

N&P-Channel Enhancement Mode MOSFET

General Description

The CMSC3606 is the highest performance trench N-ch and P-ch MOSFETs with high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

Features

- 30V, 20A, $R_{DS(ON)} = 25\text{m}\Omega$ @ $V_{GS} = 10\text{V}$
-30V, -15A, $R_{DS(ON)} = 45\text{m}\Omega$ @ $V_{GS} = -10\text{V}$
- Improved dv/dt capability
- Fast switching
- RoHS Compliant

Absolute Maximum Ratings

Symbol	Parameter	Max N-channel	Max P-channel	Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	± 20	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current	20	-15	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current	12	-9	A
I_{DM}	Pulsed Drain Current	60	-45	A
EAS	Single Pulse Avalanche Energy ¹	33	29	mJ
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation	20		W
T_{STG}	Storage Temperature Range	-55 to 150		$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150		$^\circ\text{C}$

Thermal Characteristics: N-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient (Steady-State)	---	62.5	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Maximum Junction-to-Case (Steady-State)	---	6.4	$^\circ\text{C}/\text{W}$

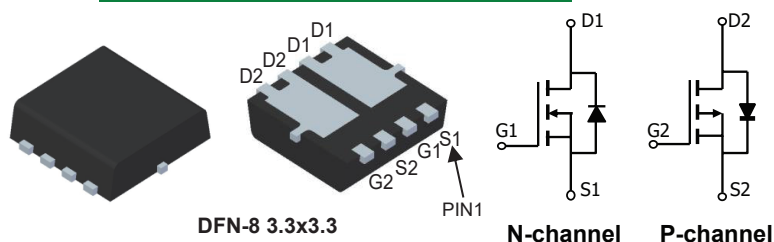
Product Summary

	BVDSS	$R_{DS(on)}$ max.	ID
N-Channel	30V	25m Ω	20A
P-Channel	-30V	45m Ω	-15A

Applications

- Synchronous Rectification.
- High Current, High Speed Switching.
- Portable equipment application

DFN-8 3.3x3.3 Pin Configuration



Type	Package	Marking
CMSC3606	DFN-8 3.3*3.3	3606

Thermal Characteristics: P-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient (Steady-State)	---	62.5	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Maximum Junction-to-Case (Steady-State)	---	6.4	$^{\circ}\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=10A$	---	19	25	$m\Omega$
		$V_{GS}=4.5V$, $I_D=5A$	---	31	45	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D = 250\mu A$	1	---	3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V$, $V_{GS}=0V$	---	---	1	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=125^{\circ}\text{C}$	---	---	10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 20V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=10A$	---	8	---	S
Q_g	Total Gate Charge	$V_{DS}=15V$, $I_D=8A$ $V_{GS}=4.5V$	---	4.2	---	nC
Q_{gs}	Gate-Source Charge		---	1	---	
Q_{gd}	Gate-Drain Charge		---	2.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=6\Omega$ $I_D=1A$	---	3	---	ns
T_r	Rise Time		---	8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	18	---	
T_f	Fall Time		---	5	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	650	---	pF
C_{oss}	Output Capacitance		---	60	---	
C_{rss}	Reverse Transfer Capacitance		---	30	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Diode continuous forward current	$V_G=V_D=0V$, Force Current	---	---	20	A
$I_{S,pulse}$	Diode pulse current		---	---	60	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_F=1A$, $T_J=25^{\circ}\text{C}$	---	---	1	V

P Channel Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-30	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-10A	---	35	45	mΩ
		V _{GS} =-4.5V, I _D =-5A	---	53	80	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250μA	-1	---	-3	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-30V, V _{GS} =0V	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =125 °C	---	---	-10	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-10A	---	9	---	S
Q _g	Total Gate Charge	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-3A	---	6	---	nC
Q _{gs}	Gate-Source Charge		---	2	---	
Q _{gd}	Gate-Drain Charge		---	2.2	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V, I _D =-1A R _G =6Ω	---	4.5	---	ns
T _r	Rise Time		---	12	---	
T _{d(off)}	Turn-Off Delay Time		---	30	---	
T _f	Fall Time		---	7	---	
C _{iss}	Input Capacitance	V _{DS} =-25V, V _{GS} =0V, f=1MHz	---	650	---	pF
C _{oss}	Output Capacitance		---	60	---	
C _{rss}	Reverse Transfer Capacitance		---	40	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	-15	A
I _{SM}	Pulsed Source Current		---	---	-45	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _F =-1A, T _J =25°C	---	---	-1	V

Note:

1.The EAS data shows Max. rating . The N-Channel test condition is V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=15A.

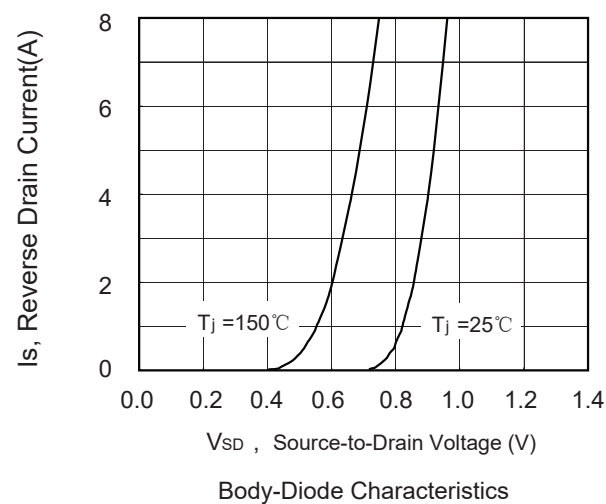
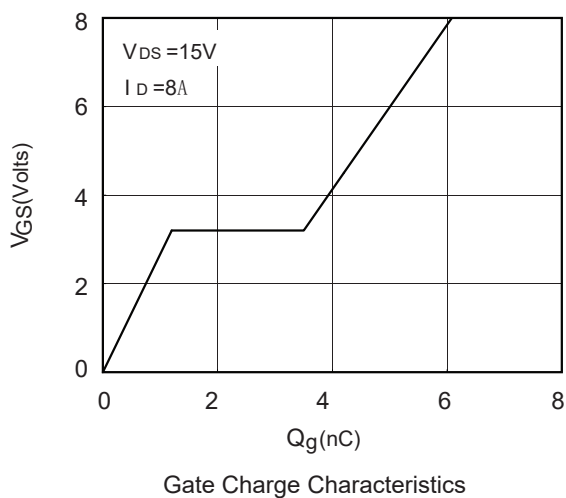
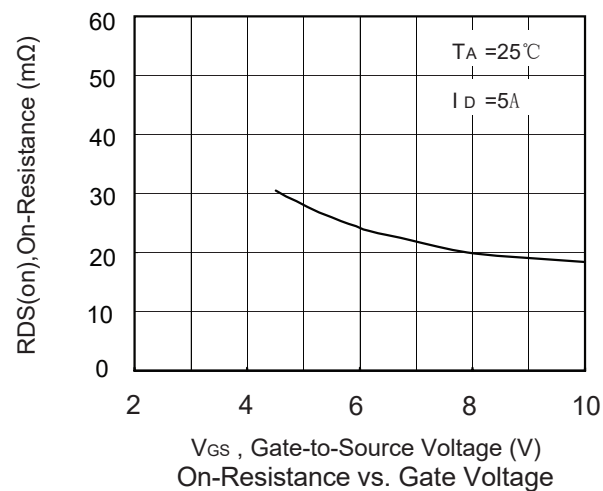
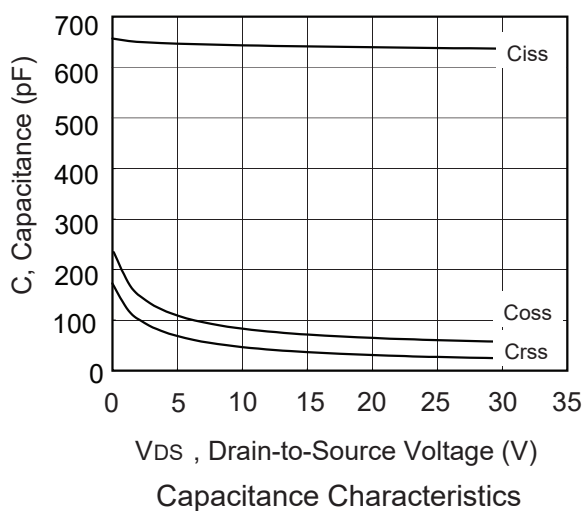
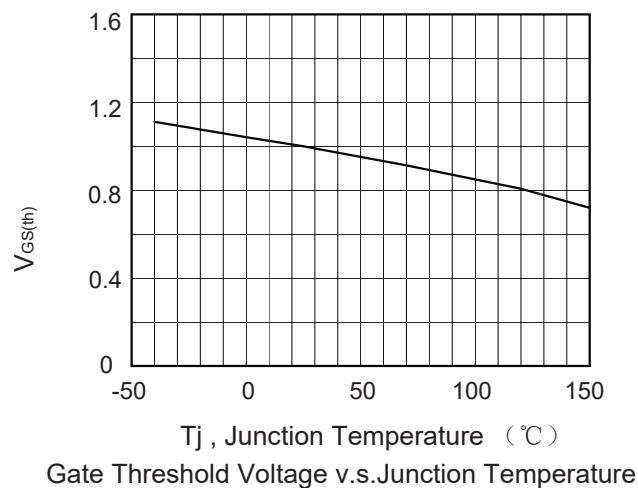
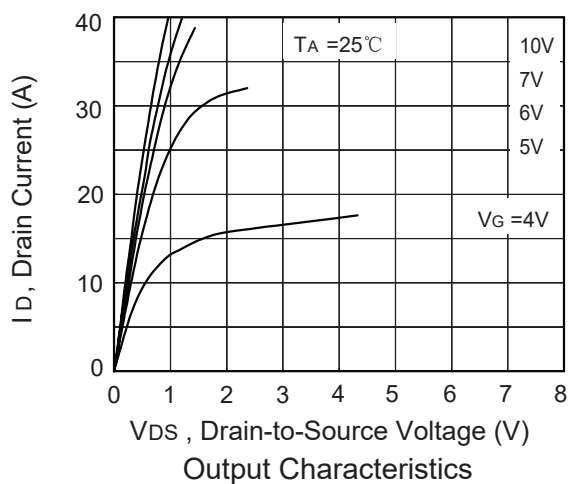
The P-Channel test condition is V_{DD}=-25V, V_{GS}=-10V, L=0.3mH, I_{AS}=-14A.

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

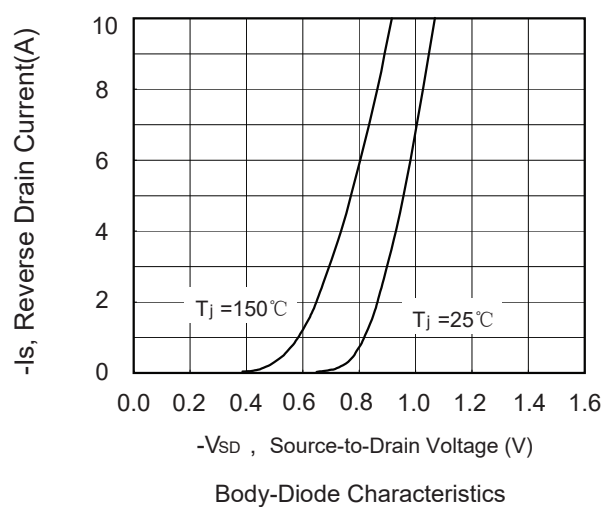
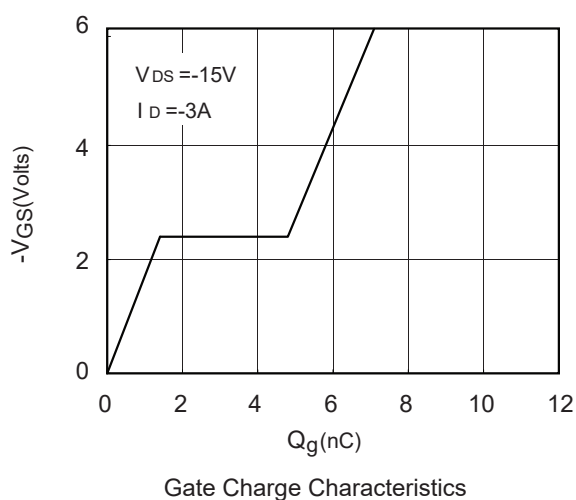
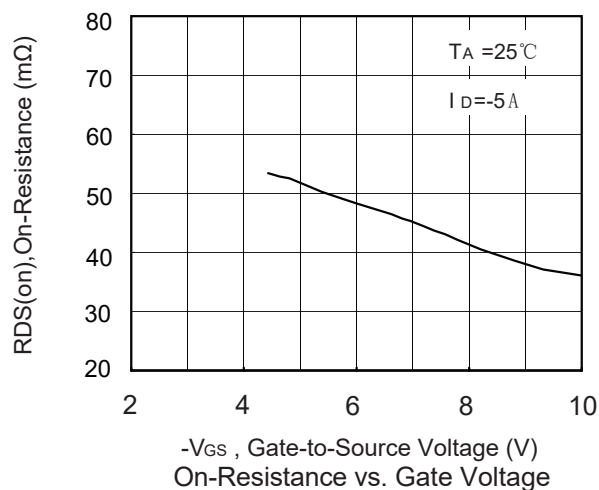
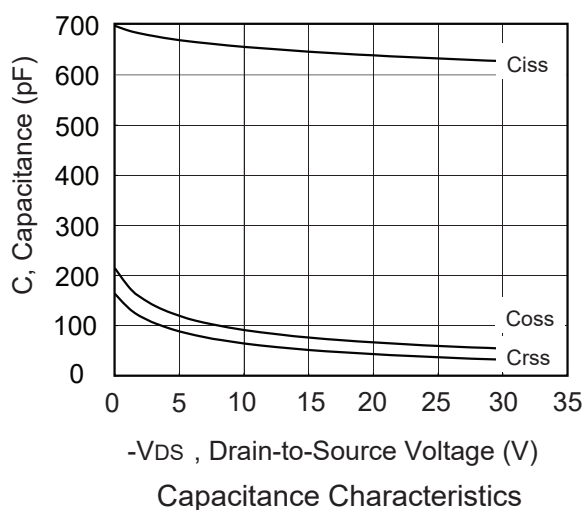
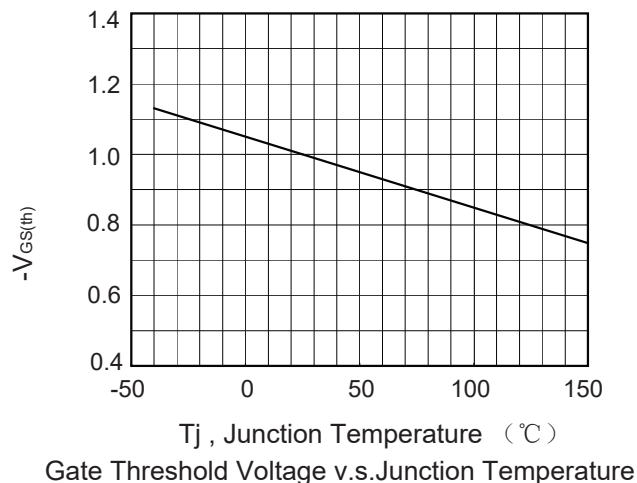
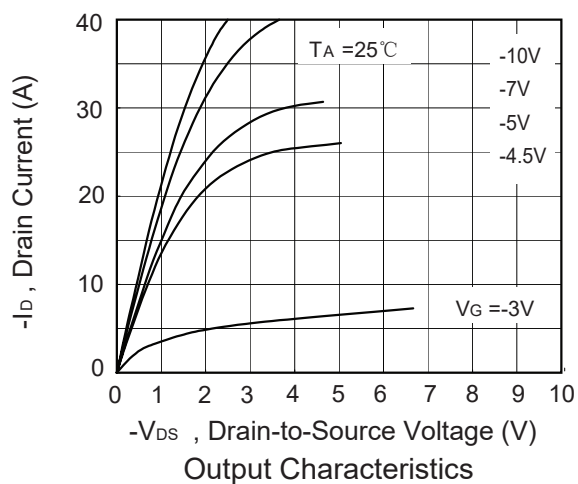
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Cmos reserves the right to improve product design, functions and reliability without notice. Please refer to the latest version of specification.

N-Channel: Typical Characteristics

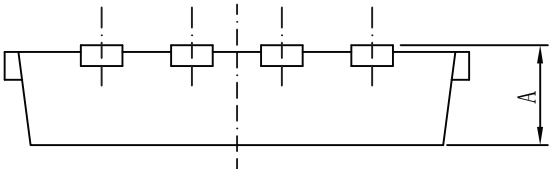
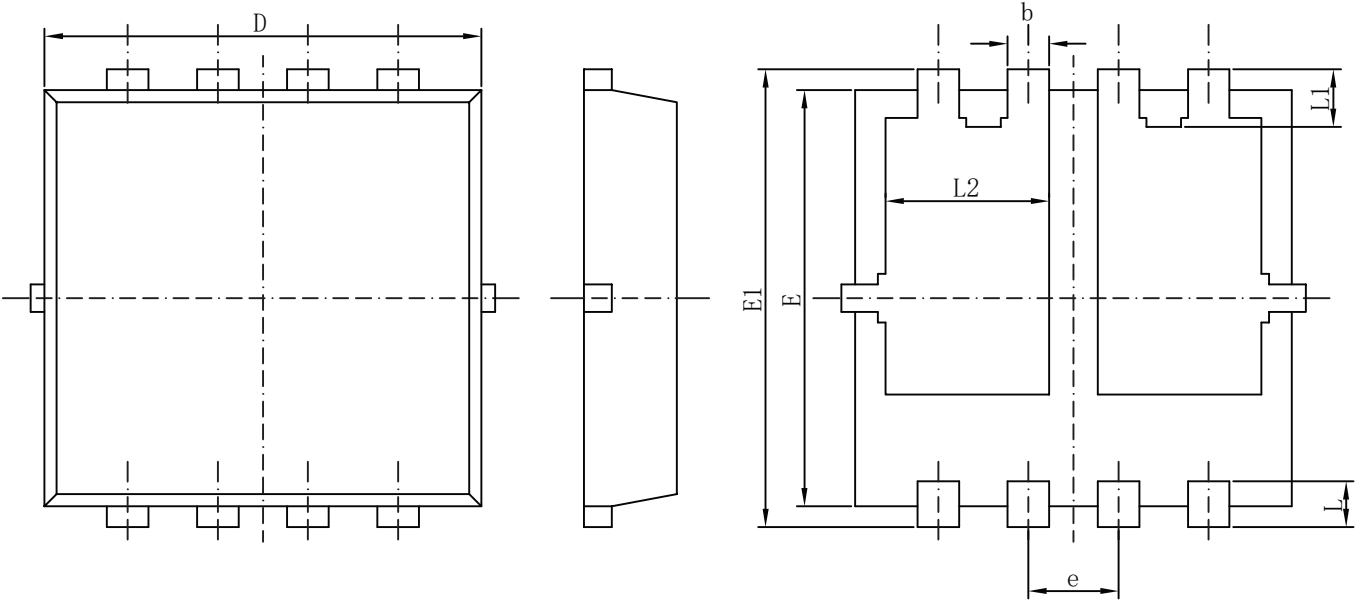


P-Channel:Typical Characteristics



Package Dimension

DFN-8 3.3x3.3 Unit :mm



- 注:
1. 未注公差 ± 0.10
 2. 塑封体无缺损、缩孔、裂纹、气泡等不良缺陷
 3. 标注单位mm

Dimensions In Millimeters			
Symbol	Min.	Max.	Ave.
A	0.700	0.900	0.800
D	3.000	3.200	3.100
E	3.000	3.200	3.100
E1	3.200	3.600	3.400
b	0.200	0.400	0.300
e	0.550	0.750	0.650
L	0.300	0.600	0.450
L1	0.395	0.695	0.545
L2	0.885	1.185	1.035