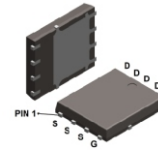


## CMS23N06H8-HF

**N-Channel  
RoHS Device  
Halogen Free**



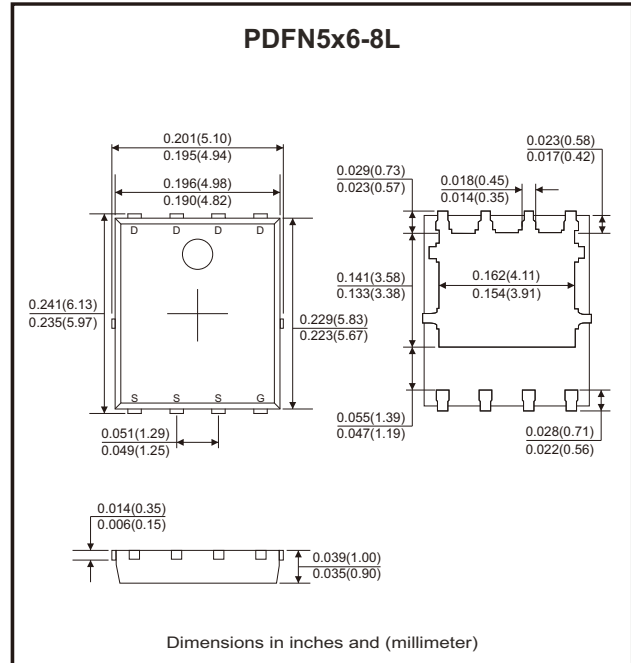
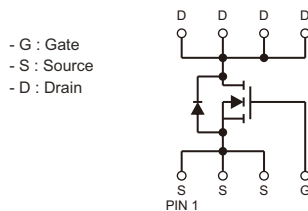
### Features

- Ultra-low on-resistance and gate-charge.
- Advanced shielded-gate technology.

### Mechanical data

- Case: PDFN5x6-8L, molded plastic.
- Molding compound: UL flammability classification rating 94V-0.
- Terminals: Matte tin-plated leads, solderability-per MIL-STD-202, method 208.

### Circuit Diagram



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

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DSS}$	60	V
Gate-source voltage	$V_{GSS}$	±20	V
Continuous drain current (Tc=25°C, silicon limited) (Note 1)	$I_D$	125	A
Continuous drain current (Tc=100°C, silicon limited) (Note 1)	$I_D$	79	
Continuous drain current (TA=25°C, silicon limited) (Note 2, 3)	$I_D$	23	
Continuous drain current (TA=100°C, silicon limited) (Note 2, 3)	$I_D$	14	
Pulsed drain current (tp=1ms) (Note 4)	$I_{DM}$	370	A
Single pulse avalanche energy (Note 5)	$E_{AS}$	110	mJ
Avalanche current (Note 6)	$I_{AS}$	40	A
Power dissipation (Tc=25°C)	$P_D$	86	W
Thermal resistance junction to case	$R_{\theta JC}$	1.45	°C/W
Thermal resistance junction to air (Note 3)	$R_{\theta JA}$	45	°C/W
Operating junction temperature range	$T_J$	-55 to +150	°C
Storage temperature range	$T_{STG}$	-55 to +150	°C

- Notes: 1. Rated according to  $R_{\theta JC}$ .  
 2. Rated according to  $R_{\theta JA}$ .  
 3. Surge-mounted on 1 inch<sup>2</sup> FR4 board, 2oz Cu.  
 4. Limited by maximum  $T_J$ .  
 5. Starting  $T_J=25^\circ\text{C}$ ,  $V_{DD}=30\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.1\text{mH}$ .  
 6. Pulse width limited by maximum  $T_J$ .

## Electrical Characteristics (at T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	60			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V			1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
<b>On Characteristics</b>						
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A		2.6	3.1	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A		3.5	4.4	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.8	2.5	V
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 30A		92		S
Gate resistance	R <sub>g</sub>	f = 1MHz		1		Ω
<b>Dynamic Characteristics</b>						
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz		3467		pF
Output capacitance	C <sub>oss</sub>			1400		
Reverse transfer capacitance	C <sub>rss</sub>			50		
Total gate charge	Q <sub>g</sub>	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A		64		nC
Gate to source charge	Q <sub>gs</sub>			8		
Gate to drain (miller) charge	Q <sub>gd</sub>			12		
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = 15A		23		ns
Turn-on rise time	t <sub>r</sub>			62		
Turn-off delay time	t <sub>d(off)</sub>			105		
Turn-off fall time	t <sub>f</sub>			28		
<b>Source-Drain Diode Characteristics</b>						
Diode forward voltage	V <sub>SD</sub>	I <sub>S</sub> = 30A, V <sub>GS</sub> = 0V		0.8		V
Reverse recovery time	t <sub>rr</sub>	I <sub>S</sub> = 30A, V <sub>GS</sub> = 0V, di/dt = 100A/μs T <sub>b</sub> = 25%		55		ns
Reverse recovery charge	Q <sub>rr</sub>				80	

## Rating and Characteristic Curves (CMS23N06H8-HF)

Fig.1 - Output Characteristics

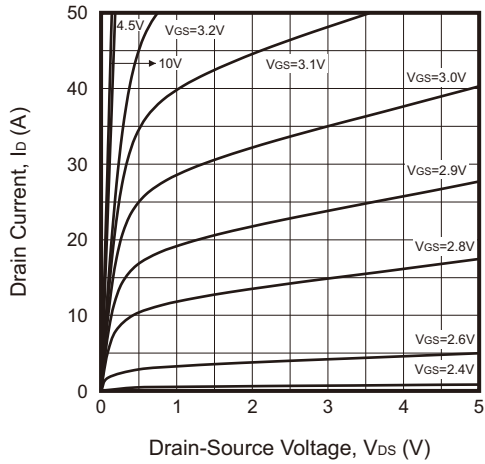


Fig.2 - On-Resistance vs. Drain Current

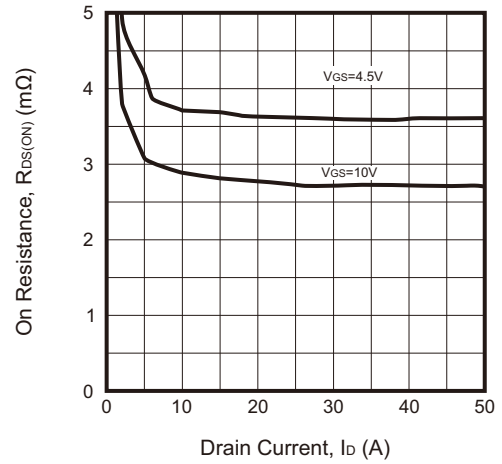


Fig.3 - On-Resistance vs. Gate-Source Voltage

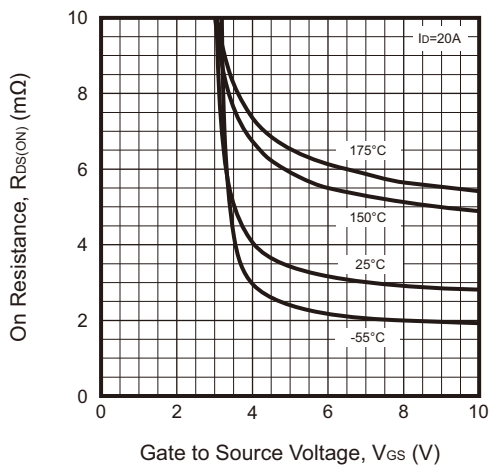


Fig.4 - Body-Diode Characteristics

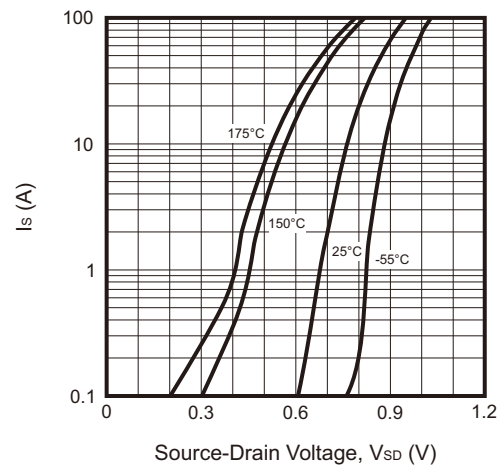


Fig.5 - Capacitance Characteristics

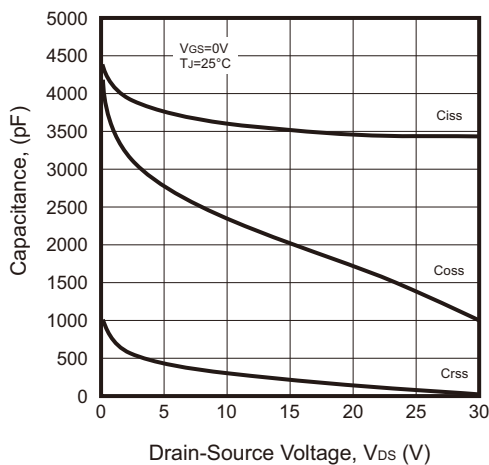
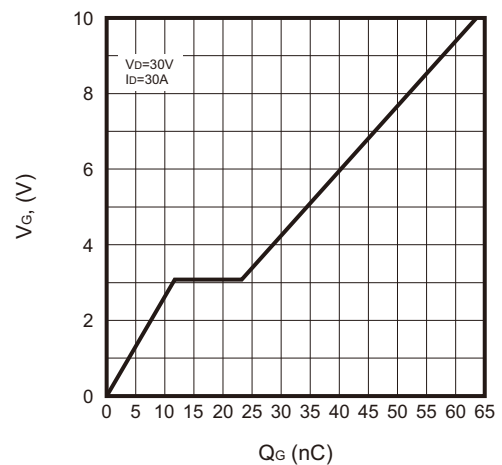


Fig.6 - Gate-Charge Characteristics



## Rating and Characteristic Curves (CMS23N06H8-HF)

Fig.7 - Transfer Characteristics

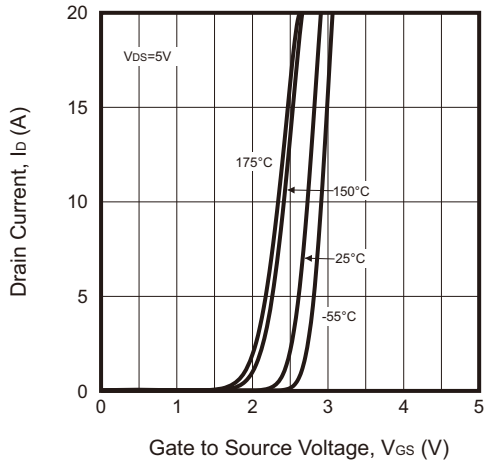


Fig.8 - Normalized  $R_{DS(ON)}$  vs  $T_J$

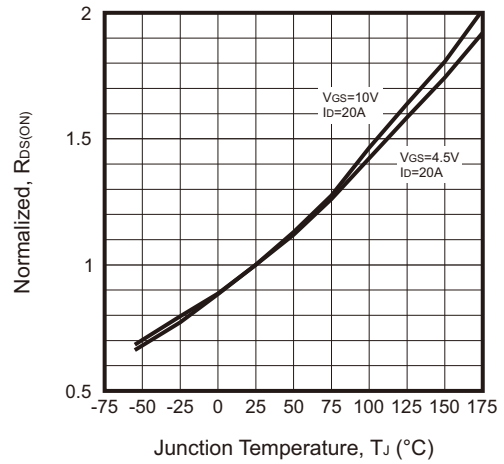


Fig.9 - Normalized  $V_{GS(th)}$  vs  $T_J$

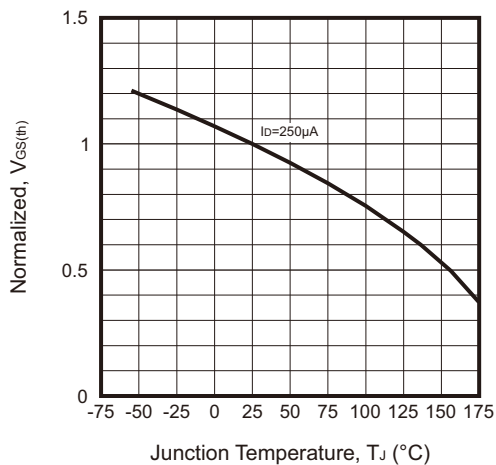


Fig.10 -  $BV_{DSS}$  vs  $T_J$

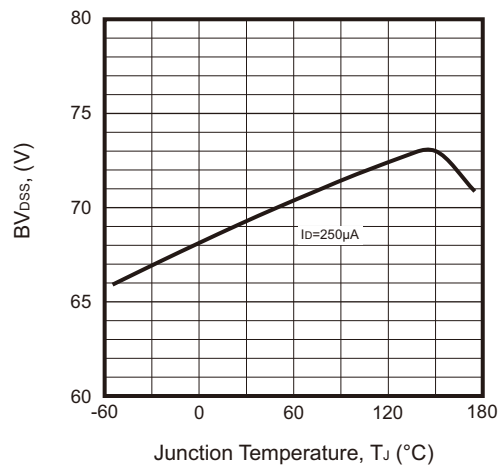
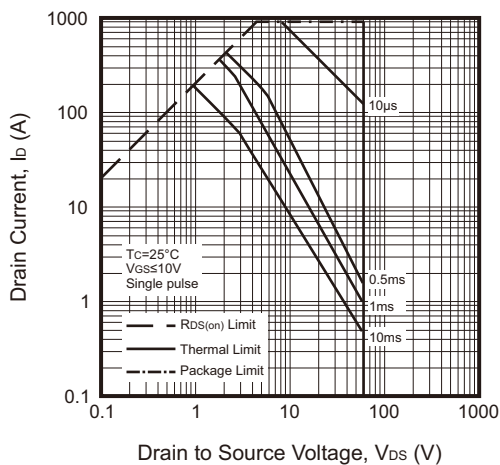
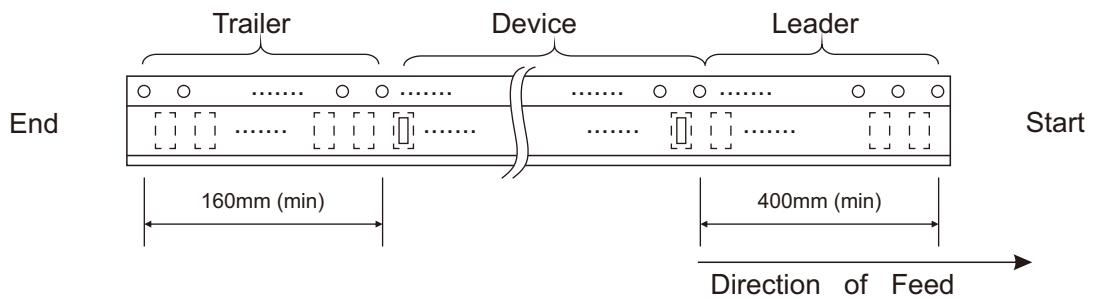
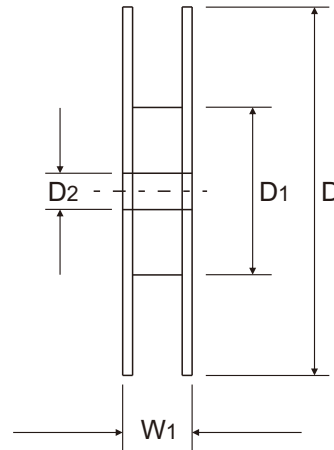
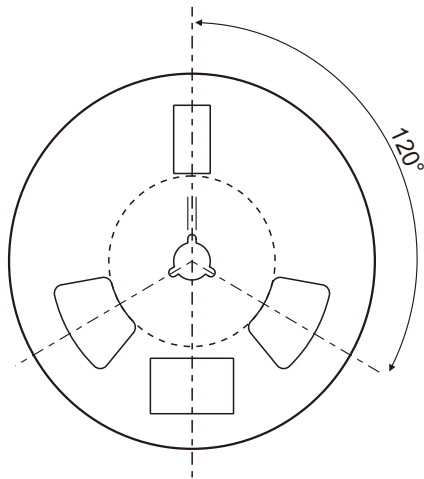
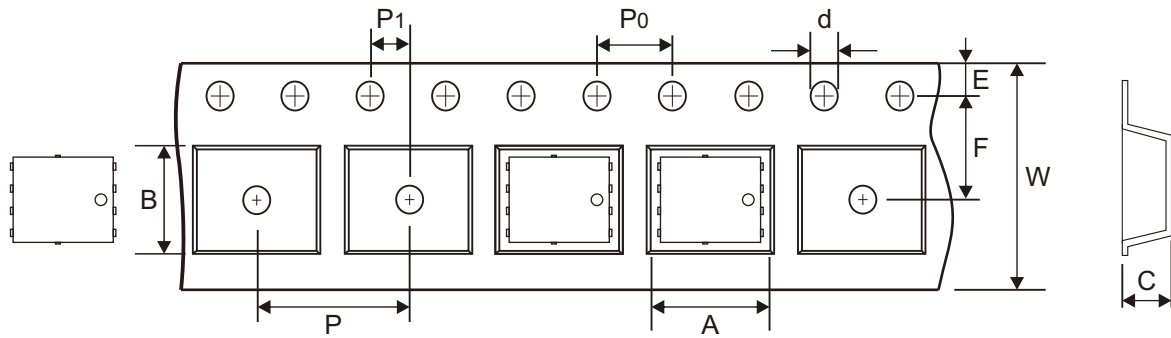


Fig.11 - Maximum Safe Operating Area



Reel Taping Specification



PDFN5x6 -8L	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	$6.30 \pm 0.10$	$5.30 \pm 0.10$	$1.20 \pm 0.10$	$1.55 + 0.01$	$330 \pm 1.00$	$100 \pm 1.00$	$13.00 \pm 0.20$
	(inch)	$0.248 \pm 0.004$	$0.209 \pm 0.004$	$0.047 \pm 0.004$	$0.061 + 0.0004$	$12.992 \pm 0.039$	$3.937 \pm 0.039$	$0.512 \pm 0.008$
PDFN5x6 -8L	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	$1.75 \pm 0.10$	$5.50 \pm 0.10$	$8.00 \pm 0.10$	$4.00 \pm 0.10$	$2.00 \pm 0.05$	$12.00 + 0.30$ $- 0.10$	$17.80 \pm 0.30$
	(inch)	$0.069 \pm 0.004$	$0.217 \pm 0.004$	$0.315 \pm 0.004$	$0.157 \pm 0.004$	$0.079 \pm 0.002$	$0.472 + 0.012$ $- 0.004$	$0.701 \pm 0.012$

## Marking Code

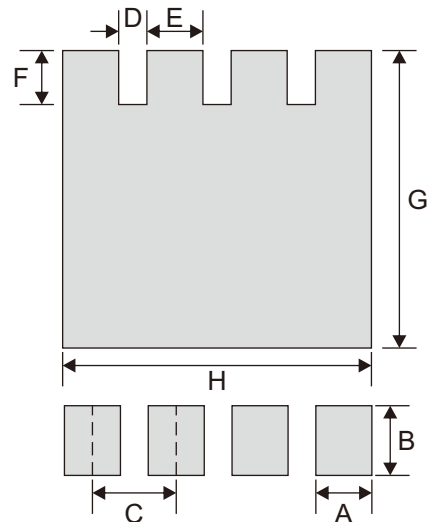
Part Number	Marking Code
CMS23N06H8-HF	031N06T



XXX = Control code

## Suggested P.C.B. PAD Layout

SIZE	PDFN5x6-8L	
	(mm)	(inch)
A	0.80	0.031
B	1.00	0.039
C	1.27	0.050
D	0.47	0.019
E	0.80	0.031
F	0.85	0.033
G	4.50	0.177
H	4.60	0.181



## Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
PDFN5x6-8L	5,000	13