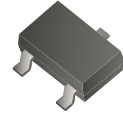


# CMSN2312T-HF

N-Channel  
RoHS Device  
Halogen Free



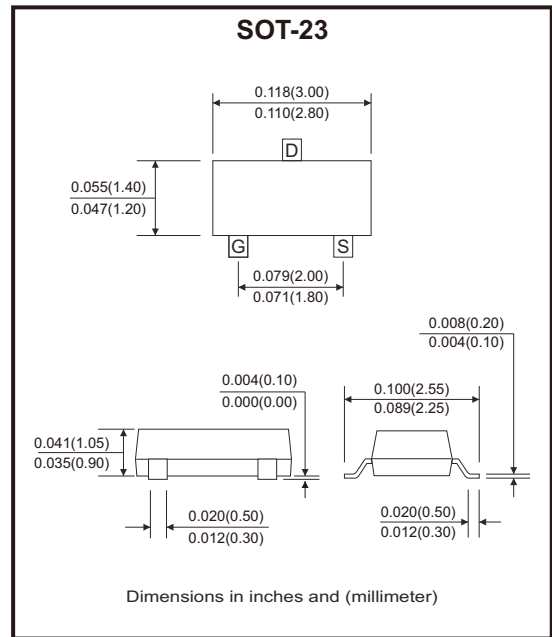
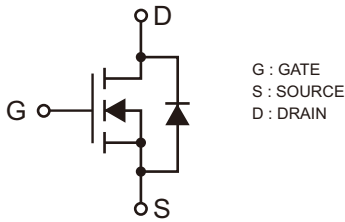
## Features

- High power and current handling capability.

## Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.

## Circuit Diagram



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

Parameter	Symbol	Value	Unit
Drain-source voltage	V <sub>DS</sub>	20	V
Gate-source voltage	V <sub>GS</sub>	±10	V
Drain current	I <sub>D</sub>	T <sub>A</sub> =25°C	6.8
		T <sub>A</sub> =70°C	5.4
Pulsed drain current (Note 1)	I <sub>DM</sub>	27	A
Total power dissipation	P <sub>D</sub>	T <sub>A</sub> =25°C	1.25
		T <sub>A</sub> =70°C	0.8
Thermal resistance junction to ambient (Note 2)	R <sub>θJA</sub>	100	°C/W
Junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 1. Pulse width ≤ 300μs, duty cycle ≤ 2%.

2. R<sub>θJA</sub> 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. R<sub>θJC</sub> is guaranteed by design, while R<sub>θJA</sub> is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Static Parameters</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$			1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 10V, V_{DS} = 0V$			$\pm 100$	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.45	0.62	1	V
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 6.8A$		13.5	18	m $\Omega$
		$V_{GS} = 2.5V, I_D = 3A$		17	22	
		$V_{GS} = 1.8V, I_D = 2.5A$		22	39	
Diode forward voltage	$V_{SD}$	$I_S = 6.8A, V_{GS} = 0V$			1.2	V
<b>Dynamic Parameters</b>						
Input capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$		888		pF
Output capacitance	$C_{oss}$			133		
Reverse transfer capacitance	$C_{rss}$			117		
<b>Switching Parameters</b>						
Total gate charge	$Q_g$	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6.8A$		11.05		nC
Gate source charge	$Q_{gs}$			1.73		
Gate drain charge	$Q_{gd}$			3.1		
Turn-on delay time	$t_{d(on)}$	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6.8A, R_{GEN} = 3\Omega$		7		ns
Turn-on rise time	$t_r$			46		
Turn-off delay time	$t_{d(off)}$			30		
Turn-off fall time	$t_f$			52		

## Typical Rating and Characteristic Curves (CMSN2312T-HF)

Fig.1 - Output Characteristics

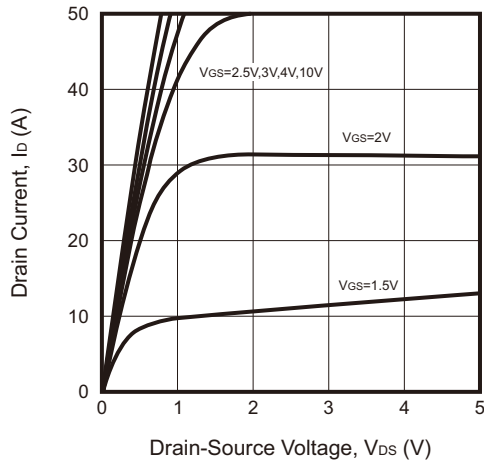


Fig.2 - Transfer Characteristics

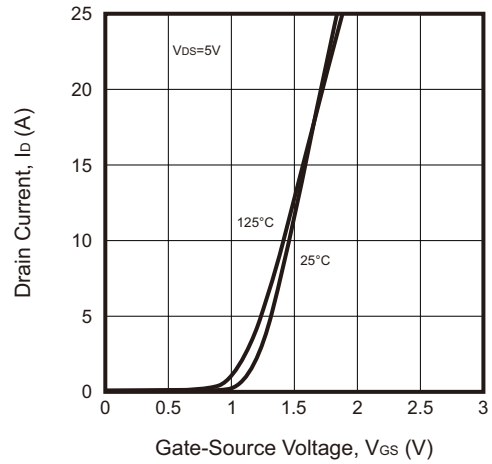


Fig.3 - On-Resistance vs. Drain Current and Gate Voltage

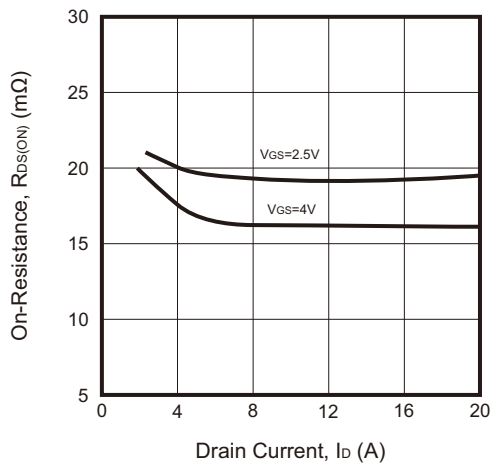


Fig.4 - On-Resistance vs. Junction Temperature

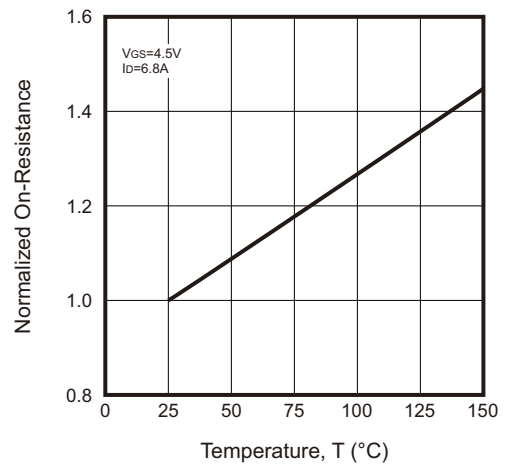


Fig.5 - Capacitance Characteristics

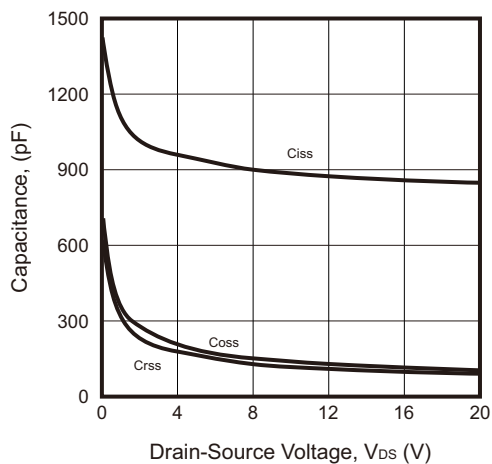
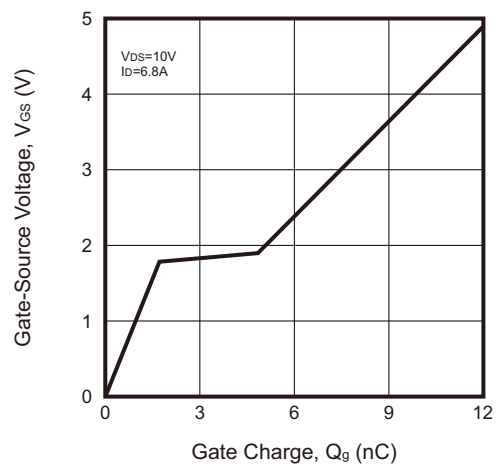


Fig.6 - Gate Charge



## Typical Rating and Characteristic Curves (CMSN2312T-HF)

Fig.7 - Safe Operation Area

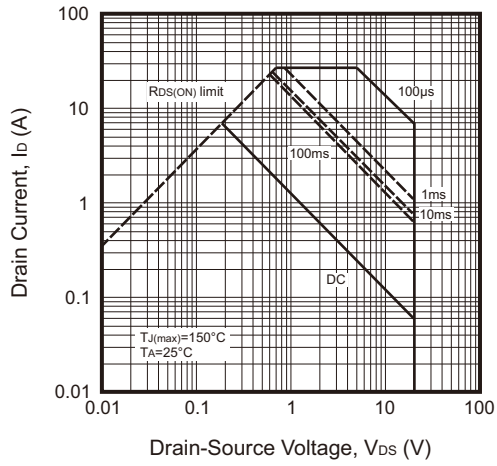
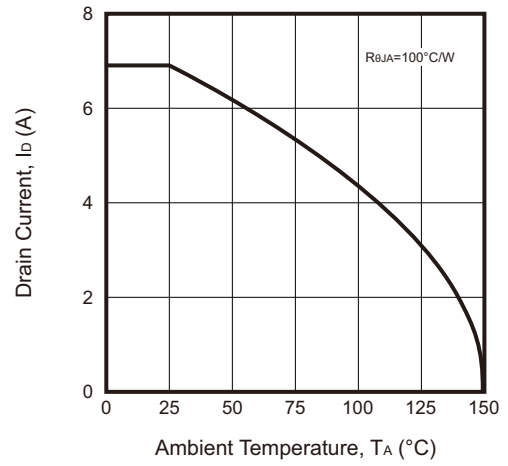
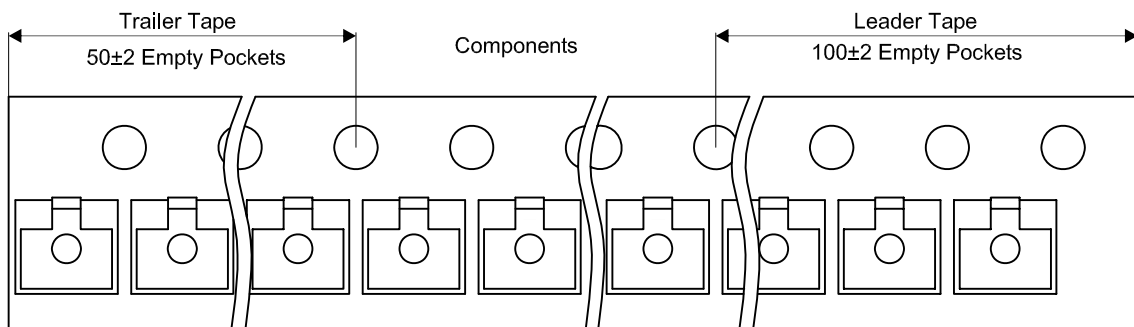
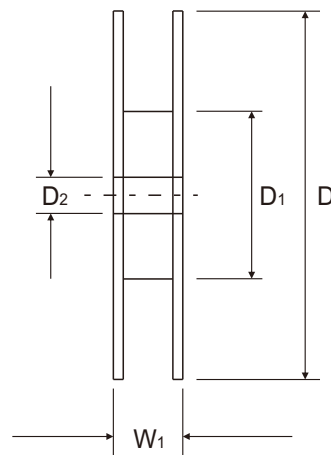
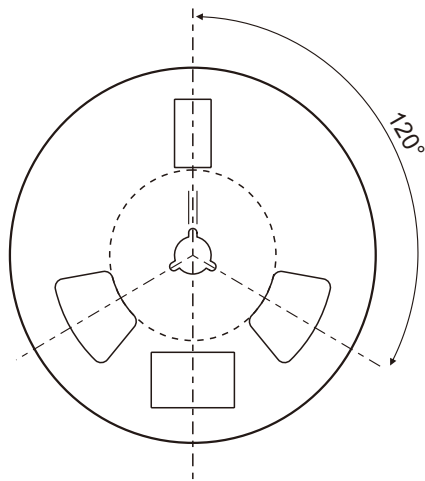
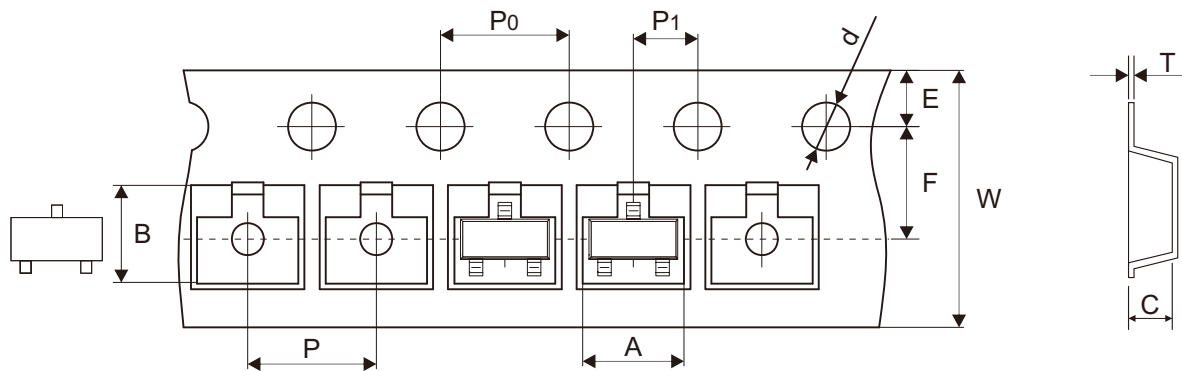


Fig.8 - Maximum Continuous Drain Current vs. Ambient Temperature



## Reel Taping Specification

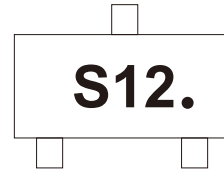


SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 + 0.10 - 0.00	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 + 0.004 - 0.000	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-23	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.20 ± 0.02	8.00 + 0.30 - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.002	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.008 ± 0.001	0.315 + 0.012 - 0.004	0.484 ± 0.039

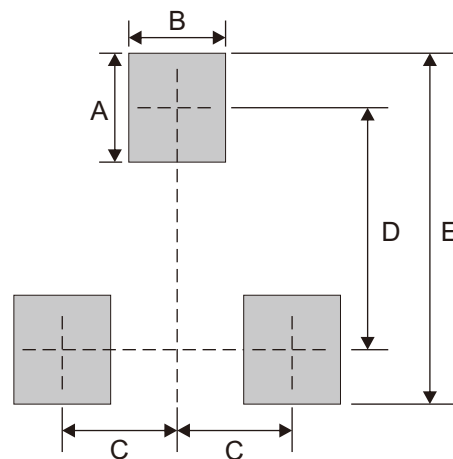
## Marking Code

Part Number	Marking Code
CMSN2312T-HF	S12.



## Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	0.95	0.037
D	2.00	0.079
E	2.90	0.114



## Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7