

# CMS80N03H8-HF

N-Channel  
RoHS Device  
Halogen Free

## Features

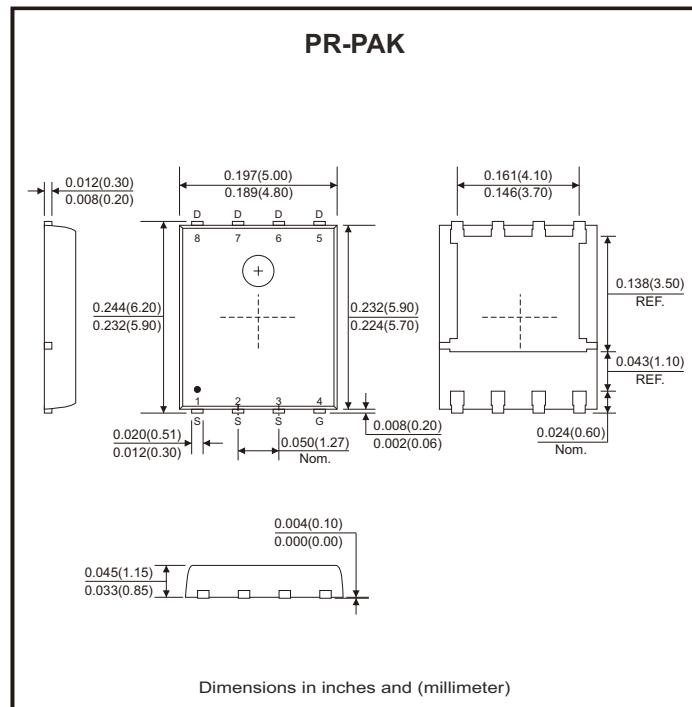
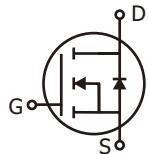
- Advanced high cell density trench technology
- Super low gate charge.
- Excellent CdV/dt effect decline.
- 100% EAS and Rg guaranteed.
- Green device available.

## Mechanical data

- Case: PR-PAK

## Circuit Diagram

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



## Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Drain-source voltage		V <sub>DS</sub>	30	V
Gate-source voltage		V <sub>GS</sub>	±20	V
Continuous drain current (Note 1)	T <sub>c</sub> = 25°C	I <sub>D</sub>	80	A
	T <sub>c</sub> = 100°C	I <sub>D</sub>	50	
Pulsed drain current (Note 1, 2)		I <sub>DM</sub>	160	A
Total power dissipation (Note 4)	T <sub>c</sub> = 25°C	P <sub>D</sub>	53	W
	T <sub>A</sub> = 25°C	P <sub>D</sub>	2	
Single pulse avalanche energy, L=0.1mH (Note 3)		E <sub>AS</sub>	88	mJ
Single pulse avalanche current, L=0.1mH (Note 3)		I <sub>AS</sub>	42	A
Operating junction and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C
Thermal resistance junction-ambient (Note 1)	Steady state	R <sub>θJA</sub>	62.5	°C/W
Thermal resistance junction-case (Note 1)	Steady state	R <sub>θJC</sub>	2.36	°C/W

Notes: 1. The data tested by surface mounted on a 1inch<sup>2</sup> 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=42A.

4. The power dissipation is limited by 150°C junction temperature.

## Electrical Characteristics (at $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source breakdown voltage	$\text{BV}_{\text{DSS}}$	$\text{V}_{\text{GS}} = 0\text{V}, \text{I}_D = 250\mu\text{A}$	30			V
Gate threshold voltage	$\text{V}_{\text{GS(th)}}$	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}, \text{I}_D = 250\mu\text{A}$	1.0		2.5	V
Forward transconductance	$\text{g}_{\text{fs}}$	$\text{V}_{\text{DS}} = 10\text{V}, \text{I}_D = 10\text{A}$		18		S
Gate-source leakage current	$\text{I}_{\text{GSS}}$	$\text{V}_{\text{GS}} = \pm 20\text{V}$			$\pm 100$	nA
Drain-source leakage current ( $T_J=25^\circ\text{C}$ )	$\text{I}_{\text{DSS}}$	$\text{V}_{\text{DS}} = 30\text{V}, \text{V}_{\text{GS}} = 0\text{V}$			1	$\mu\text{A}$
Drain-source leakage current ( $T_J=125^\circ\text{C}$ )		$\text{V}_{\text{DS}} = 24\text{V}, \text{V}_{\text{GS}} = 0\text{V}$			10	
Static drain-source on-resistance (Note 2)	$\text{R}_{\text{DS(on)}}$	$\text{V}_{\text{GS}} = 10\text{V}, \text{I}_D = 20\text{A}$			5.5	$\text{m}\Omega$
		$\text{V}_{\text{GS}} = 4.5\text{V}, \text{I}_D = 10\text{A}$			8	
Total gate charge (Note 2)	$\text{Q}_g$	$\text{I}_D = 20\text{A}, \text{V}_{\text{DS}} = 15\text{V}, \text{V}_{\text{GS}} = 4.5\text{V}$		11.1		$\text{nC}$
Gate-source charge	$\text{Q}_{\text{gs}}$			1.9		
Gate-drain ("miller") charge	$\text{Q}_{\text{gd}}$			6.8		
Turn-on delay time (Note 2)	$t_{\text{d(on)}}$	$\text{V}_{\text{DD}} = 15\text{V}, \text{I}_D = 15\text{A}$ $\text{V}_{\text{GS}} = 10\text{V}, \text{R}_G = 3.3\Omega$		7.5		$\text{nS}$
Rise time	$t_r$			14.5		
Turn-off delay time	$t_{\text{d(off)}}$			35.2		
Fall time	$t_f$			9.6		
Input capacitance	$\text{C}_{\text{iss}}$	$\text{V}_{\text{GS}} = 0\text{V}, \text{V}_{\text{DS}} = 25\text{V}, f = 1\text{MHz}$		1160		$\text{pF}$
Output capacitance	$\text{C}_{\text{oss}}$			200		
Reverse transfer capacitance	$\text{C}_{\text{rss}}$			180		
Gate resistance	$\text{R}_g$	$f = 1\text{MHz}$		2.5	3.5	$\Omega$
<b>Source-drain diode</b>						
Diode forward voltage (Note 2)	$\text{V}_{\text{SD}}$	$\text{I}_s = 20\text{A}, \text{V}_{\text{GS}} = 0\text{V}, T_J=25^\circ\text{C}$			1.2	V
Continuous source current (Note 1, 4)	$\text{I}_s$	$\text{V}_G = \text{V}_D = 0\text{V}, \text{Force current}$			80	A
Pulsed source current (Note 2, 4)	$\text{I}_{\text{SM}}$				160	A
<b>Guaranteed avalanche characteristics</b>						
Single pulse avalanche energy (Note 3)	$\text{EAS}$	$\text{V}_{\text{DD}} = 25\text{V}, L = 0.1\text{mH}, \text{I}_{\text{AS}} = 20\text{A}$	20			$\text{mJ}$

Notes: 1. The data tested by surface mounted on a 1inch<sup>2</sup> FR-4 board with 2oz copper.

2. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

3. The min. value is 100% EAS tested guarantee.

4. The data is theoretically the same as ID and IDM, in real applications, should be limited by total power dissipation.

## Rating and Characteristic Curves (CMS80N03H8-HF)

Fig.1 - Typical Output Characteristics

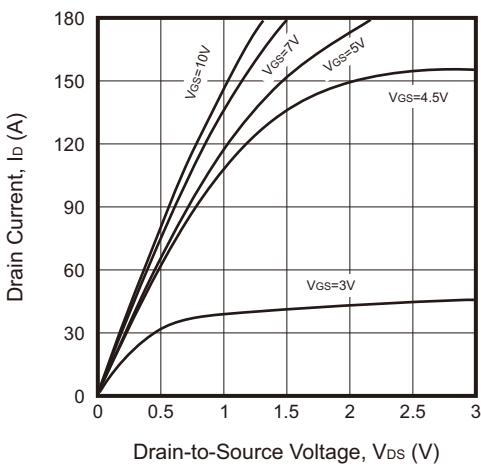


Fig.2 - On-Resistance vs. G-S Voltage

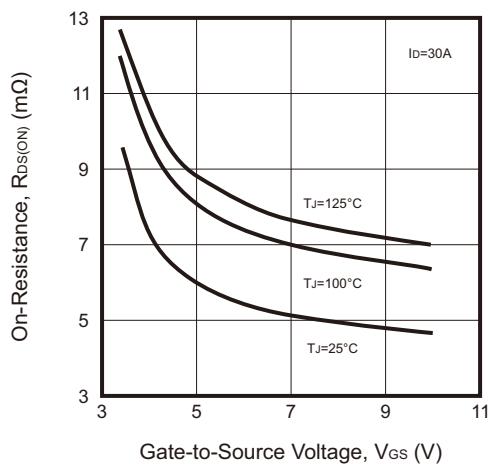


Fig.3 - Normalized  $V_{GS(th)}$  vs.  $T_J$

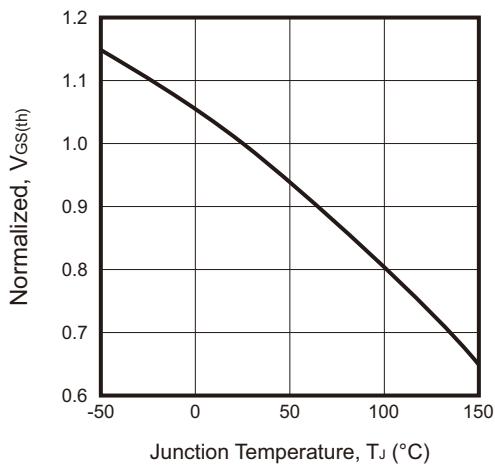


Fig.4 - Normalized  $R_{DS(ON)}$  vs.  $T_J$

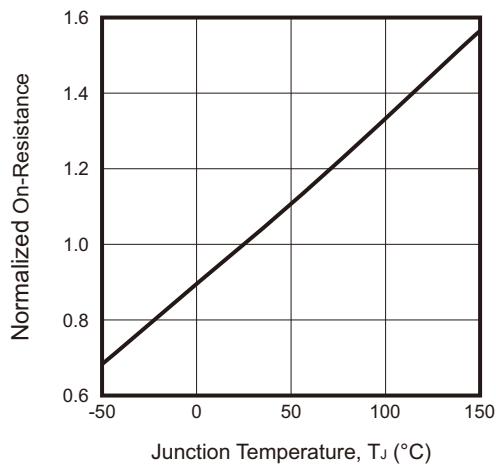


Fig.5 - Safe Operating Area

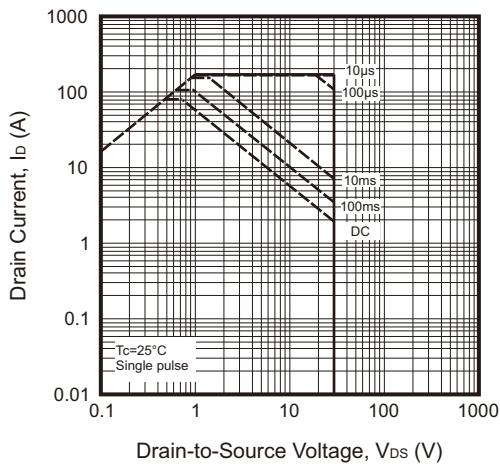
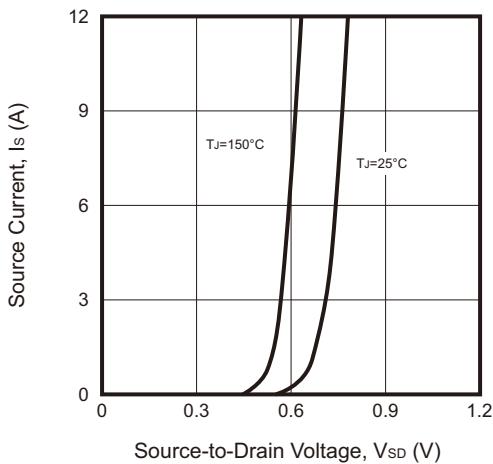


Fig.6 - Forward Characteristics of Reverse



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## Rating and Characteristic Curves (CMS80N03H8-HF)

Fig.7 - Gate Charge Characteristics

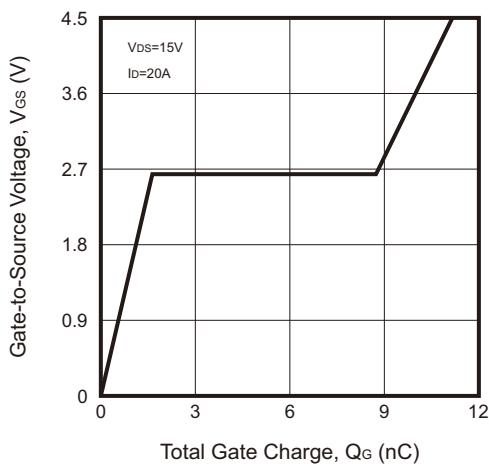
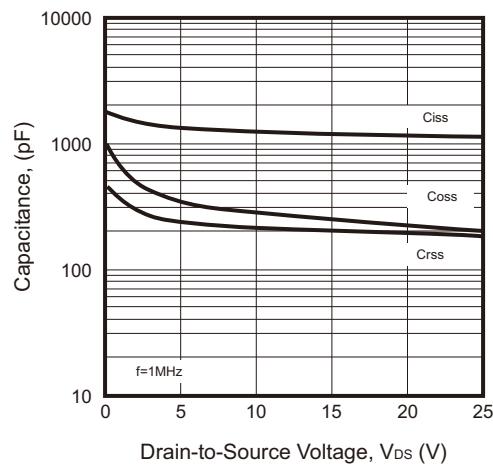
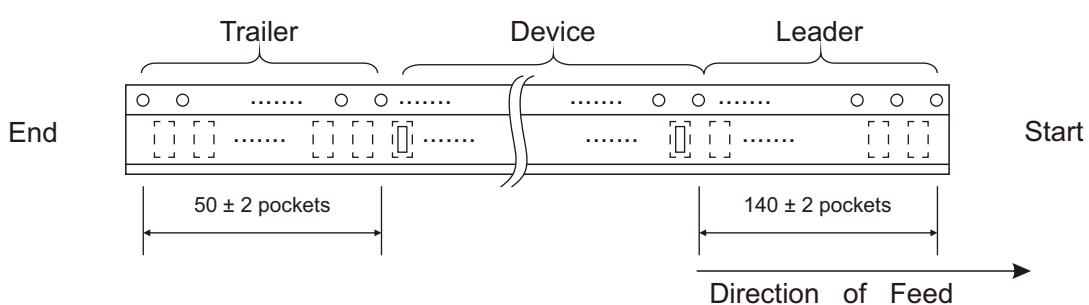
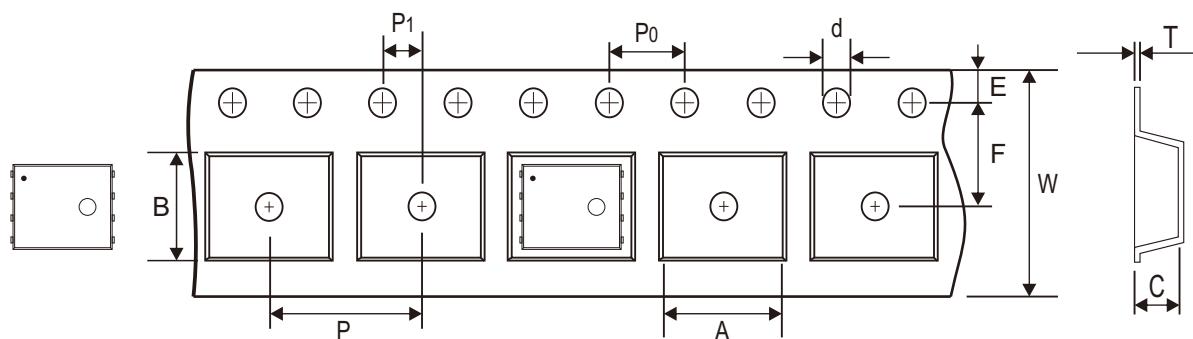


Fig.8 - Capacitance Characteristics



## Reel Taping Specification



PR-PAK	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	$6.50 \pm 0.10$	$5.30 \pm 0.10$	$1.40 \pm 0.10$	$1.50 + 0.10$ - 0.00	$330.00 \pm 1.00$	$178.00 + 0.00$ - 2.00	13.00 min.
	(inch)	$0.256 \pm 0.004$	$0.209 \pm 0.004$	$0.055 \pm 0.004$	$0.059 + 0.004$ - 0.000	$12.992 \pm 0.039$	$7.008 + 0.000$ - 0.079	0.512 min.

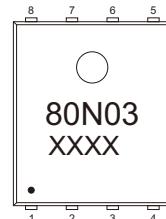
PR-PAK	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	$1.75 \pm 0.10$	$5.50 \pm 0.05$	$8.00 \pm 0.10$	$4.00 \pm 0.10$	$2.00 \pm 0.05$	$0.30 \pm 0.05$	$12.00 \pm 0.30$	18.40 ref.
	(inch)	$0.069 \pm 0.004$	$0.217 \pm 0.002$	$0.315 \pm 0.004$	$0.157 \pm 0.004$	$0.079 \pm 0.002$	$0.012 \pm 0.002$	$0.472 \pm 0.012$	0.724 ref.

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## Marking Code

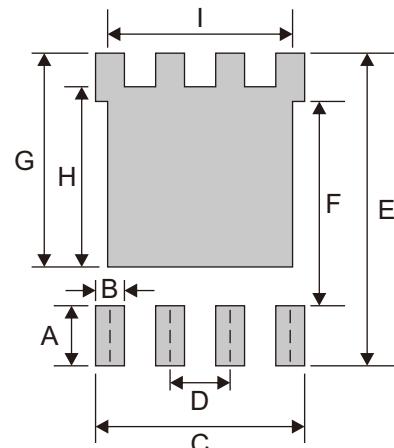
Part Number	Marking Code
CMS80N03H8-HF	80N03



XXXX = Control code

## Suggested PAD Layout

SIZE	PR-PAK	
	(mm)	(inch)
A	1.27	0.050
B	0.61	0.024
C	4.42	0.174
D	1.27	0.050
E	6.61	0.260
F	4.32	0.170
G	4.52	0.178
H	3.81	0.150
I	3.91	0.154



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

## Standard Packaging

Case Type	REEL PACK	
	REEL ( pcs )	Reel Size (inch)
PR-PAK	3,000	13

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