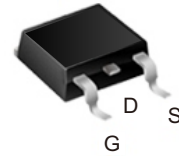


CMS100N04D-HF

N-Channel
RoHS Device
Halogen Free



Features

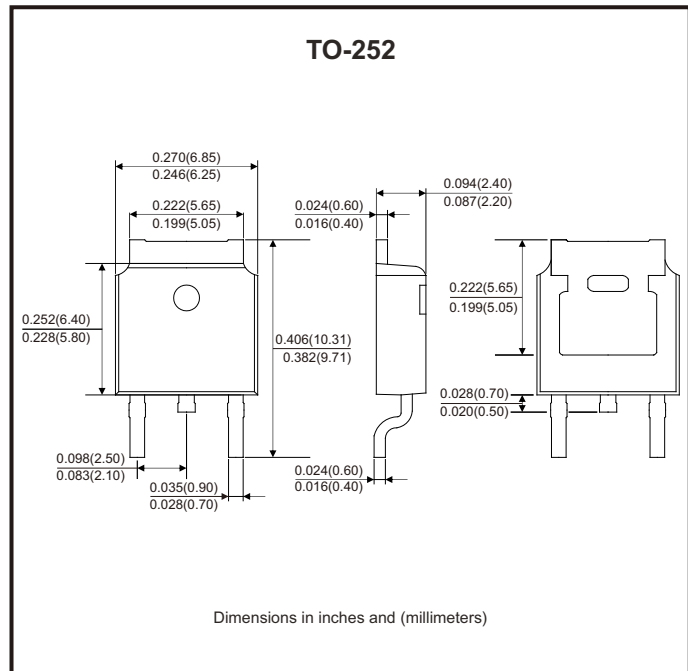
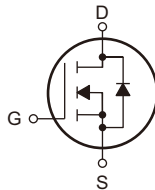
- Super low gate charge.
- 100% EAS guaranteed.
- Excellent C_{dv}/dt effect decline.
- Advanced high cell density technology.

Mechanical data

- Case: TO-252, molded plastic.
- Molding compound: UL flammability classification rating 94V-0.
- Terminals: Matte tin-plated leads, solderability-per MIL-STD-202, method 208.

Circuit Diagram

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



Maximum Ratings (at $T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_C=25^\circ\text{C}$)	I_D	100	A
Continuous drain current ($T_C=100^\circ\text{C}$)	I_D	68	
Continuous drain current ($T_A=25^\circ\text{C}$) (Note 1)	I_D	21	
Continuous drain current ($T_A=100^\circ\text{C}$) (Note 1)	I_D	13	
Pulsed drain current ($t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$)	I_{DM}	400	A
Single pulse avalanche energy (Note 3)	E_{AS}	230	mJ
Power dissipation ($T_C=25^\circ\text{C}$)	P_D	96	W
Operating junction temperature range	T_J	-55 to +150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal resistance junction to case	$R_{\theta JC}$		0.9	1.3	$^\circ\text{C}/\text{W}$
Thermal resistance junction to air (Note 1)	$R_{\theta JA}$		20	30	$^\circ\text{C}/\text{W}$

REV:A

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{DSS}	V _{GS} = 0V, I _D = 250μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 40V, V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics						
Static drain-source on-resistance (Note 2)	R _{DS(on)}	V _{GS} = 10V, I _D = 30A		4	5	mΩ
	R _{DS(on)}	V _{GS} = 4.5V, I _D = 20A		4.9	5.4	mΩ
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.5	2.5	V
Gate resistance	R _G	V _{GS} = 0V, f = 1MHz		1.6		Ω
Dynamic Characteristics						
Input capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz		4407		pF
Output capacitance	C _{oss}			327		
Reverse transfer capacitance	C _{rss}			280		
Switching Characteristics						
Turn-on delay time (Note 4)	t _{d(on)}	V _{DD} = 30V, V _{GS} = 10V R _G = 3Ω, R _L = 2.5Ω		12		ns
Turn-on rise time (Note 4)	t _r			16		
Turn-off delay time (Note 4)	t _{d(off)}			39		
Turn-off fall time (Note 4)	t _f			15		
Total gate charge	Q _g	V _{DD} = 30V, V _{GS} = 10V, I _D = 15A		86		nC
Gate to source charge	Q _{gs}			11		
Gate to drain (miller) charge	Q _{gd}			16.5		
Source-Drain Diode Characteristics						
Diode forward voltage (Note 2)	V _{SD}	I _{SD} = 1A, V _{GS} = 0V		0.7	1.2	V
Reverse recovery time	t _{rr}	I _F = 15A, V _{GS} = 0V, dI _F /dt = 100A/μs		41		ns
Reverse recovery charge	Q _{rr}			30		nC

- Notes: 1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
 2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
 3. The EAS data shows max. rating. The test condition is $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=10\text{mH}$.
 4. Guaranteed by design, not subject to production.

Rating and Characteristic Curves (CMS100N04D-HF)

Fig.1 - Power Dissipation

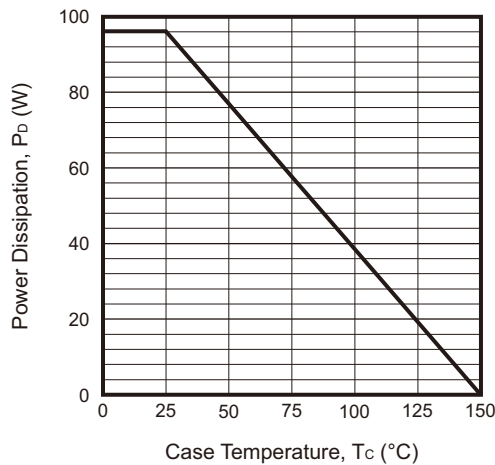


Fig.2 - Drain Current

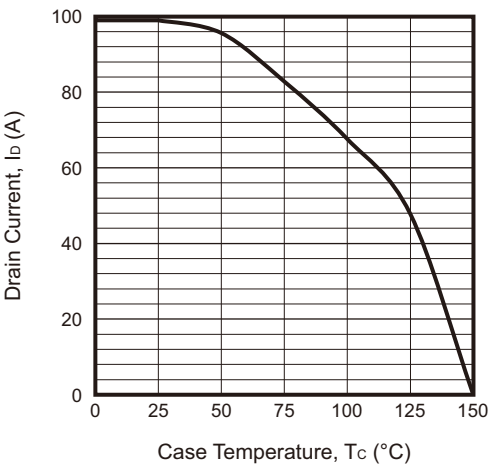


Fig.3 - Typical Output Characteristics

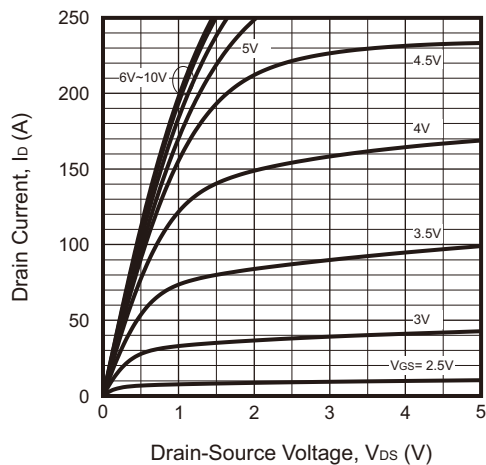


Fig.4 - On-Resistance vs. Drain Current and Gate Voltage

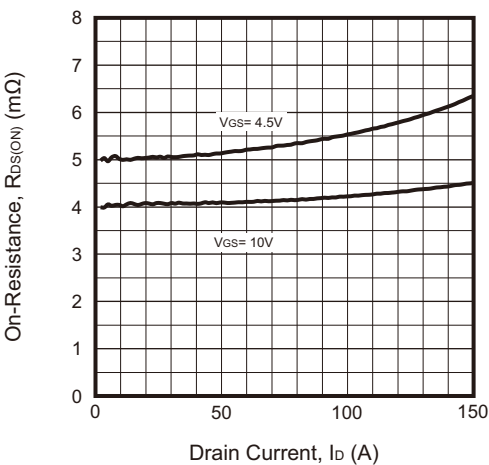


Fig.5 - On-Resistance vs. Gate-Source Voltage

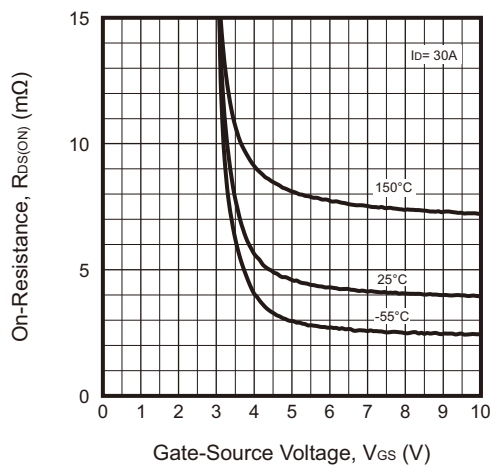
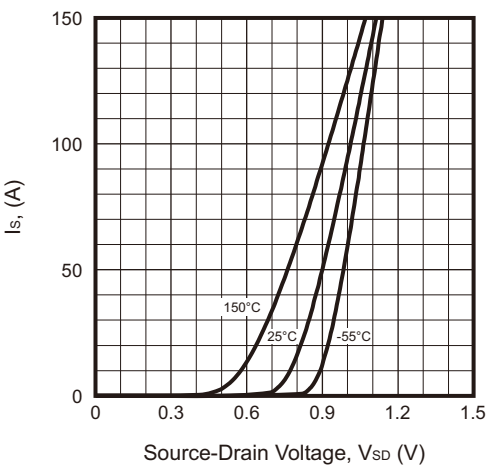


Fig.6 - Body-Diode Characteristics



Rating and Characteristic Curves (CMS100N04D-HF)

Fig.7 - Normalized On-Resistance vs. Junction Temperature

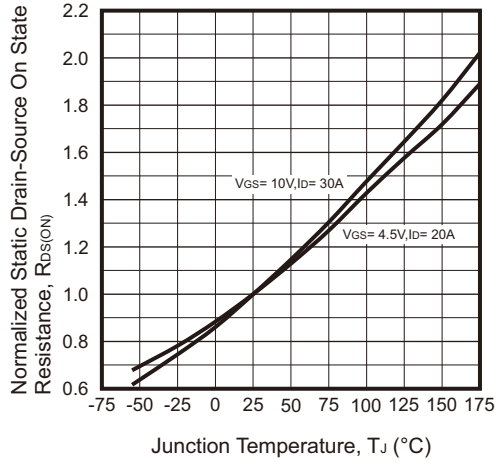


Fig.8 - Transfer Characteristics

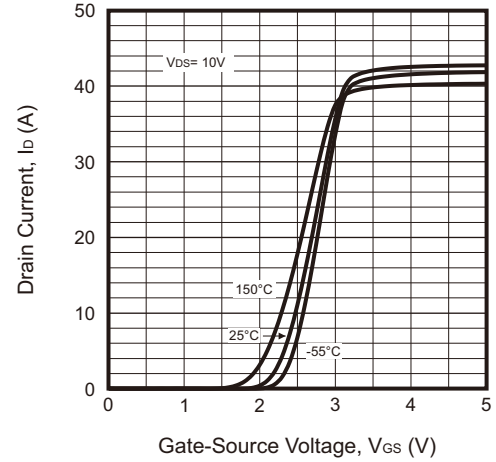


Fig.9 - Capacitance Characteristics

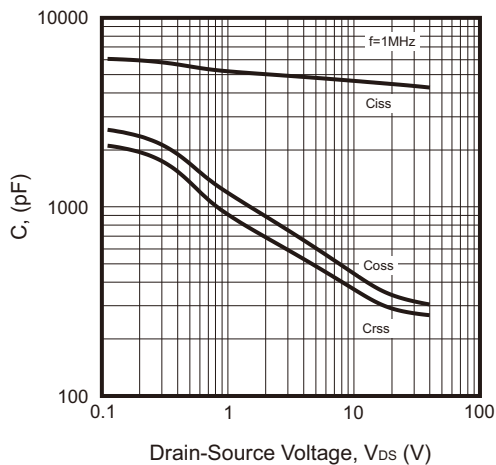


Fig.10 - Gate-Charge Characteristics

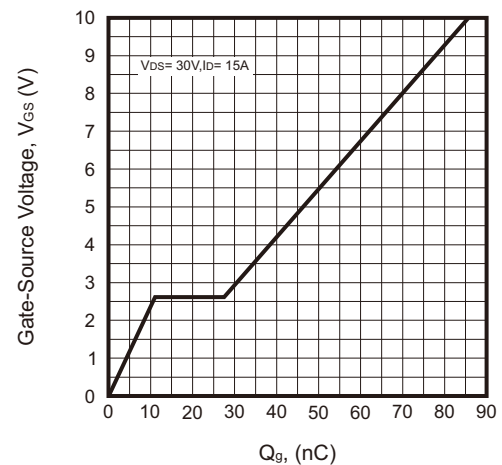


Fig.11 - Normalized Breakdown Voltage vs. Junction Temperature

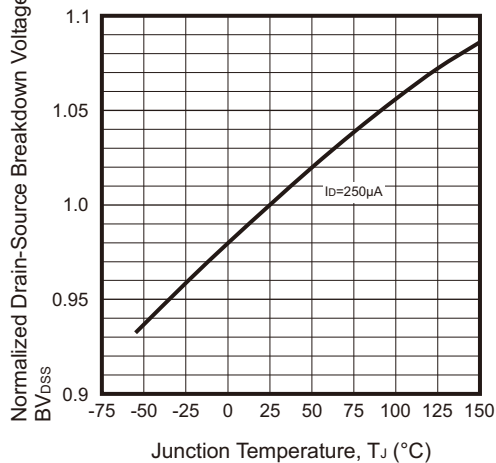
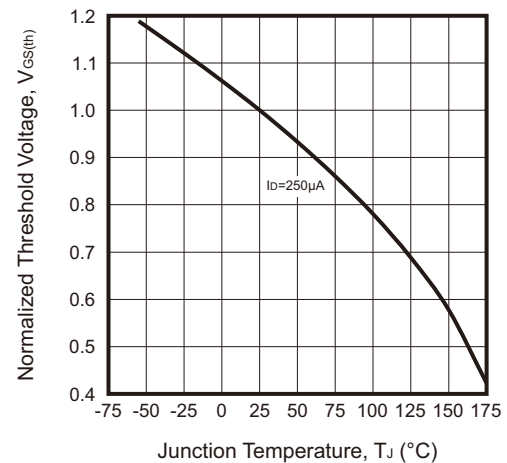
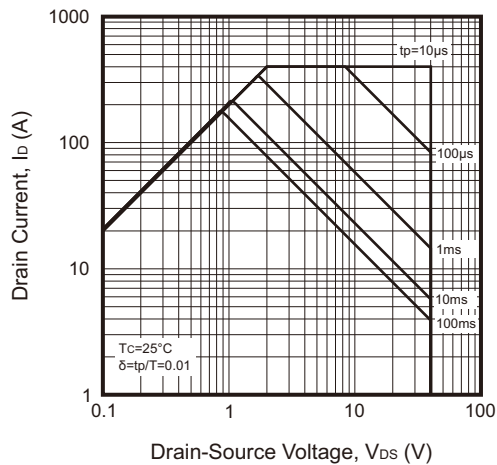


Fig.12 - Normalized $V_{GS(th)}$ vs. Junction Temperature

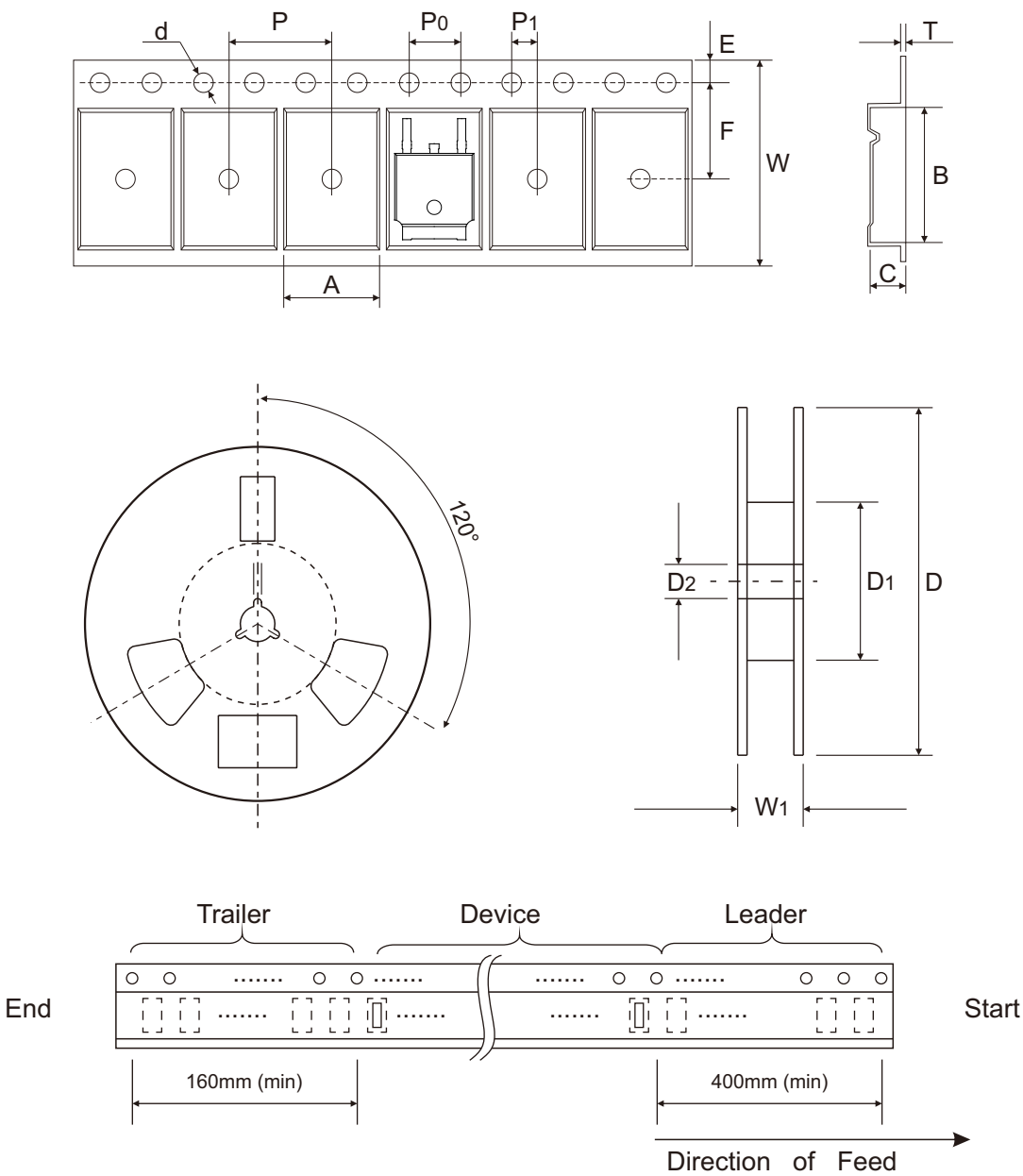


Rating and Characteristic Curves (CMS100N04D-HF)

Fig.13 - Safe Operating Area



Reel Taping Specification

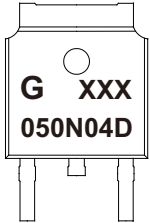


TO-252	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	6.90 ± 0.10	10.50 ± 0.10	2.70 ± 0.10	1.50 ± 0.25	330 ± 1.00	100 ± 1.00	13.00 ± 0.20
	(inch)	0.272 ± 0.004	0.413 ± 0.004	0.106 ± 0.004	0.059 ± 0.010	12.992 ± 0.039	3.937 ± 0.039	0.512 ± 0.008

TO-252	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	7.50 ± 0.10	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	0.30 ± 0.05	16.00 ± 0.30 $- 0.20$	21.00 ± 0.30
	(inch)	0.069 ± 0.004	0.295 ± 0.004	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.012 ± 0.002	0.630 ± 0.012 $- 0.008$	0.827 ± 0.012

Marking Code

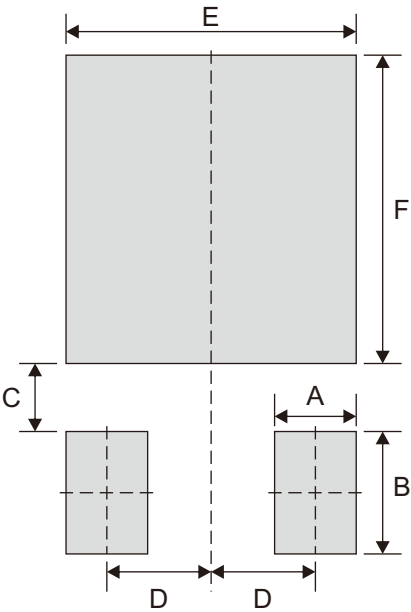
Part Number	Marking Code
CMS100N04D-HF	050N04D



XXX = Control code

Suggested P.C.B. PAD Layout

SIZE	TO-252	
	(mm)	(inch)
A	1.80	0.071
B	2.70	0.106
C	1.50	0.059
D	2.30	0.091
E	6.40	0.252
F	6.80	0.268



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
TO-252	2,500	13