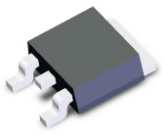
CMS16N06D-HF

N-Channel
RoHS Device
Halogen Free



Features

- Low reverse transfer capacitance.
- High switching speed.
- Improved dv/dt capability.
- 100% EAS guaranteed.
- Green device available.

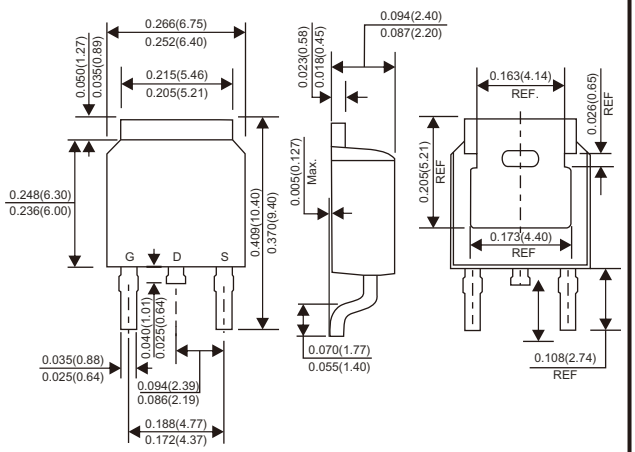
Mechanical data

- Case: D-PAK/TO-252 standard package, molded plastic.

Description

The CMS16N06D is the highest performance N-ch MOSFETs with super high dense cell density for extremely low $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications. The CMS16N06D meet the ROHS and Green Product require ment, 100% EAS guaranteed with full function reliability approved.

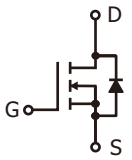
D-PAK(TO-252)



Dimensions in inches and (millimeters)

Circuit Diagram

- G : Gate
- D : Drain
- S : Source



Maximum Ratings (at T_A=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Value	Unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	V
Continuous drain current (Note 1)	T_C = 25°C	I_D	16	A
	T_C = 100°C	I_D	10	
Pulsed drain current (Note 1, 2)	T_C = 25°C	I_{DM}	64	A
Continuous drain current	T_A = 25°C	I_D	4.4	A
	T_A = 70°C	I_D	3.5	
Total power dissipation (Note 4)	T_C = 25°C	P_D	27	W
	T_A = 25°C	P_D	2	
Single pulse avalanche energy, L=0.1mH (Note 3)		E_{AS}	11	mJ
Single pulse avalanche current, L=0.1mH (Note 3)		I_{AS}	15	A
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +150	°C

Thermal Data

Parameter	Conditions	Symbol	Max. Value	Unit
Thermal resistance junction-ambient (Note 1)	Steady state	$R_{\theta JA}$	62.5	°C/W
Thermal resistance junction-case (Note 1)	Steady state	$R_{\theta JC}$	4.6	°C/W

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

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Drain-source breakdown voltage	BV_{DSS}	60			V	V_{GS} = 0, I_D = 250μA
Gate threshold voltage	$V_{GS(th)}$	1.0	1.8	2.5	V	V_{DS} = V_{GS}, I_D = 250μA
Gate-source leakage current	I_{GSS}			±100	nA	V_{GS} = ±20V
Drain-source leakage current	I_{DSS}			1	μA	V_{DS} = 60V, V_{GS} = 0
Static drain-source on-resistance (Note 2)	$R_{DS(on)}$		37	50	mΩ	V_{GS} = 10V, I_D = 8A
			42	60		V_{GS} = 4.5V, I_D = 4A
Total gate charge (Note 2)	Q_g		14		nC	I_D = 4A, V_{DS} = 30V, V_{GS} = 10V
Gate-source charge	Q_{gs}		2.9			
Gate-drain (“Miller”) change	Q_{gd}		2.3			
Turn-on delay time (Note 2)	$t_{d(on)}$		3.9		ns	V_{DS} = 30V, I_D = 1A, V_{GS} = 10V, R_G = 3.3Ω
Rise time	t_r		13			
Turn-off delay time	$t_{d(off)}$		23			
Fall time	t_f		6.7			
Input capacitance	C_{iss}		815		pF	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz
Output capacitance	C_{oss}		379			
Reverse transfer capacitance	C_{rss}		110			
Guaranteed avalanche characteristics						
Single pulse avalanche energy (Note 5)	EAS	3.2			mJ	V_{DD} = 25V, L = 0.1mH, I_{AS} = 8A
Source-drain diode						
Diode forward voltage (Note 2)	V_{SD}		0.73	1.0	V	I_S = 1A, V_{GS} = 0V, T_J = 25°C
Continuous source current (Note 1, 6)	I_S			16	A	

Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
3. The EAS data shows Max. rating. The test condition is VDD=25V, VGS=10V, L=0.1mH, IAS=15A.
4. The power dissipation is limited by 150°C junction temperature.
5. The min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

Rating and Characteristic Curves (CMS16N06D-HF)

Typical Characteristics

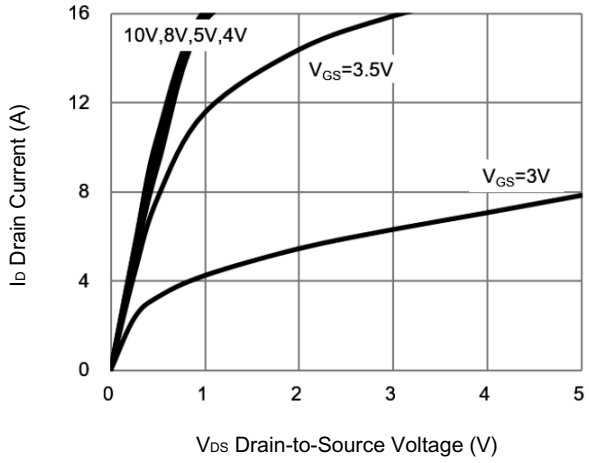


Fig.1 Typical Output Characteristics

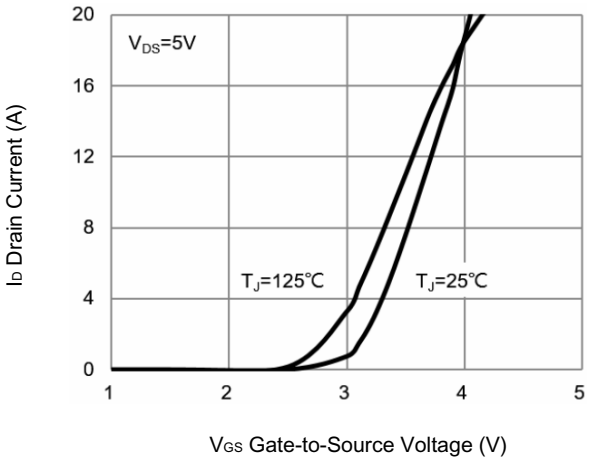


Fig.2 Transfer Characteristics

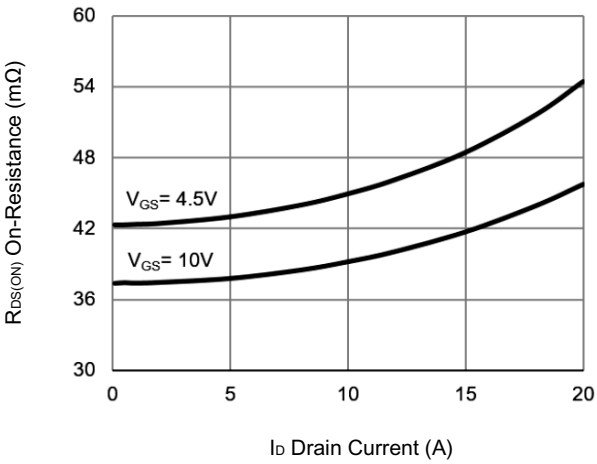


Fig.3 On-Resistance vs. Drain Current

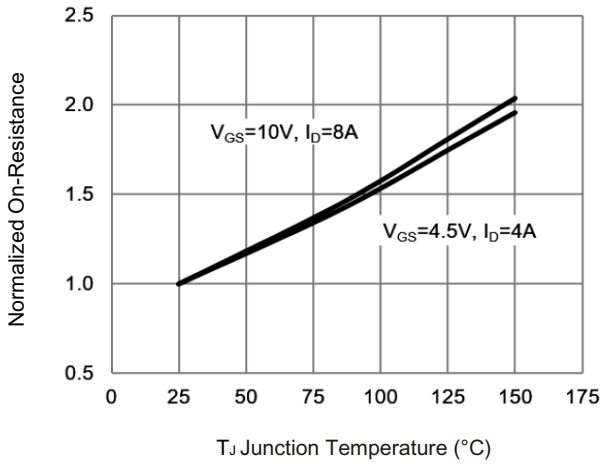


Fig.4 Normalized RDSON vs. TJ

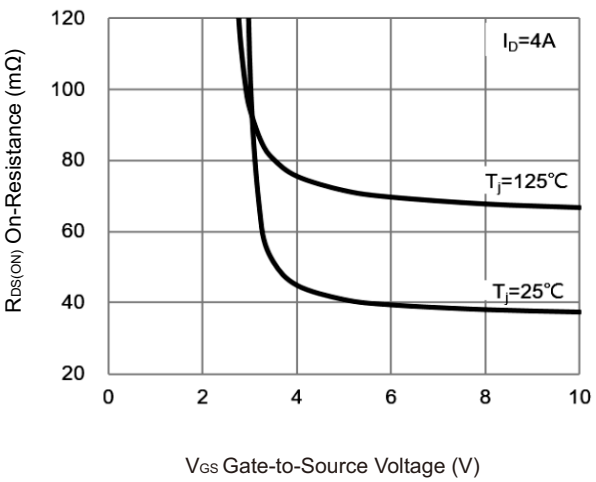


Fig.5 On-Resistance vs. G-S Voltage

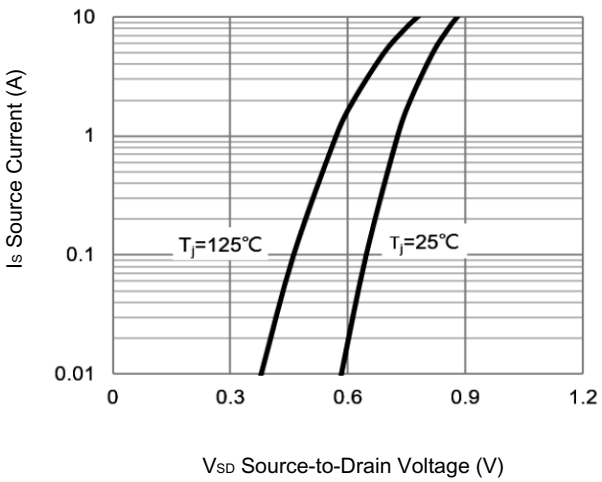


Fig.6 Forward Characteristics of Reverse

Rating and Characteristic Curves (CMS16N06D-HF)

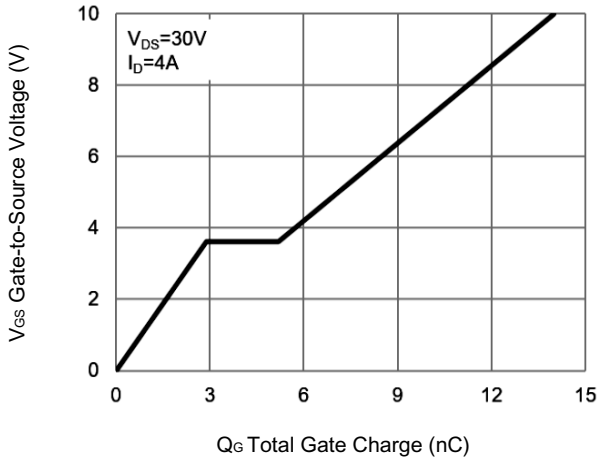


Fig.7 Gate Charge Characteristics

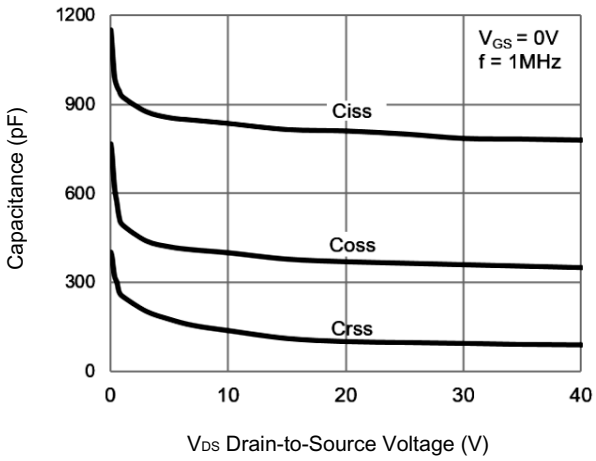


Fig.8 Capacitance Characteristics

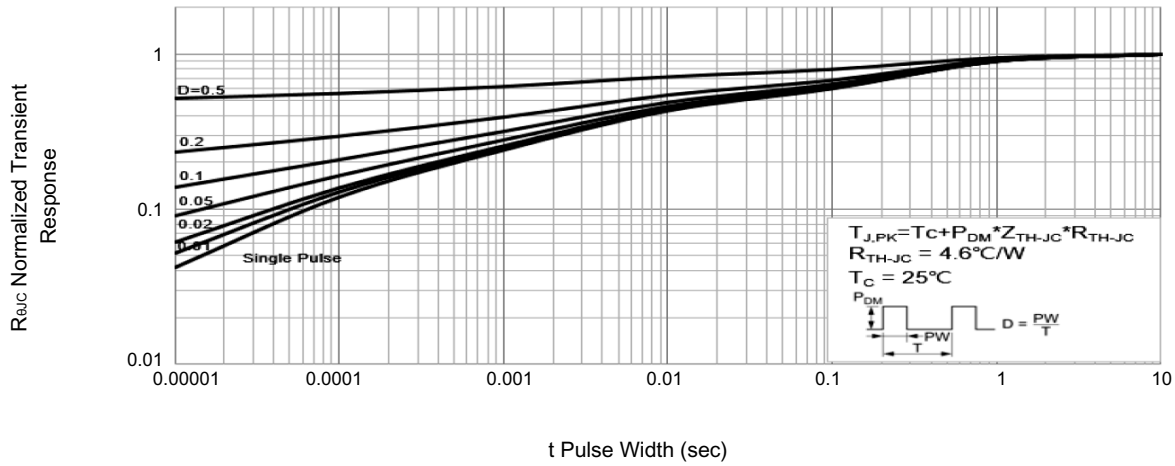


Fig.9 Normalized Maximum Transient Thermal Impedance

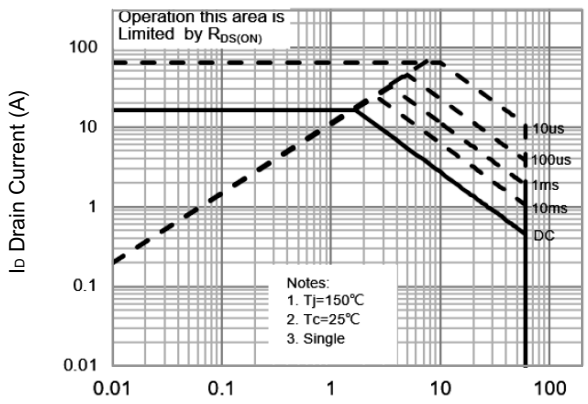


Fig.10 Safe Operating Area

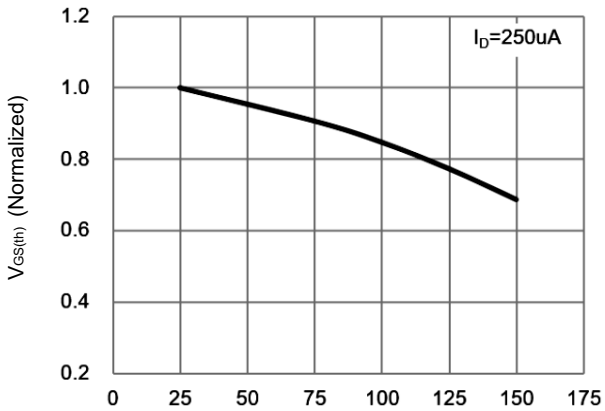
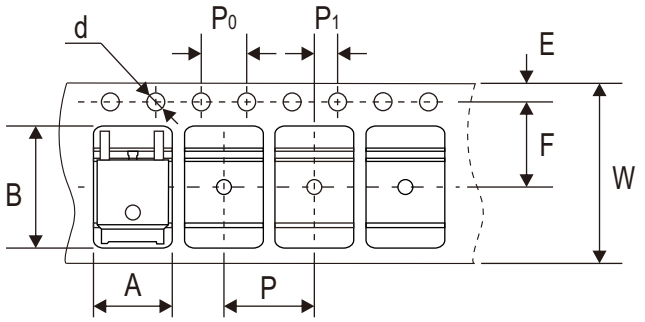
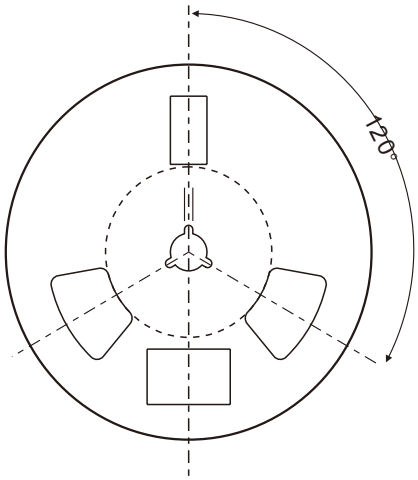
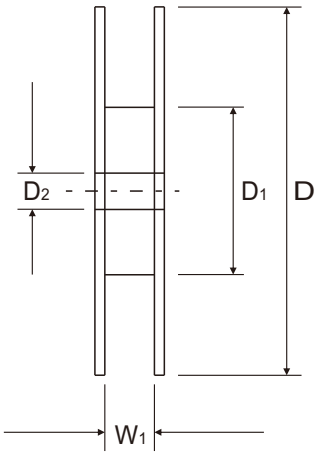


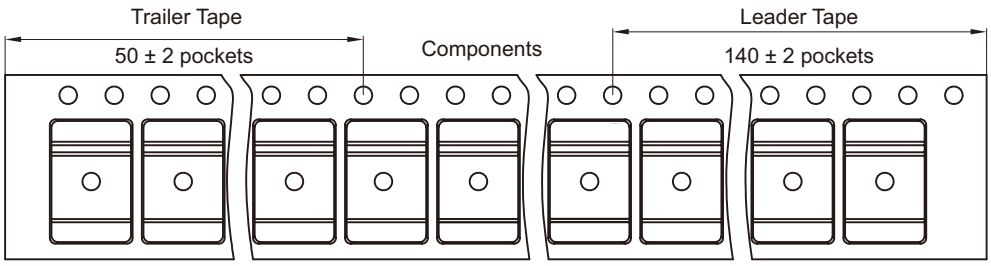
Fig.11 Normalized $V_{GS(th)}$ vs. Temperature

Reel Taping Specification







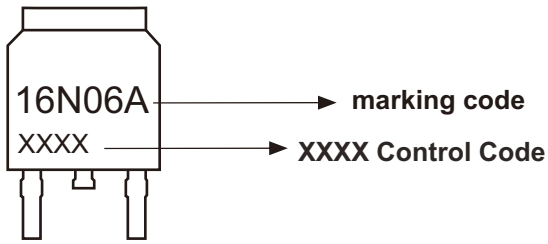


	SYMBOL	A	B	C	d	D	D1	D2
TO-252 (D-PAK)	(mm)	6.90 ± 0.10	10.50 ± 0.10	2.78 ± 0.10	1.50 ± 0.10	330 ± 1.00	100.00 ± 0.50	13.20 ± 0.20
	(inch)	0.272 ± 0.004	0.413 ± 0.004	0.109 ± 0.004	0.059 ± 0.004	12.992 ± 0.039	3.937 ± 0.020	0.520 ± 0.008

	SYMBOL	E	F	P	P0	P1	T	W	W1
TO-252 (D-PAK)	(mm)	1.75 ± 0.10	7.50 ± 0.10	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.25 ± 0.02	16.00 ± 0.10	16.40 ± 0.02
	(inch)	0.069 ± 0.004	0.295 ± 0.004	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.010 ± 0.001	0.630 ± 0.004	0.646 ± 0.01

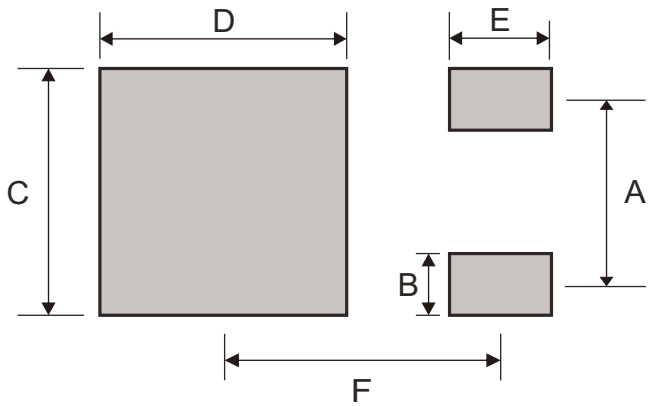
Marking Code

Part Number	Marking Code
CMS16N06D-HF	16N06A



Suggested P.C.B. PAD Layout

SIZE	TO-252 / DPAK	
	(mm)	(inch)
A	4.60	0.181
B	1.40	0.055
C	6.00	0.236
D	6.50	0.256
E	3.00	0.118
F	6.25	0.246



Note: 1. The pad layout is for reference purposes only.

Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	REEL SIZE (inch)
TO-252/D-PAK	2,500	13