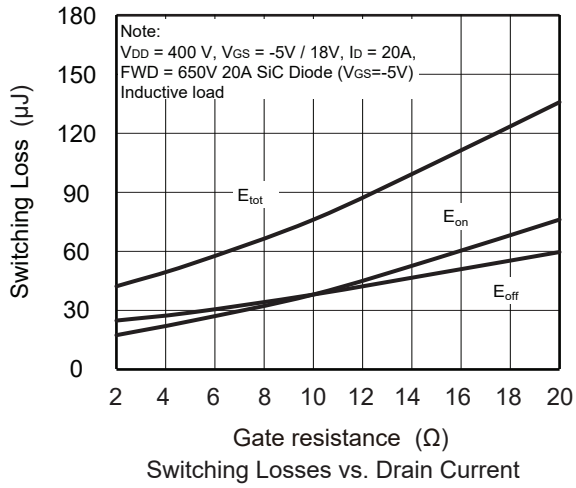
Typical Characteristics



Typical Characteristics

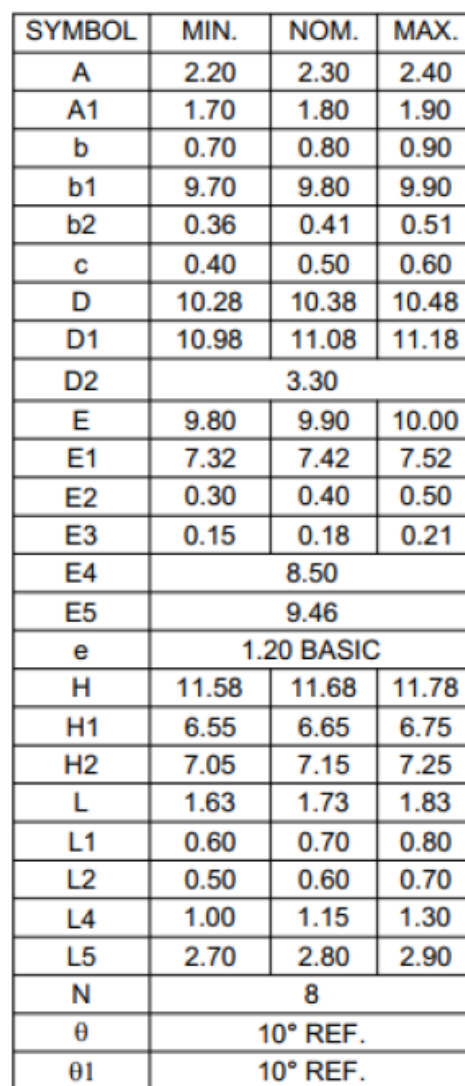


Typical Characteristics



Package Dimension

Unit :mm



* Dimensions in millimeters