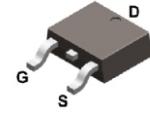


CMS04N65D-HF

N-Channel
RoHS Device
Halogen Free



Features

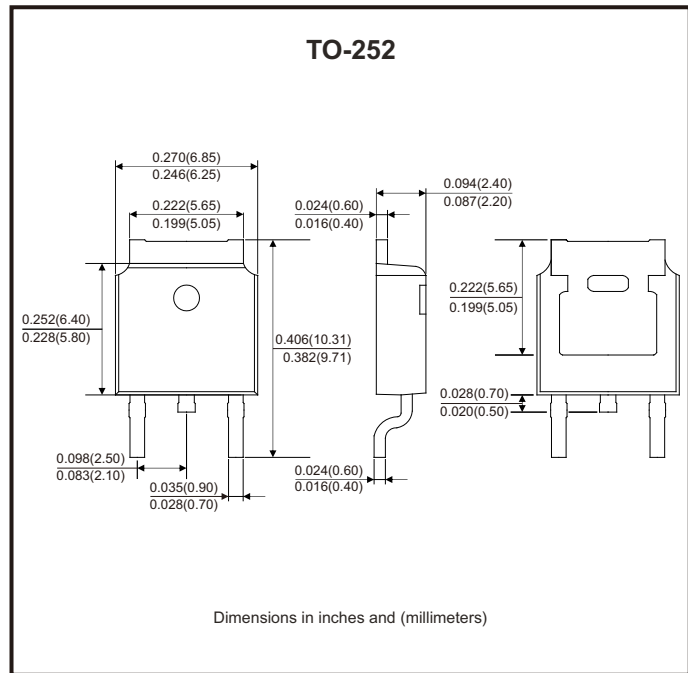
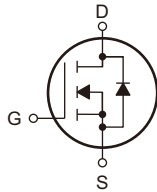
- Low $R_{DS(ON)}$.
- Fast switching.
- Low gatecharge.
- Low reverse transfer capacitances.

Mechanical data

- Case: TO-252, molded plastic.
- Molding compound: UL flammability classification rating 94V-0.
- Terminals: Matte tin-plated leads, solderable-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}	650	V
Gate-source voltage	V_{GS}	± 30	V
Continuous drain current ($T_C=25^\circ\text{C}$)	I_D	4	A
Continuous drain current ($T_C=100^\circ\text{C}$)	I_D	2.5	
Pulsed drain current ($t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$)	I_{DM}	16	A
Single pulse avalanche energy (Note 2)	E_{AS}	200	mJ
Power dissipation ($T_C=25^\circ\text{C}$)	P_D	78	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	$R_{\theta JC}$			1.6	$^\circ\text{C/W}$
Thermal resistance junction to air	$R_{\theta JA}$			100	$^\circ\text{C/W}$

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 _{DS}	V _{GS} = 0V, I _D = 250μA	650			V
Zero gate voltage drain current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V			±100	nA
On Characteristics						
Static drain-source on-resistance (Note 1)	R _{DS(on)}	V _{GS} = 10V, I _D = 2A			2.8	Ω
	R _{DS(on)}	V _{GS} = 4.5V, I _D = 2A		3.16		Ω
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2		4	V
Dynamic Characteristics						
Input capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz		610		pF
Output capacitance	C _{oss}			53		
Reverse transfer capacitance	C _{rss}			3.5		
Switching Characteristics						
Turn-on delay time (Note 3)	t _{d(on)}	V _{DD} = 325V, I _D = 4A R _G = 10Ω		14		ns
Turn-on rise time (Note 3)	t _r			16		
Turn-off delay time (Note 3)	t _{d(off)}			32		
Turn-off fall time (Note 3)	t _f			11		
Total gate charge	Q _g	V _{DD} = 520V, V _{GS} = 10V, I _D = 4A		14.5		nC
Gate to source charge	Q _{gs}			3		
Gate to drain (miller) charge	Q _{gd}			6.5		
Source-Drain Diode Characteristics						
Diode forward voltage (Note 1)	V _{SD}	I _{SD} = 4A, V _{GS} = 0V			1.5	V
Reverse recovery time	t _{rr}	I _{SD} = 4A, V _{GS} = 0V, di/dt = 100A/μs		256		ns
Reverse recovery charge	Q _{rr}				1.2	

Notes: 1. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

2. The EAS data shows max. rating. The test condition is $V_{DD}=100\text{V}$, $V_{GS}=15\text{V}$, $L=50\text{mH}$.

3. Guaranteed by design, not subject to production.

Typical Rating and Characteristic Curves (CMS04N65D-HF)

Fig.1 - Power Dissipation

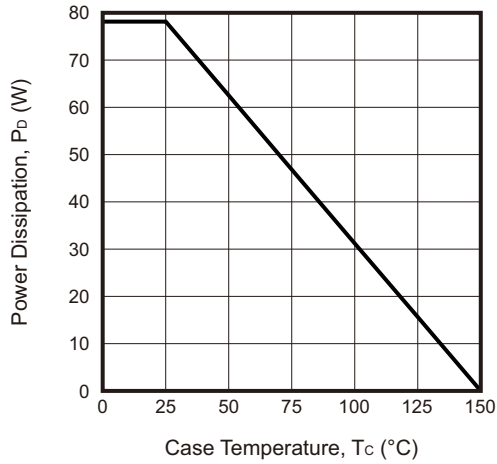


Fig.2 - Drain Current

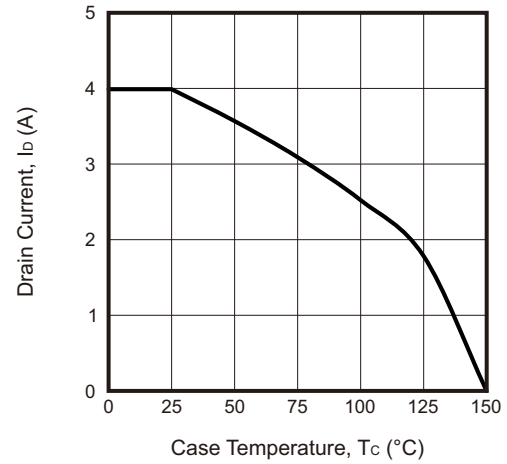


Fig.3 - Typical Output Characteristics

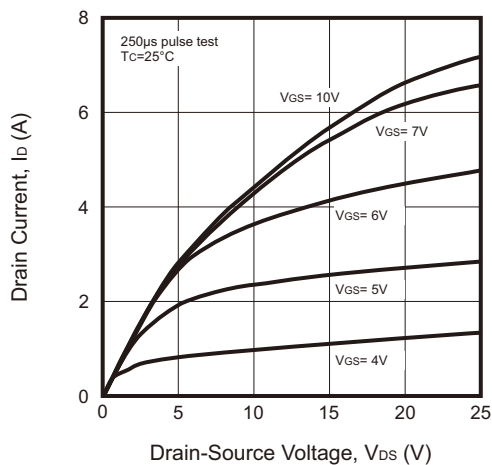


Fig.4 - On-Resistance vs. Drain Current and Gate Voltage

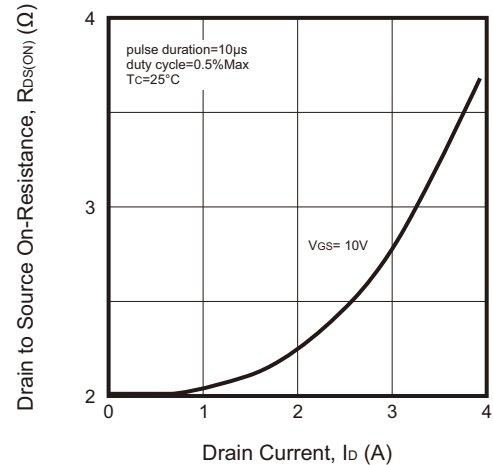


Fig.5 - Safe Operation Area

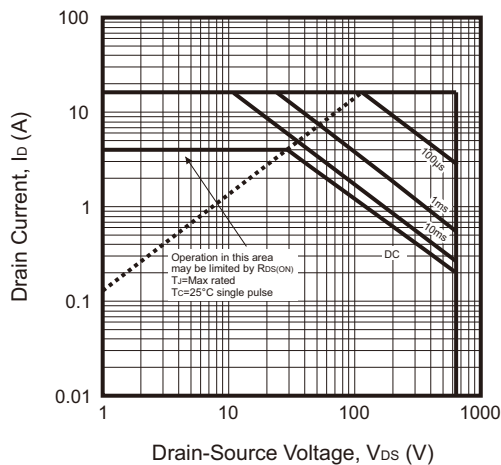
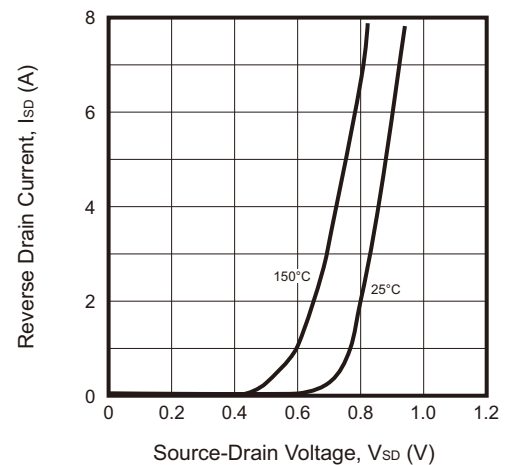


Fig.6 - Body-Diode Characteristics



Typical Rating and Characteristic Curves (CMS04N65D-HF)

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

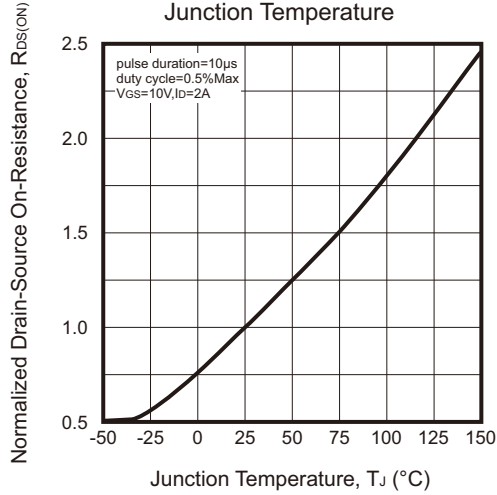


Fig.8 - Transfer Characteristics

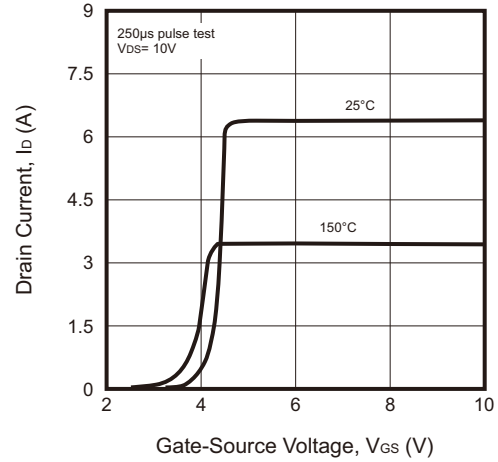


Fig.9 - Capacitance Characteristics

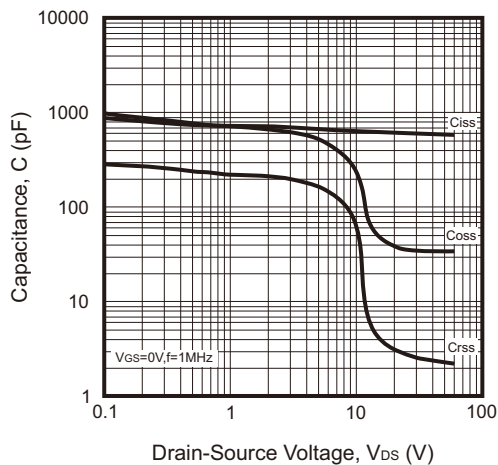


Fig.10 - Gate Charge Characteristics

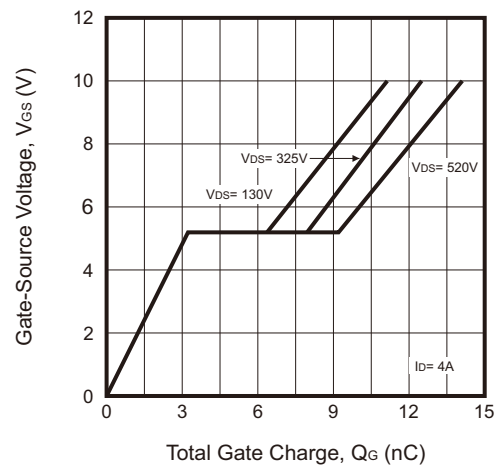


Fig.11 - Normalized Breakdown Voltage vs. Junction Temperature

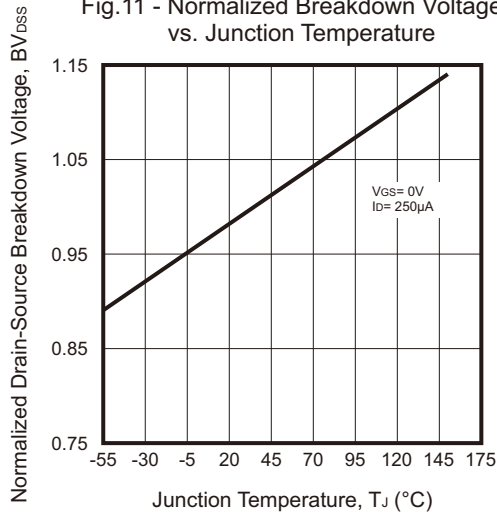
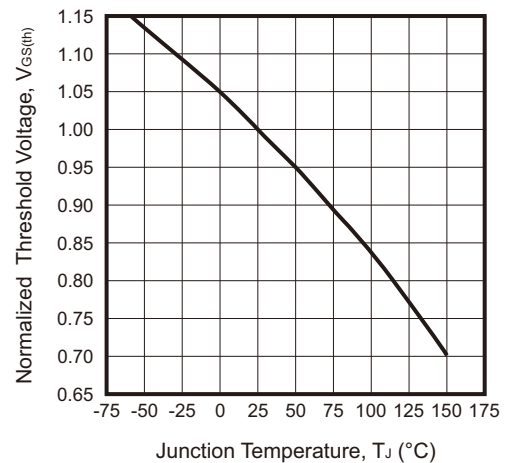
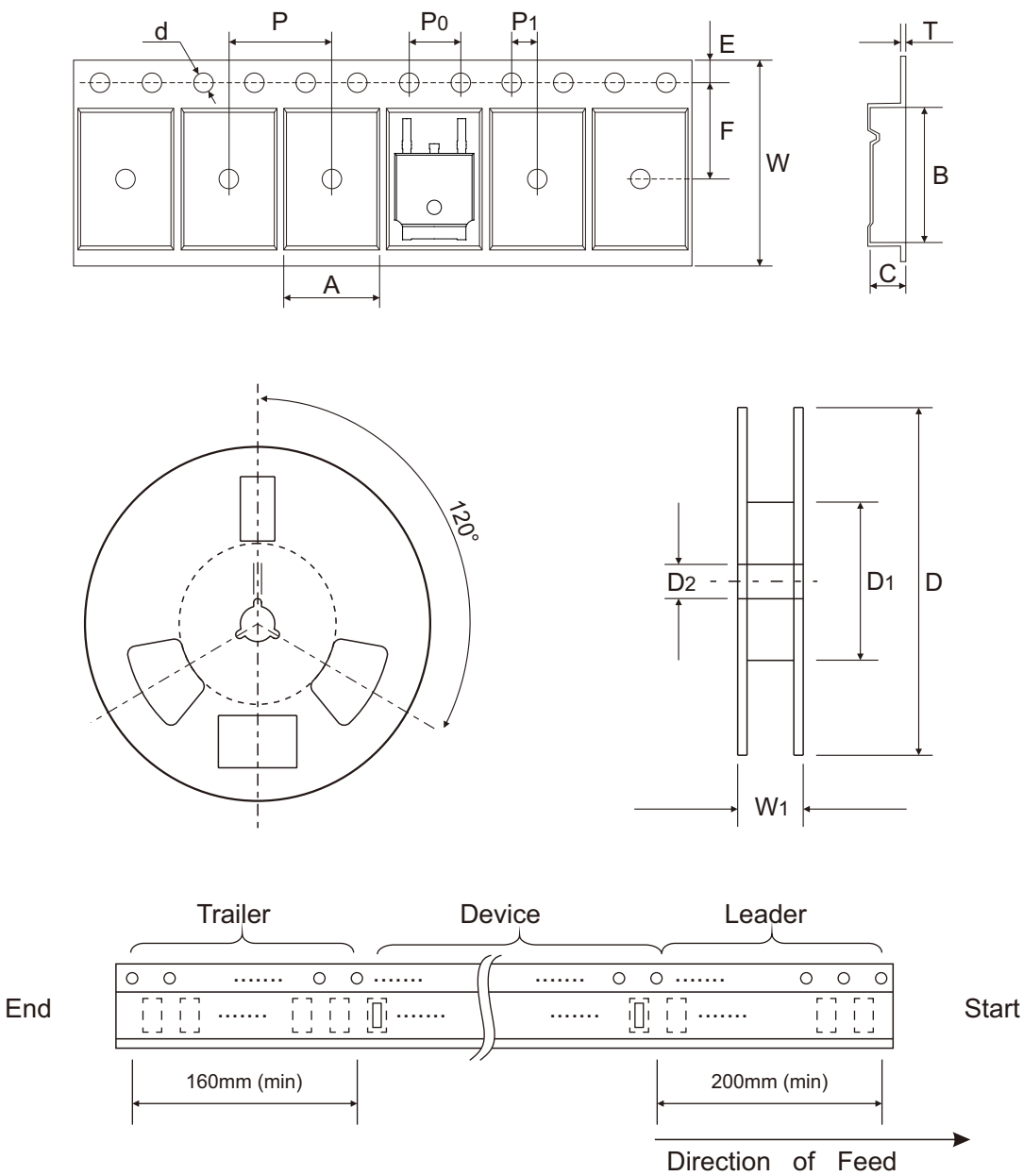


Fig.12 - Normalized $V_{GS(th)}$ vs. Junction Temperature



Reel Taping Specification

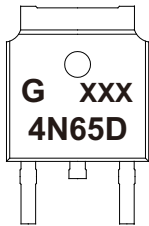


	SYMBOL	A	B	C	d	D	D1	D2
TO-252	(mm)	6.90 ± 0.10	10.50 ± 0.10	2.70 ± 0.10	1.50 + 0.25 - 0.00	330.00 ± 1.00	100.00 ± 1.00	13.00 ± 0.20
	(inch)	0.272 ± 0.004	0.413 ± 0.004	0.106 ± 0.004	0.059 + 0.010 - 0.000	12.992 ± 0.039	3.937 ± 0.039	0.512 ± 0.008

	SYMBOL	E	F	P	P0	P1	T	W	W1
TO-252	(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

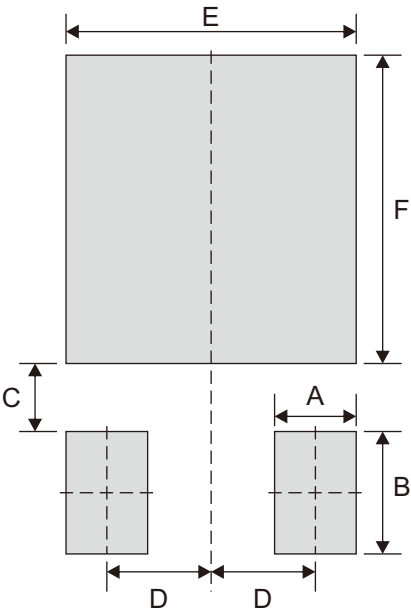
Part Number	Marking Code
CMS04N65D-HF	4N65D



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