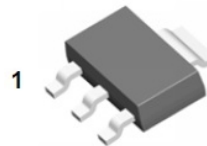


## CMS04N06Y-HF

**N-Channel**  
**RoHS Device**  
**Halogen Free**



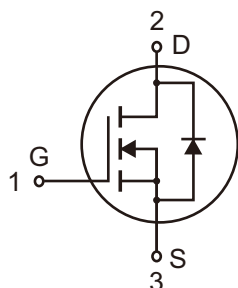
### Features

- Advanced trench process technology.
- High density cell design for ultra low on-resistance.

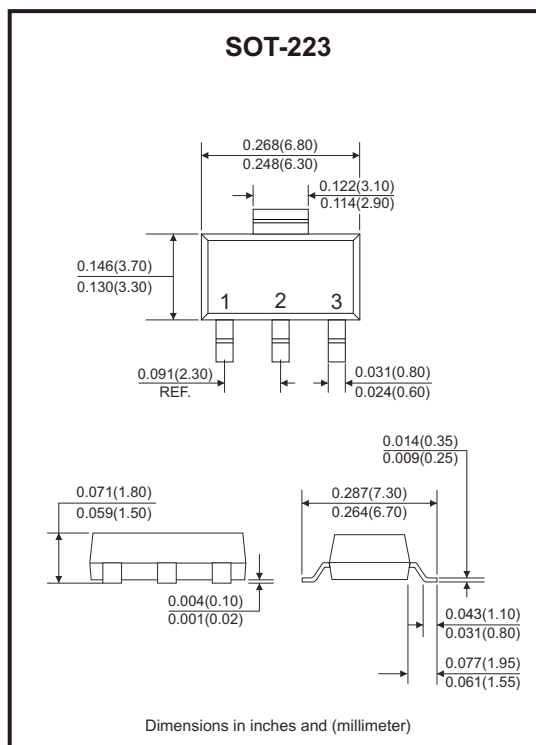
### Mechanical data

- Case: SOT-223 Package.
- Terminals: Solderable per MIL-STD-750, method 2026.
- Weight: 0.123 grams (approx.).

### Circuit diagram



1. G : GATE  
 2. D : DRAIN  
 3. S : SOURCE



### Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	60	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current	$I_D$	$T_A=25^\circ\text{C}$	4
		$T_A=70^\circ\text{C}$	3.2
Pulsed drain current (Note1)	$I_{DM}$	8	A
Power dissipation	$P_D$	$T_A=25^\circ\text{C}$	3.1
		$T_A=70^\circ\text{C}$	2
Typical thermal resistance	Junction to ambient (Note 5)	$R_{\theta JA}$	40.3
Operating junction temperature range	$T_J$	-55 to +150	$^\circ\text{C}$
Storage temperature range	$T_{STG}$	-55 to +150	$^\circ\text{C}$

Value only by maximum junction temperature.

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.86	2.5	
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3.0A$		85	100	m $\Omega$
		$V_{GS} = 4.5V, I_D = 2.0A$		95	110	
Drain-source leakage current	$I_{DSS}$	$V_{DS} = 48V, V_{GS} = 0V$			1.0	$\mu A$
Gate-source leakage current	$I_{GSS}$	$V_{GS} = \pm 20V$			$\pm 100$	nA
<b>Dynamic (Note 6)</b>						
Total gate charge	$Q_g$	$V_{DS} = 48V, I_D = 3A,$ $V_{GS} = 4.5V$ (Note 2,3)		5.1		nC
Gate-source charge	$Q_{gs}$			1.2		
Gate-drain ("miller") charge	$Q_{gd}$			1.9		
Input capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$		509		pF
Output capacitance	$C_{oss}$			39		
Reverse transfer capacitance	$C_{rss}$			26		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 30V, I_D = 3A,$ $V_{GS} = 10V,$ $R_{\theta} = 3.3\Omega$ (Note 2,3)		1.6		ns
Turn-on rise time	$t_r$			7.3		
Turn-off delay time	$t_{d(off)}$			25		
Turn-off fall time	$t_f$			14		
<b>Drain-source diode</b>						
Maximum continuous drain-source Diode forward current	$I_S$				4	A
Diode forward voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V, T_J = 25^\circ\text{C}$		0.8	1.2	V

Notes:

1. Pulse test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^\circ\text{C}$ .  
Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^\circ\text{C}$ .
4. The maximum current rating is package limited.
5.  $R_{\theta JA}$  is the sum of the junction to case and case to ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch<sup>2</sup> with 2 oz. square pad of copper.
6. Guaranteed by design, not subject to production testing.

## Rating and Characteristic Curves (CMS04N06Y-HF)

Fig.1 - Output Characteristic

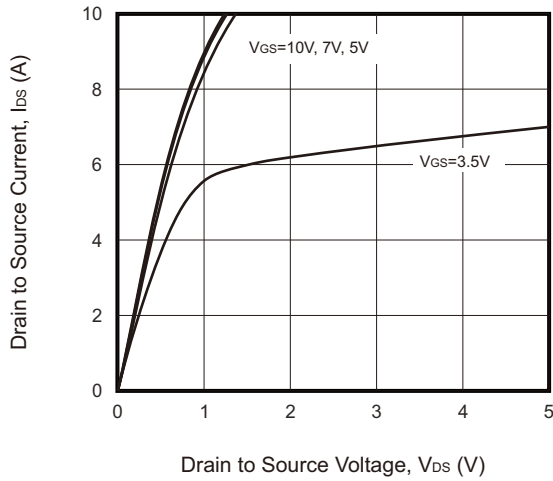


Fig.2 - Transfer Characteristics

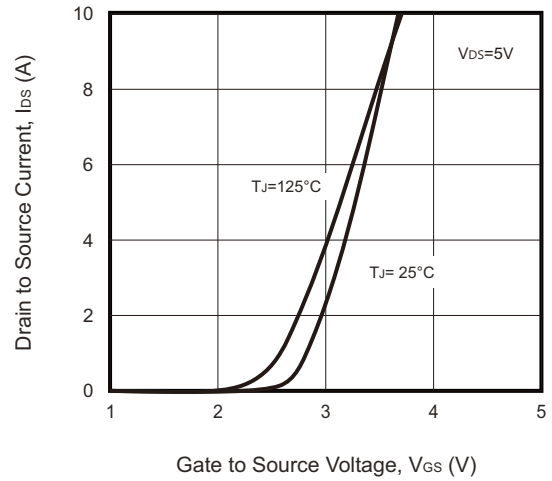


Fig.3 - On-Resistance VS. Drain Current

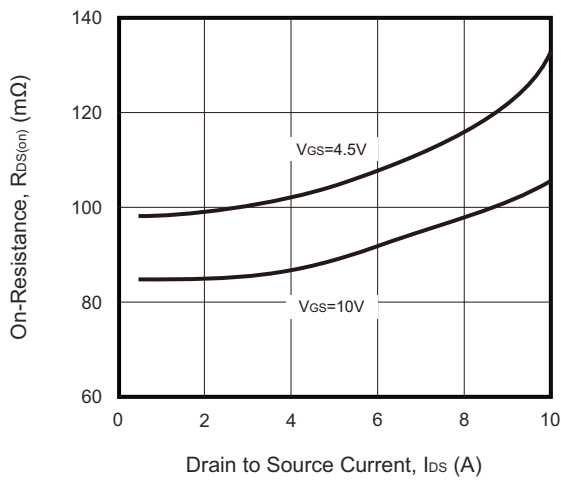


Fig.4 - Source-Drain Diode Forward Voltage

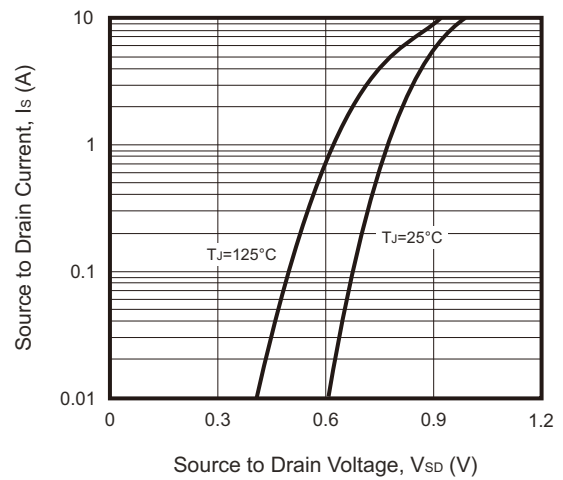


Fig.5 - Gate Charge Characteristics

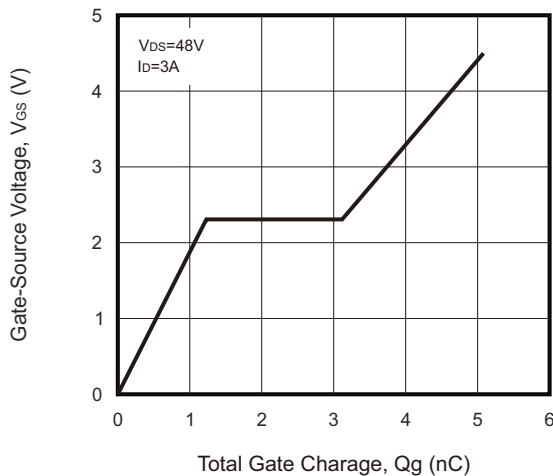
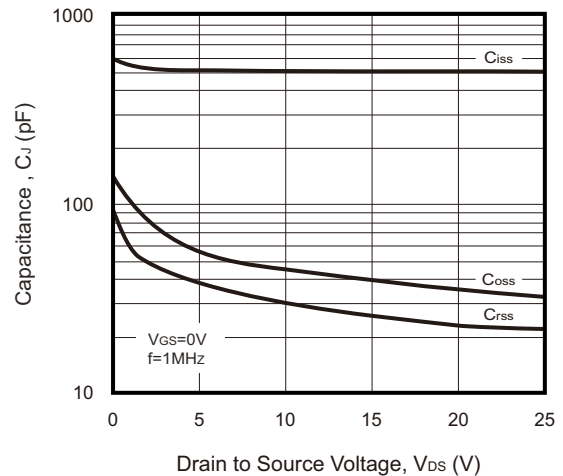


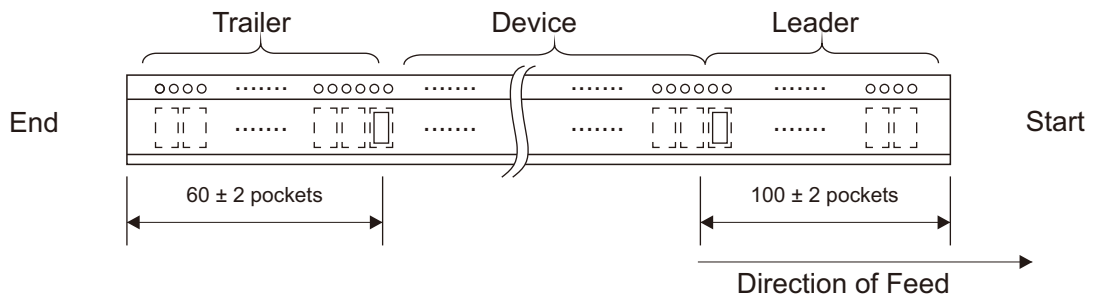
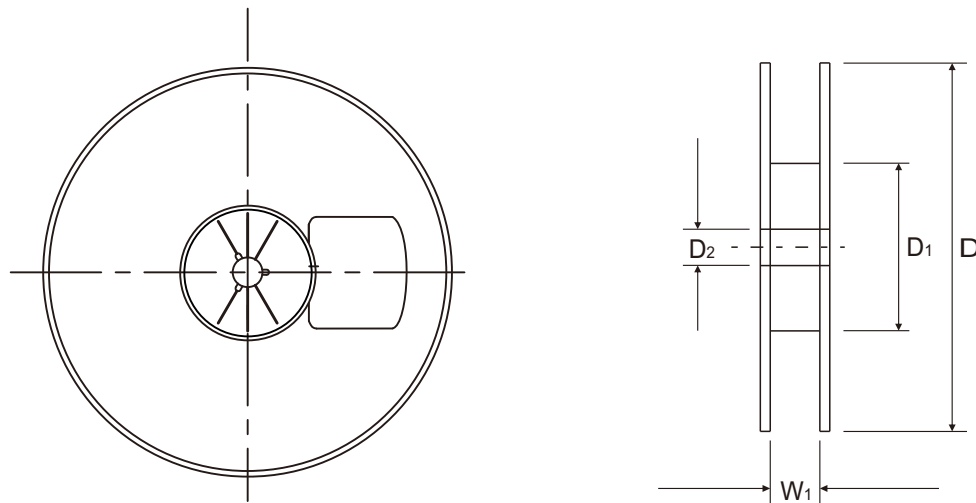
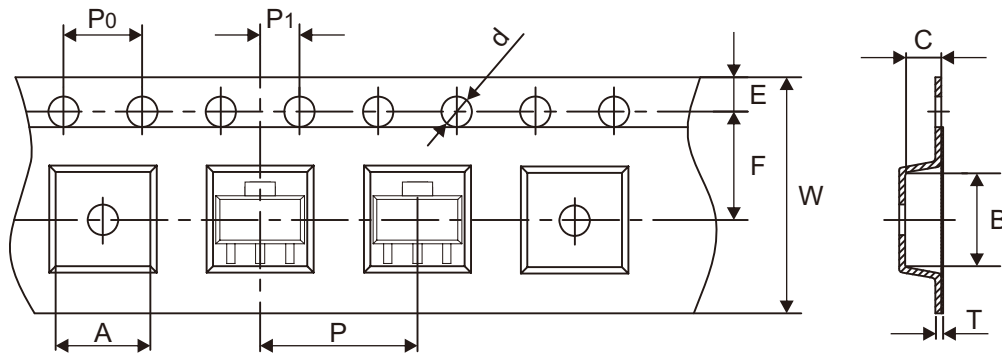
Fig.6 - Capacitance VS. Drain-Source Voltage



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## Reel Taping Specification



SOT-223	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	7.05 ± 0.10	7.40 ± 0.10	1.90 ± 0.10	1.55 ± 0.05	330.00 ± 1.00	100.00 ± 0.50	13.00 ± 0.50
	(inch)	0.278 ± 0.004	0.291 ± 0.004	0.075 ± 0.004	0.061 ± 0.002	12.992 ± 0.039	3.937 ± 0.020	0.512 ± 0.020

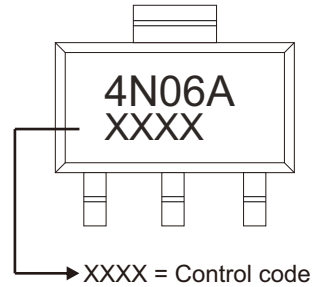
SOT-223	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.25 ± 0.05	12.00 + 0.15 - 0.10	12.40 + 2.00 - 0.00
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.010 ± 0.002	0.472 + 0.006 - 0.004	0.488 + 0.079 - 0.000

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REV:B

## Marking Code

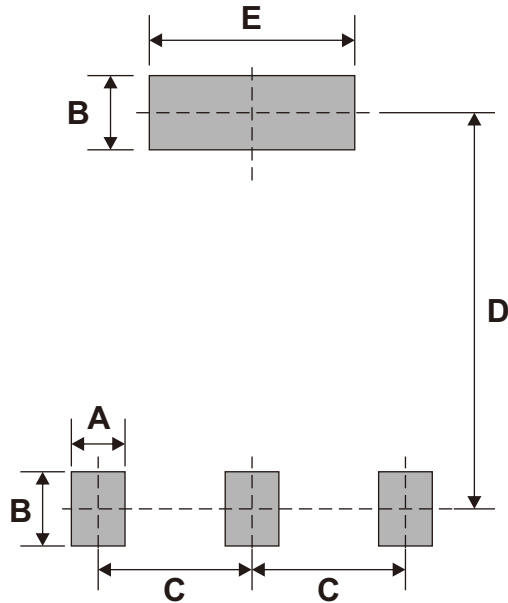
Part Number	Marking Code
CMS04N06Y-HF	4N06A XXXX



## Suggested PAD Layout

SIZE	SOT-223	
	(mm)	(inch)
A	0.81	0.032
B	1.12	0.044
C	2.30	0.091
D	5.98	0.235
E	3.10	0.122

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



## Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-223	2,500	13