CMSLG65R015

650V, 18mΩ typ., 135A 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.

Product Summary

BVDSS	$R_{DS(on)}$ typ.	ID
650V	18mΩ	135A

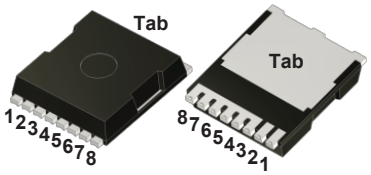
Applications

- inverter
- EV charging infrastructure
- uninterruptable power supplies

Features

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

TOLL Pin Configuration



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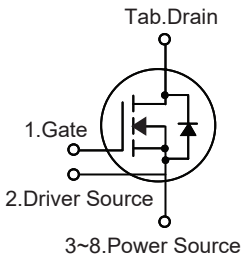

Absolute Maximum Ratings

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℃	Continuous Drain Current	135	A
I_D@T_C=100℃	Continuous Drain Current	96	A
I_{DM}	Pulsed Drain Current	375	A
EAS	Single Pulse Avalanche Energy (Note 1)	4335	mJ
P_D@T_C=25℃	Total Power Dissipation	500	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.30	℃/W

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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=2mA	650	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=18V , I_D=30A	---	18	22	mΩ
		V_{GS}=18V , I_D=30A , T_J=175℃	---	22	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =20.3mA (tested after V_{GS}=22V,1ms pulse)	1.8	2.4	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℃	---	10	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=-10V to 22V , V_{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=20V , I_D =20A	---	7.5	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.2	---	Ω
$Q_{g(tot)}$	Total Gate Charge	V_{DS} =400V , I_D=60A V_{GS}=-5V to 18V	---	146	---	nC
Q_{gs}	Gate-Source Charge		---	45	---	
Q_{gd}	Gate-Drain Charge		---	36	---	
E_{oss}	Stored Energy in Output Capacitance	V_{GS} =0V , V_{DS} =0V to 400V	---	36.5	---	μJ
$C_{o(er)}$	Energy Related Output Capacitance		---	456	---	pF
$C_{o(tr)}$	Time Related Output Capacitance		---	648	---	
E_{on}	Turn-on Switching Energy	V_{DS} =400V I_D =60A V_{GS}=-5V / 18V R_G =5.6Ω FWD = 650V 20A SiC Diode Inductive load	---	146	---	μJ
E_{off}	Turn-off Switching Energy		---	279	---	
E_{tot}	Total Switching Energy		---	425	---	
$T_{d(on)}$	Turn-On Delay Time		---	29	---	ns
T_r	Rise Time		---	26	---	
$T_{d(off)}$	Turn-Off Delay Time		---	60	---	
T_f	Fall Time		---	10.5	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=250kHz	---	3500	---	pF
C_{oss}	Output Capacitance		---	680	---	
C_{rss}	Reverse Transfer Capacitance		---	35	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	135	A
I_{SM}	Pulsed Source Current		---	---	375	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_{SD}=30A , T_J=25℃	---	3.7	---	V
t_{rr}	Reverse Recovery Time	di/dt=1000A/μs , V_{GS}=0V V_{DD}=400V , I_F=60A , T_J=25℃	---	30	---	ns
Q_{rr}	Reverse Recovery Charge		---	303	---	nC

Note :

1.The EAS data shows Max. rating . The test condition is V_{DD}=100V , V_{GS}=10V , L=30mH , I_{AS}=17A.

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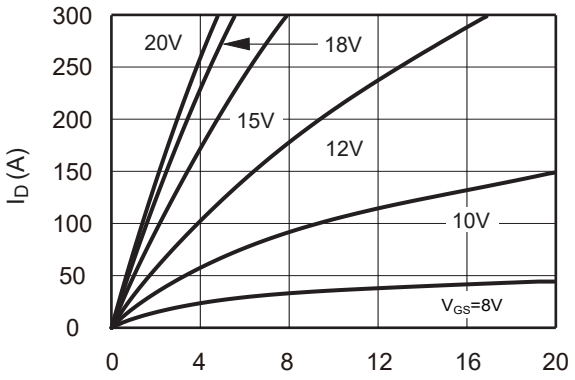
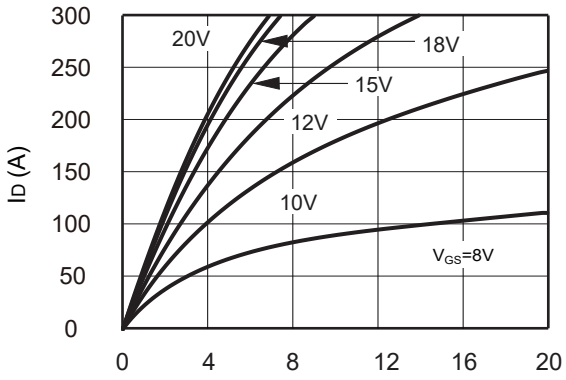
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.Please refer to the latest version of specification.

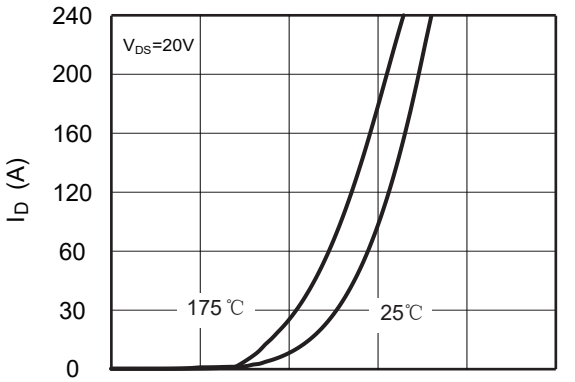
Typical Characteristics



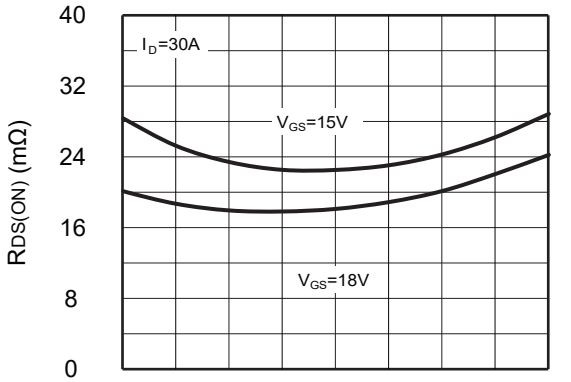
Output Characteristics Tj=25℃



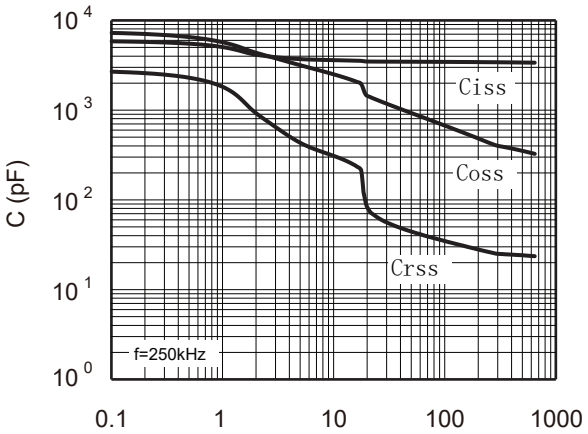
Output Characteristics Tj=175℃



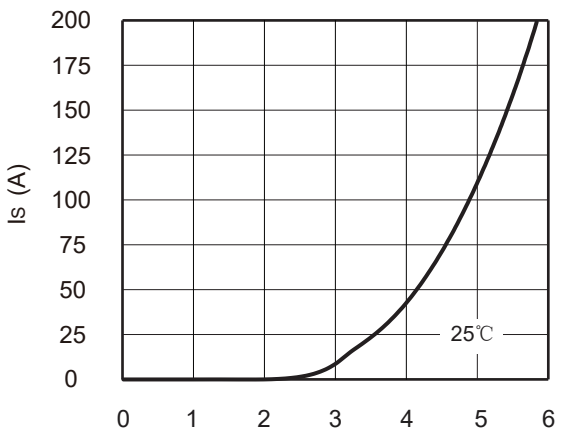
Transfer Characteristics



On-Resistance vs. temperature

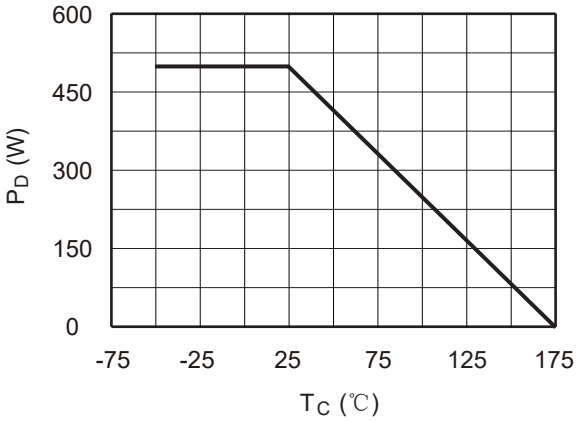


Capacitance Characteristics

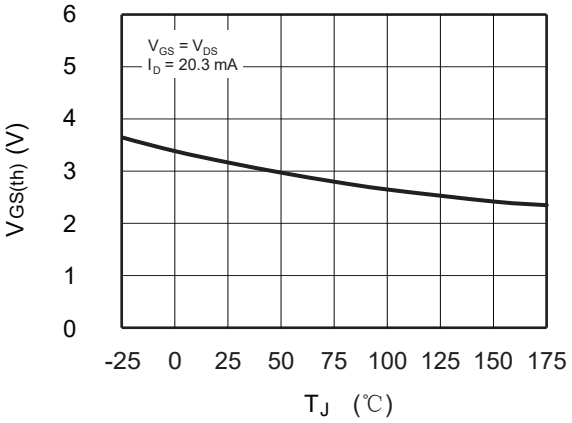


Body-Diode Characteristics

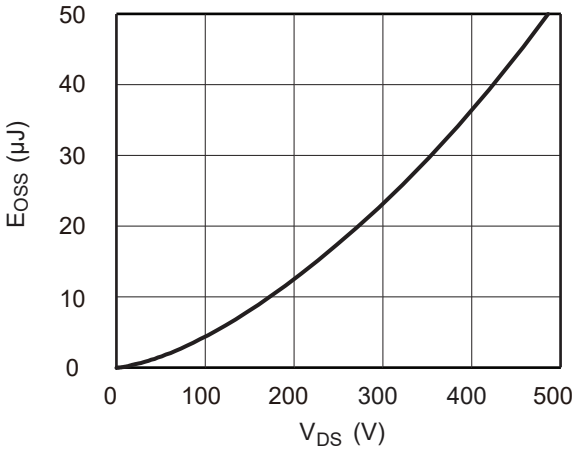
Typical Characteristics



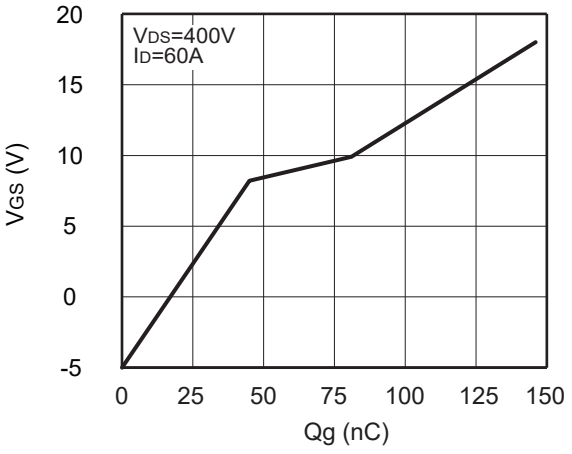
Maximum total power dissipation



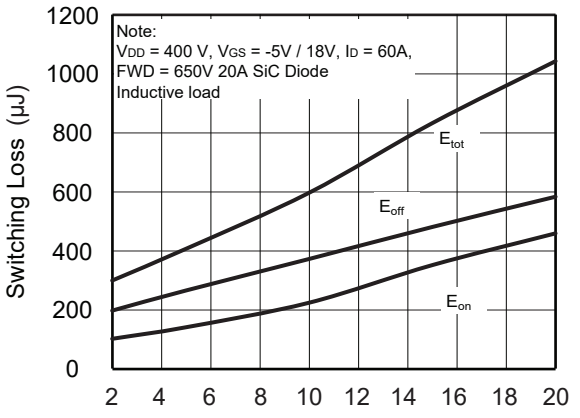
Threshold Voltage vs. Junction Temperatur



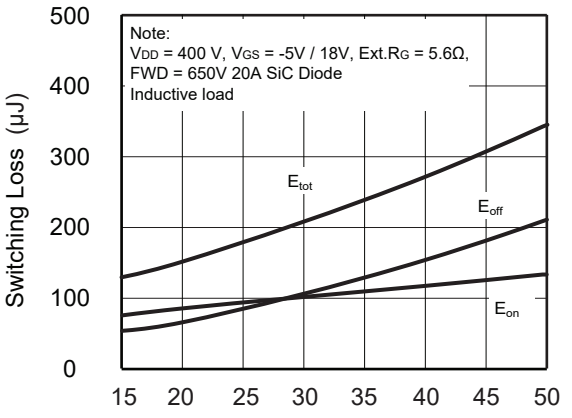
Stored Energy in Output Capacitance



Gate charge vs gate-source voltage

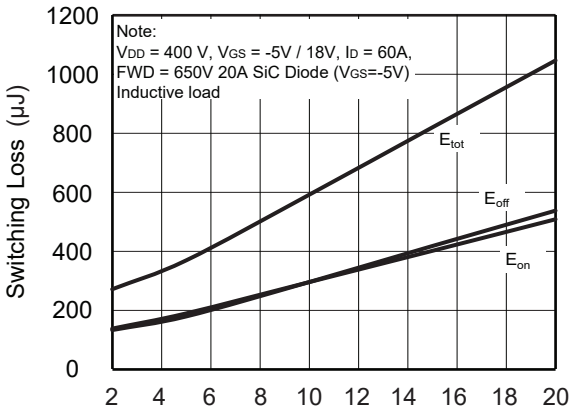


Switching Losses vs. Drain Current

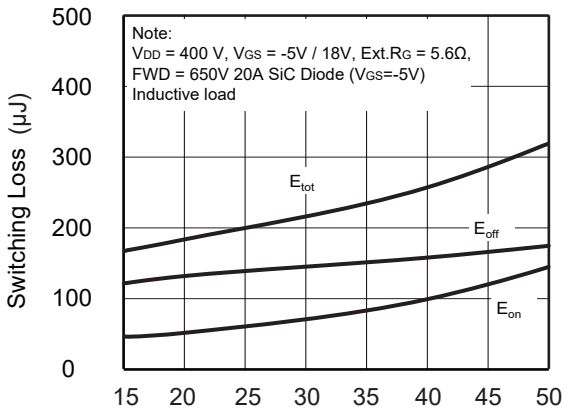


Switching Losses vs. Drain Current

Typical Characteristics



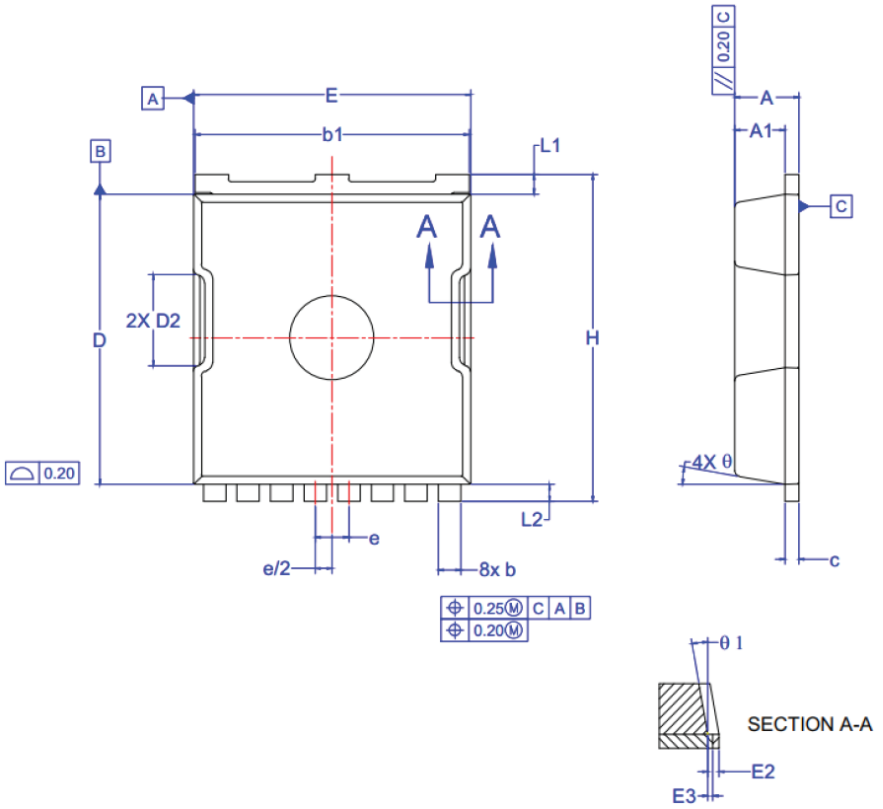
Switching Losses vs. Drain Current

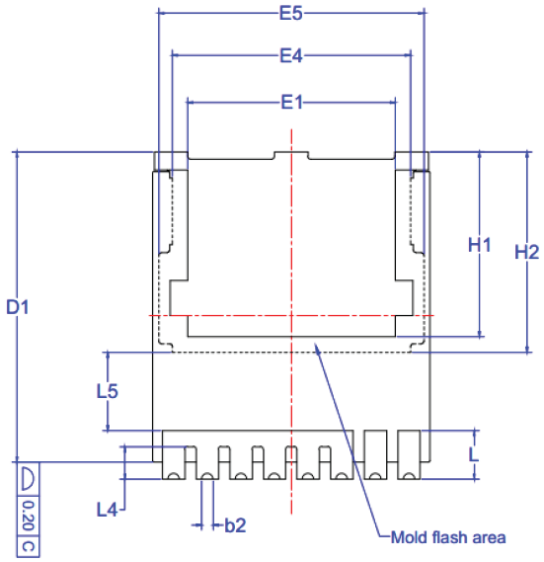


Switching Losses vs. Drain Current

Package Dimension

TOLL Unit :mm





SYMBOL	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	1.70	1.80	1.90
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.41	0.51
c	0.40	0.50	0.60
D	10.28	10.38	10.48
D1	10.98	11.08	11.18
D2		3.30	
E	9.80	9.90	10.00
E1	7.32	7.42	7.52
E2	0.30	0.40	0.50
E3	0.15	0.18	0.21
E4		8.50	
E5		9.46	
e		1.20 BASIC	
H	11.58	11.68	11.78
H1	6.55	6.65	6.75
H2	7.05	7.15	7.25
L	1.63	1.73	1.83
L1	0.60	0.70	0.80
L2	0.50	0.60	0.70
L4	1.00	1.15	1.30
L5	2.70	2.80	2.90
N		8	
θ		10° REF.	
θ1		10° REF.	

* Dimensions in millimeters