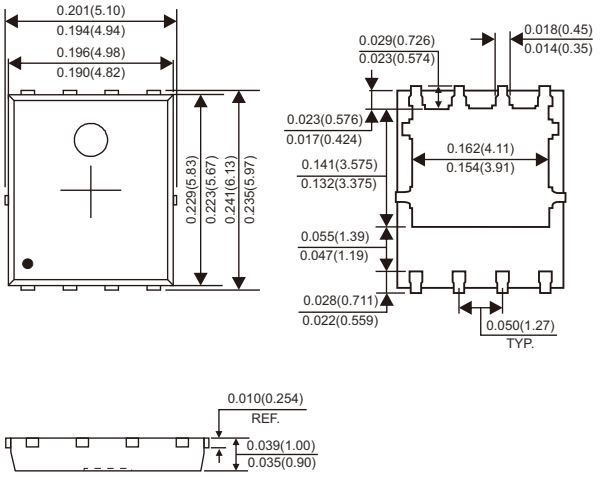
CMS13N06H8-HF

N-Channel
RoHS Device
Halogen Free

BV_{DSS}	60V
I_D@V_{GS}=10V, T_C=25°C	56A
I_D@V_{GS}=10V, T_A=25°C	13.8A
$R_{DS(ON)}$@ V_{GS}=10V, I_D=25A	5.1mΩ(typ)
$R_{DS(ON)}$@ V_{GS}=4.5V, I_D=25A	7.4mΩ(typ)

PDFN5x6-8L



Dimensions in inches and (millimeter)

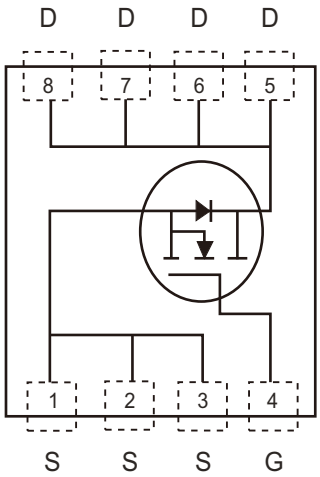
Features

- Single drive requirement.
- Low On-resistance.
- Fast switching characteristic.
- Repetitive avalanche rated.

Mechanical data

- Case : PDFN5x6-8L, molded plastic.
- Epoxy : UL 94V-0 rated flame retardant.
- Lead: Pure tin plated.

Circuit Diagram



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

Parameter		Symbol	10s	Steady State	Unit
Drain-source voltage		V_{DS}	60		V
Gate-source voltage		V_{GS}	±20		V
Drain current-continuous @ T_C=25°C,V_{GS}=10V (silicon limit) (Note 1)		I_D	80		A
Continuous drain current @ T_C=25°C,V_{GS}=10V (package limit) (Note 1)			56		A
Continuous drain current @ T_C=100°C,V_{GS}=10V (Note 1)			35		A
Continuous drain current @ T_A=25°C,V_{GS}=10V (Note 2)		I_{DSM}	20.8	13.8	A
Continuous drain current @ T_A=70°C,V_{GS}=10V (Note 2)			16.6	11.0	A
Continuous drain current @ T_A=85°C,V_{GS}=10V (Note 2)			15.0	9.9	A
Pulsed drain current (Note 3)		I_{DM}	224 * 1		A
Avalanche current (Note 3)		I_{AS}	40		A
Avalanche energy @ L=0.1mH, I_D=40A, V_{DD}=30V (Note 2,4)		E_{AS}	80		mJ
Repetitive avalanche energy @ L=0.05mH (Note 3)		E_{AR}	10 * 2		
Total power dissipation	T_C=25°C (Note 1)	P_D	83		W
	T_C=100°C (Note 1)		33		
	T_A=25°C (Note 2)	P_{DSM}	5.7	2.5	
	T_A=70°C (Note 2)		4.0	1.8	
	T_A=85°C (Note 2)		3.6	1.6	
Operating temperature range		TJ	-55~+150		°C
Storage temperature range		T_{STG}	-55 to +150		°C

Thermal Data

Parameter		Symbol	Typical	Maximum	Unit
Thermal resistance, junction to ambient (Note 2)	t≤10s	$R_{\theta JA}$	18	22	°C/W
	Steady state		42	50	°C/W
Thermal resistance	junction to case	$R_{\theta JC}$	1.4	1.5	°C/W

Notes: 1. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C .

4. 100% tested by conditions of L=0.1mH, I_{AS}=10A, V_{GS}=10V, V_{DD}=30V .

Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	60			V
Gate-threshold voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(th)}$	1.4		2.6	V
Forward transconductance (Note 1)	V_{DS} = 10V, I_D = 30A	G_{FS}		30		S
Gate-Source leakage current	V_{GS} = ±20V	I_{GSS}			±100	nA
Zero gate voltage drain current	V_{DS} = 48V, V_{GS} = 0V	I_{DSS}			1	μA
	V_{DS} = 48V, V_{GS} = 0V, T_J = 125°C	I_{DSS}			25	
Static drain-source on-resistance (Note 1)	V_{GS} = 10V, I_D = 25A	$R_{DS(ON)}$		5.1	6.4	mΩ
	V_{GS} = 4.5V, I_D = 25A			7.4	9.6	
Dynamic						
Input capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	C_{iss}		1619		pF
Output capacitance		C_{oss}		275		
Reverse transfer capacitance		C_{rss}		143		
Total gate charge (Note 1,2)	V_{DS} = 48V, V_{GS} = 10V, I_D = 25A	Q_g		42.8		nC
Gate-source charge (Note 1,2)		Q_{gs}		5.8		
Gate-drain charge (Note 1,2)		Q_{gd}		15.6		
Turn-on delay time (Note 1,2)	V_{DS} = 30V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω	$t_{d(on)}$		15.2		ns
Turn-on rise time (Note 1,2)		t_r		22.4		
Turn-off delay time (Note 1,2)		$t_{d(off)}$		74		
Turn-off fall time (Note 1,2)		t_f		36		
Gate resistance	f =1MHz	Rg		4		
Source-Drain Diode						
Drain-source diode forward current (Note 1)		I_S			56	A
Pulse diode forward current (Note 3)		I_{SM}			224	
Drain-source diode forward voltage (Note 1)	V_{GS} = 0V, I_S = 25A	V_{SD}		0.82	1.2	V
Body Diode Reverse Recovery Time	I_F = 25A, dI_F/d_t = 100A/μs	trr		18		nS
Body Diode Reverse Recovery Charge		Qrr		12		nC

Notes: 1. Pulse test : Pulse width ≤300μs, Duty cycle ≤ 2%.
2. Independent of operating temperature.
3. Pulse width limited by maximum junction temperature.

Rating and Characteristic Curves (CMS13N06H8-HF)

Fig.1 - Typical Output Characteristics

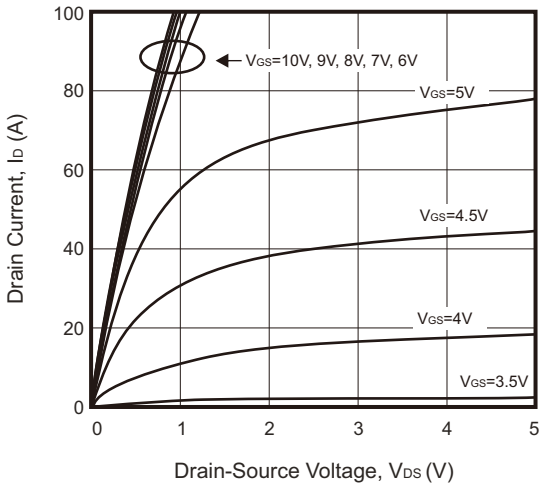


Fig.2 - Static Drain-Source On-State Resistance VS Drain Current

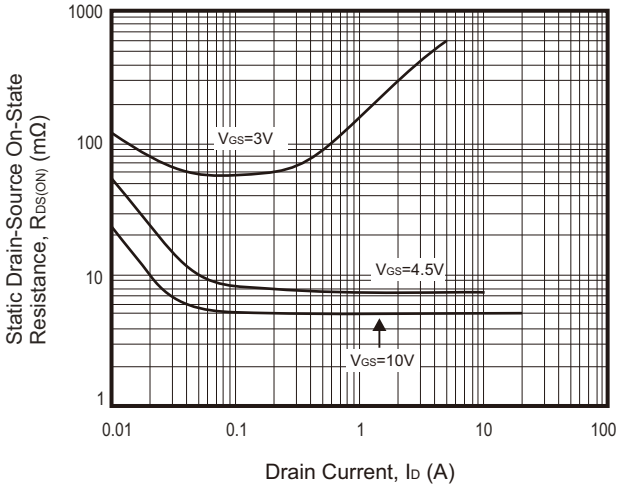


Fig.3 - Static Drain-Source On-State Resistance VS Gate-Source Voltage

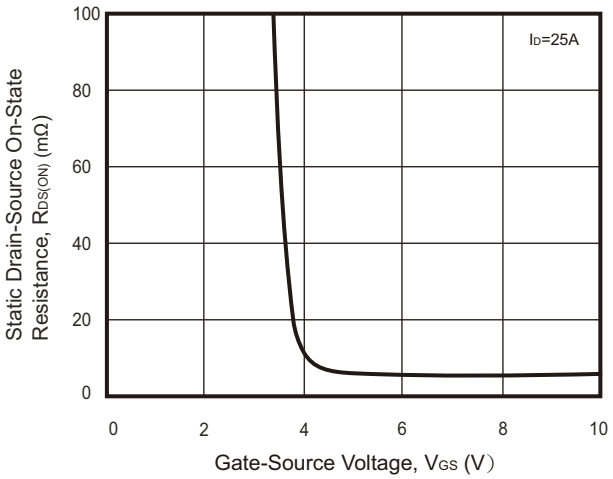


Fig.4 - Capacitance VS Drain-Source Voltage

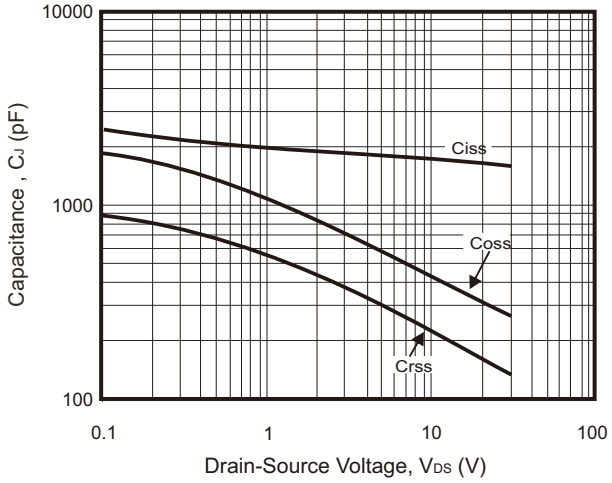


Fig.5 - Forward Transfer Admittance VS Drain Current

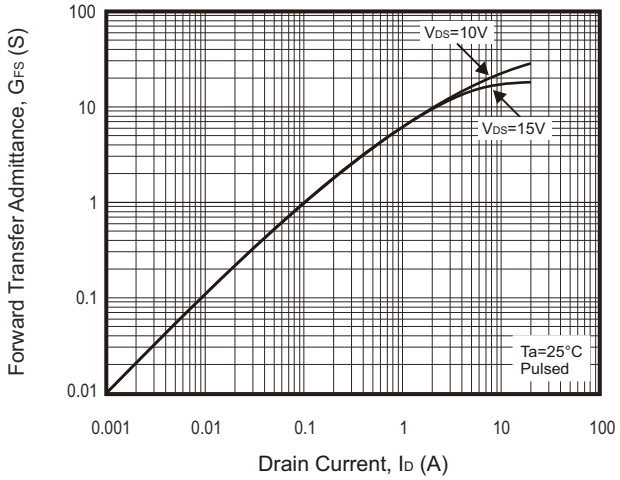
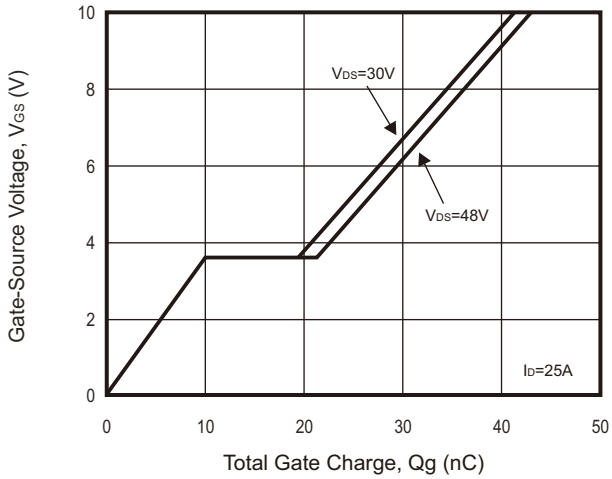
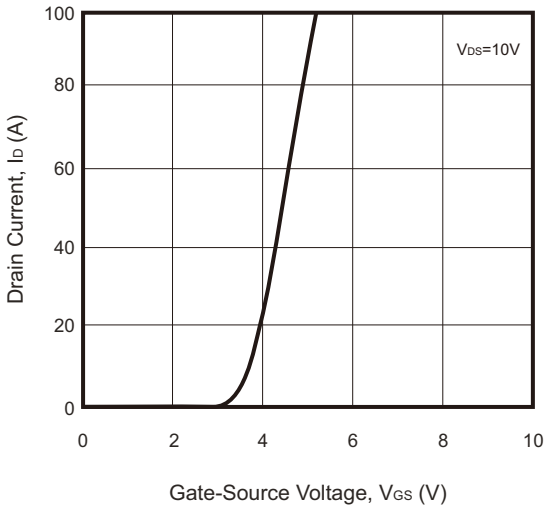


Fig.6 - Gate Charge Characteristics

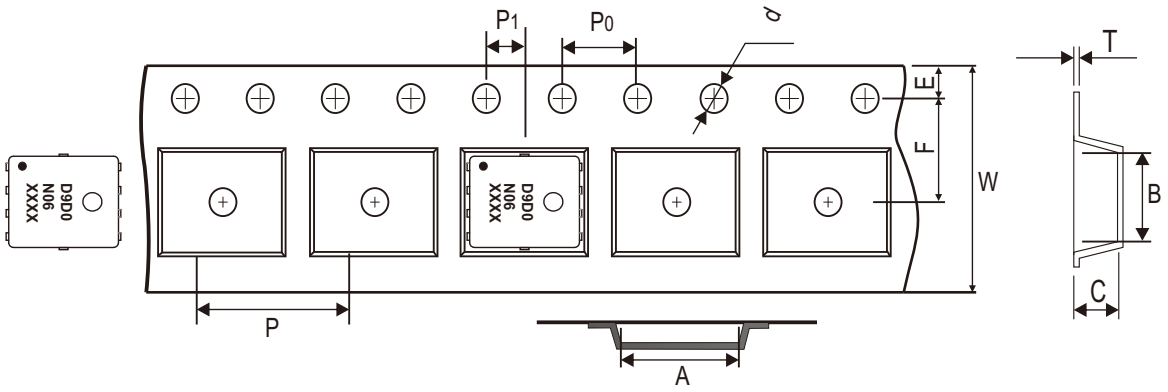


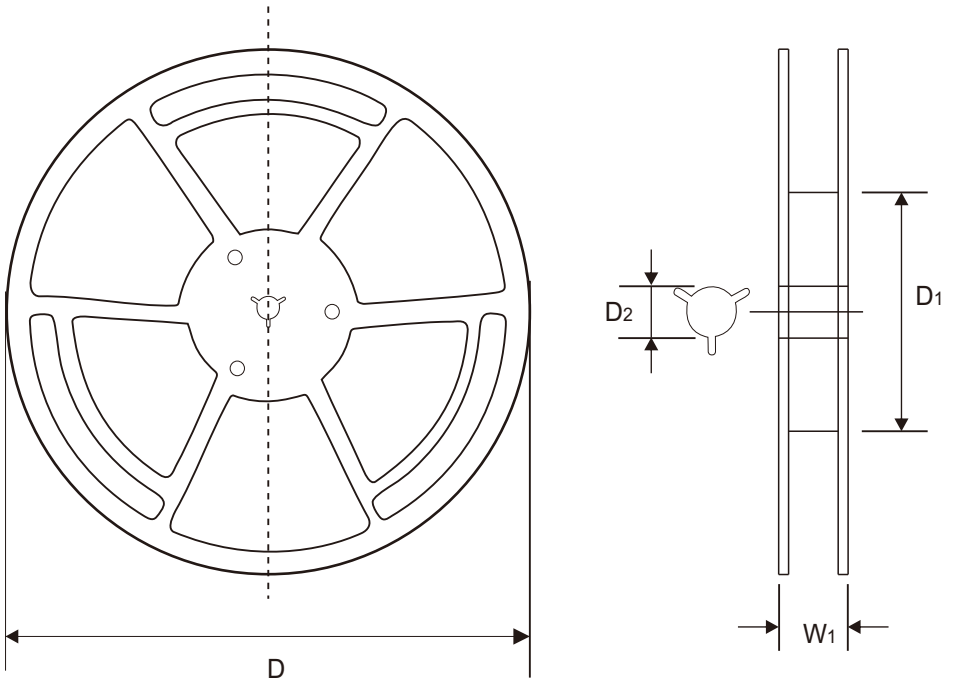
Rating and Characteristic Curves (CMS13N06H8-HF)

Fig.7 - Typical Transfer Characteristics



Reel Taping Specification



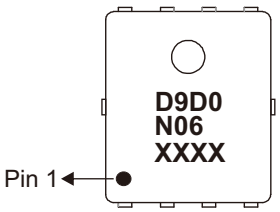


	SYMBOL	A	B	C	d	D	D1	D2
PDFN5x6 8L	(mm)	6.30 ± 0.10	5.30 ± 0.10	1.10 ± 0.10	1.50 + 0.10 - 0.00	330.00 ± 1.00	100.00 ± 0.50	13.00 ± 0.20
	(inch)	0.248 ± 0.004	0.209 ± 0.004	0.043 ± 0.004	0.059 + 0.004 - 0.000	12.992 ± 0.039	3.937 ± 0.020	0.512 ± 0.008

	SYMBOL	E	F	P	P0	P1	T	W	W1
PDFN5x6 8L	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.25 ± 0.02	12.00 + 0.30 - 0.10	17.60 + 1.00 - 0.00
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.010 ± 0.001	0.472 + 0.012 - 0.004	0.693 + 0.039 - 0.000

Marking Code

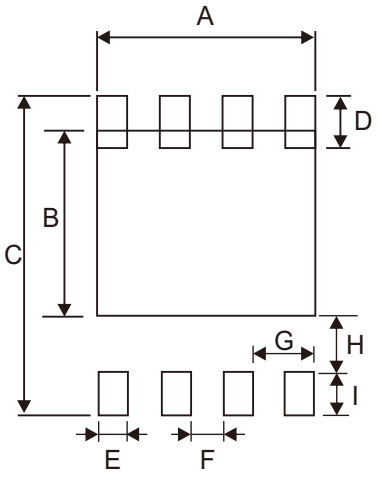
Part Number	Marking Code
CMS13N06H8-HF	D9D0N06



XXXX = Control code

Suggested P.C.B. PAD Layout

SIZE	PDFN5x6-8L	
	(mm)	(inch)
A	4.42	0.174
B	3.81	0.150
C	6.61	0.260
D	1.02	0.040
E	0.61	0.024
F	0.66	0.026
G	1.27	0.050
H	1.23	0.048
I	0.86	0.034



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
PDFN5x6-8L	3,000	13