CMSC25NP06

60V, 36mΩ typ., 25A N-Channel MOSFET and -60V, 74mΩ typ., -15A P-Channel MOSFET

General Description

The CMSC25NP06 uses advanced trench technology MOSFETs to provide excellent RDS(ON) and low gate charge.The complementary MOSFETs may be used in Battery protection and other Switching Application.

Product Summary

	BVDSS	RDSON	ID
N-Channel	60V	42mΩ	25A
P-Channel	-60V	84mΩ	-15A

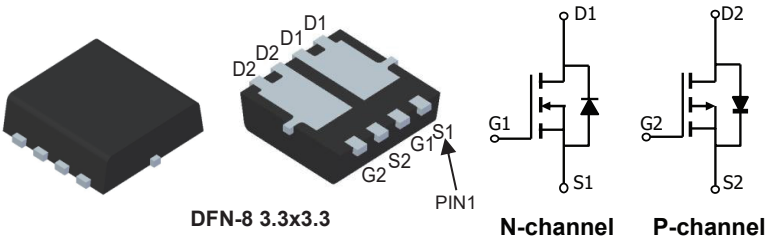
Applications

- Load switch
- Battery protection

Features

- N Channel+P Channel
- Low On-Resistance
- Surface Mount Package
- RoHS Compliant

DFN-8 3.3X3.3 Dual Pin Configuration



Type	Package	Marking
CMSC25NP06	DFN-8 3.3X3.3 Dual	25NP06

Absolute Maximum Ratings

Symbol	Parameter	Max N-channel	Max P-channel	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current	25	-15	A
I_D@T_C=100℃	Continuous Drain Current	17	-10	A
I_{DM}	Pulsed Drain Current	100	-60	A
EAS	Single Pulse Avalanche Energy [1]	20	27	mJ
P_D@T_C=25℃	Power Dissipation	35	30	W
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Characteristics: N-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	3.57	℃/W

60V, 36mΩ typ., 25A N-Channel MOSFET and -60V, 74mΩ typ., -15A P-Channel MOSFET

Thermal Characteristics: P-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambientt	---	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	4.17	℃/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	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	36	42	mΩ
		V_{GS}=4.5V , I_D=5A	---	40	48	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D = 250μA	1	---	3	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=60V , V_{GS}=0V , T_J=25℃	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=4.5A	---	19	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.5	---	Ω
Q_g	Total Gate Charge	V_{DD}=48V , I_D=5.5A V_{GS}=10V	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	2.2	---	
Q_{gd}	Gate-Drain Charge		---	4.3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=48V , V_{GS}=10V , R_G=2.5Ω I_D=5.5A	---	7	---	ns
T_r	Rise Time		---	13	---	
$T_{d(off)}$	Turn-Off Delay Time		---	18	---	
T_f	Fall Time		---	2.5	---	
C_{iss}	Input Capacitance	V_{DS}= 25V, V_{GS}=0V , f=1MHz	---	620	---	pF
C_{oss}	Output Capacitance		---	40	---	
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	---	---	25	A
$I_{S,pulse}$	Diode pulse current		---	---	100	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=20A , Tj=25℃	---	0.96	1.3	V

60V, 36mΩ typ., 25A N-Channel MOSFET and -60V, 74mΩ typ., -15A P-Channel MOSFET

P Channel Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250μA	-60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-10A	---	74	84	mΩ
		V_{GS}=-4.5V , I_D=-5A	---	93	110	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250μA	-1	---	-3	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-60V , V_{GS}=0V	---	---	-1	uA
		V_{DS}=-60V , V_{GS}=0V,T_J=125℃	---	---	-10	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-10A	---	11	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	12	---	Ω
Q_g	Total Gate Charge	V_{DS}=-30V, V_{GS}=-10V, I_D=-3A	---	19	---	nC
Q_{gs}	Gate-Source Charge		---	3.4	---	
Q_{gd}	Gate-Drain Charge		---	4.4	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-30V , V_{GS}=-10V, I_D =-3A R_G=3Ω	---	5	---	ns
T_r	Rise Time		---	23	---	
$T_{d(off)}$	Turn-Off Delay Time		---	34	---	
T_f	Fall Time		---	42	---	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , f=1MHz	---	880	---	pF
C_{oss}	Output Capacitance		---	50	---	
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		---	---	-60	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=-20A ,T_J=25℃	---	-1	-1.3	V

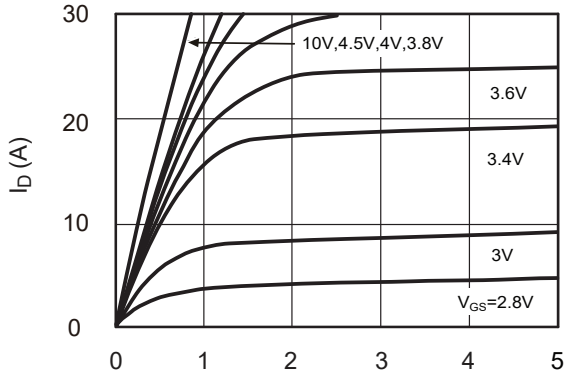
Note:

1. The EAS data shows Max. rating . The N-Channel test condition is V_{DD}=35V , V_{GS}=10V , L=0.3mH , I_{AS}=11.5A.
   The P-Channel test condition is V_{DD}=-35V , V_{GS}=-10V , L=0.3mH , I_{AS}=-13.5A.

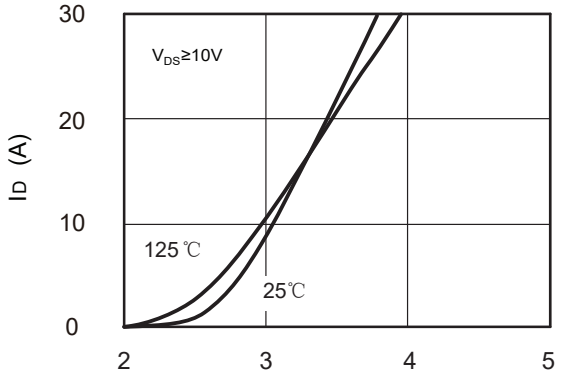
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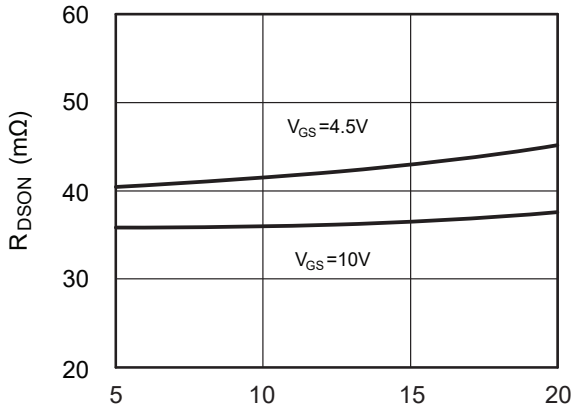
Typical Characteristics:N-Channel



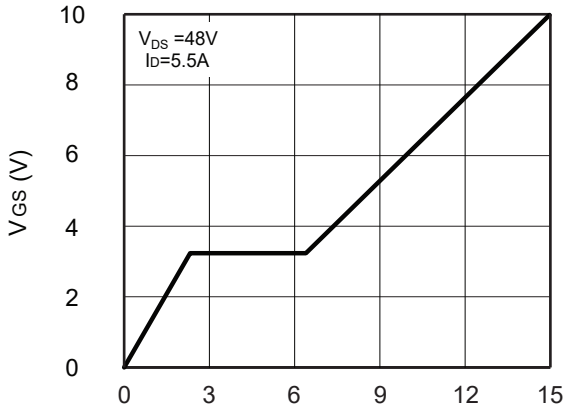
Output Characteristics



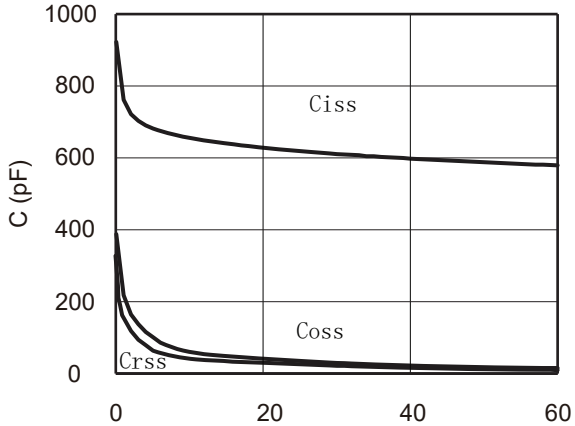
transfer characteristics



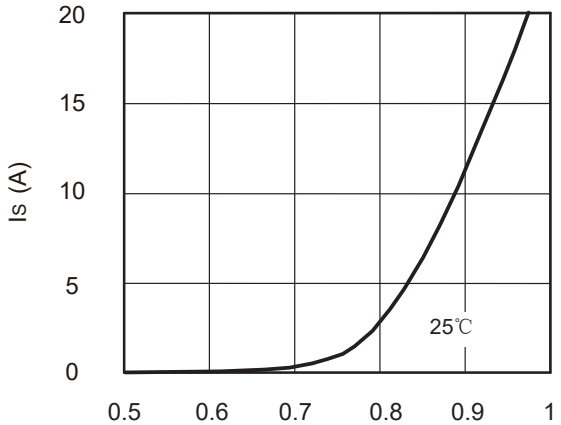
On-Resistance vs. Drain Current



Gate charge vs gate-source voltage



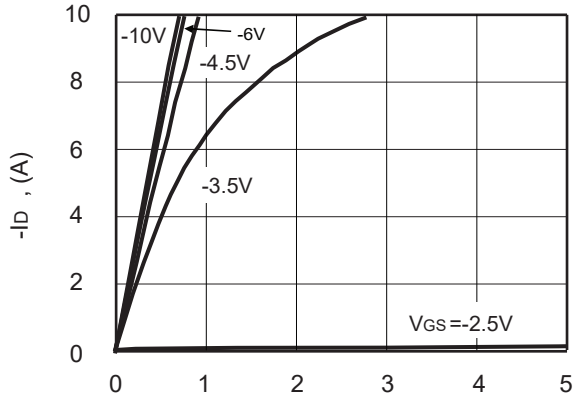
Capacitance Characteristics



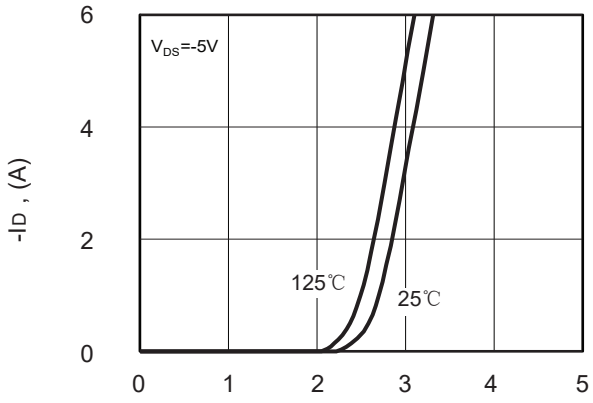
Body-Diode Characteristics

60V, 36mΩ typ., 25A N-Channel MOSFET and -60V, 74mΩ typ., -15A P-Channel MOSFET

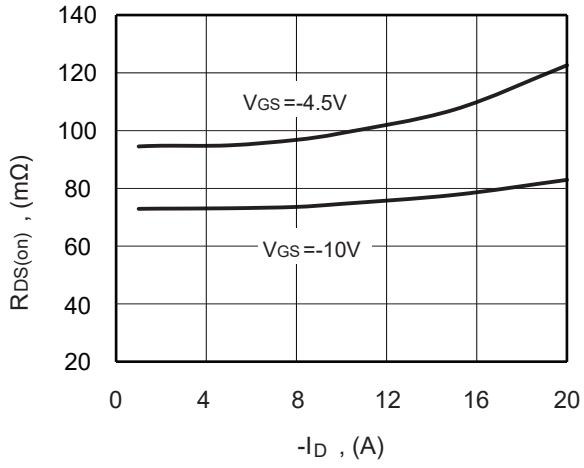
Typical Characteristics:P-Channel



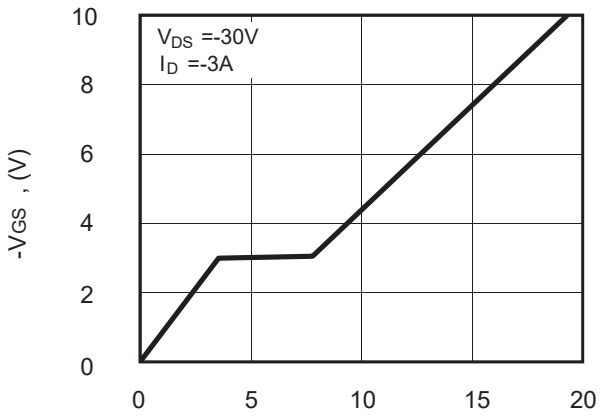
Output Characteristics



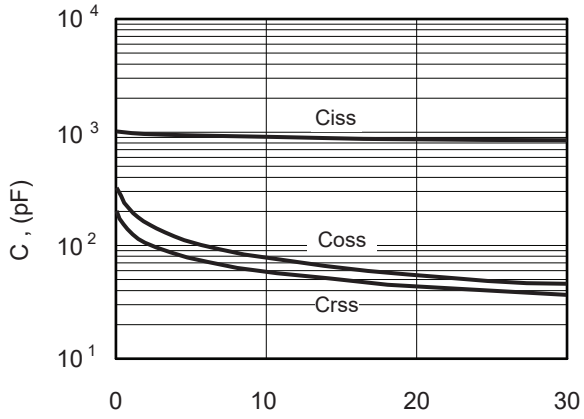
transfer characteristics



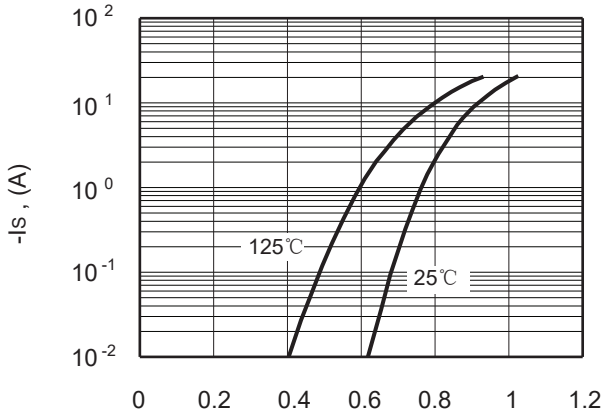
On-Resistance vs. Drain Current



Gate Charge Characteristics



Capacitance Characteristics

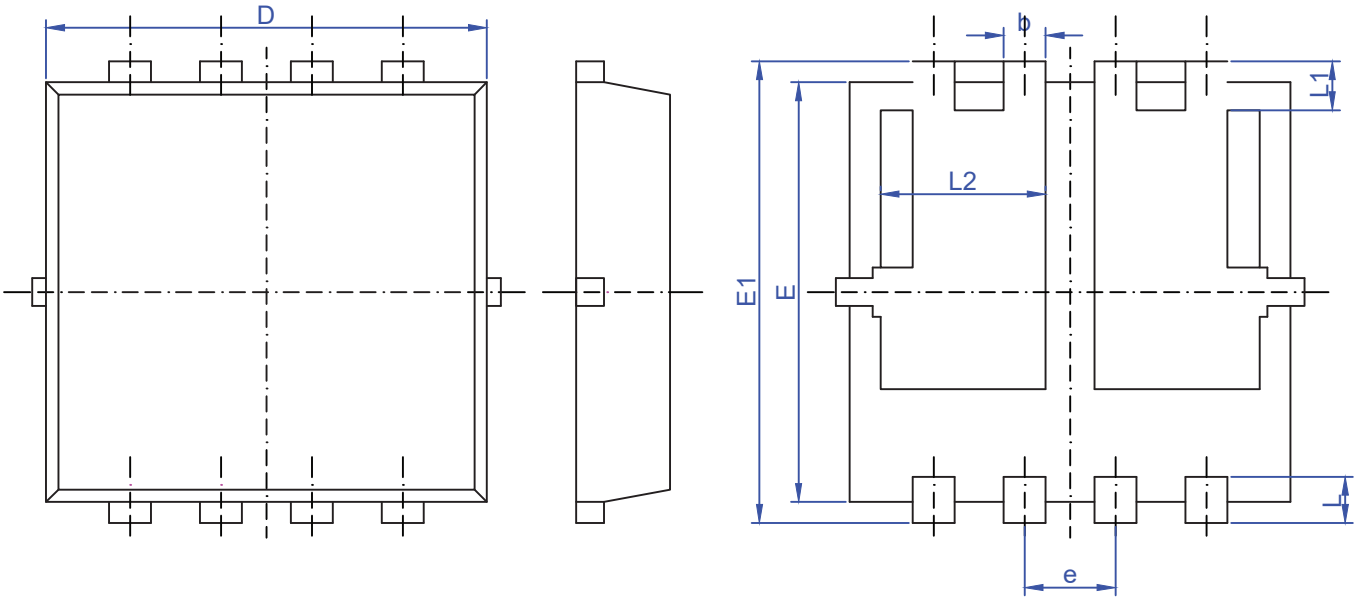


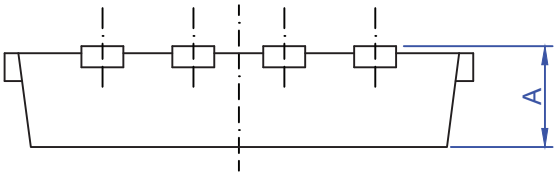
Body-Diode Characteristics

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Package Dimension

DFN-8 3.3X3.3 Dual Unit :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	0.250	0.650	0.450
L1	0.255	0.655	0.455
L2	0.935	1.135	1.035

Note:

1. No tolerance ±0.10
2. The plastic package has no defects such as defects, shrinkage holes, cracks, bubbles, etc.
3. Marking unit mm