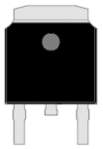
MOSFET

CMS50N10D-HF

N-Channel
RoHS Device
Halogen Free



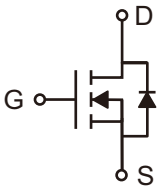
Features

- Low on resistance.
- Low gate charge.
- Fast switching characteristic.

Mechanical data

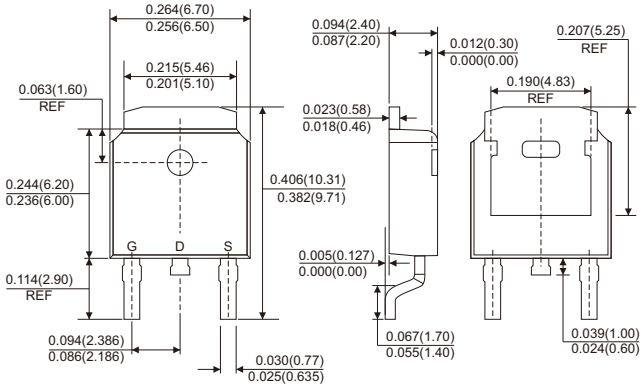
- Case: D-PAK/TO-252, molded plastic.

Circuit Diagram



G : GATE
S : SOURCE
D : DRAIN

D-PAK(TO-252)



Dimensions in inches and (millimeters)

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

Parameter		Symbol	Value	Units
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	±20	V
Continuous drain current @V_{GS}=10V (Note 1)	T_C = 25°C	I_D	44	A
	T_C = 100°C		28	
Continuous drain current @V_{GS}=10V (Note 2)	T_A = 25°C		7	
	T_A = 70°C		5.6	
Pulsed drain current (Note 3)		I_{DM}	176	A
Continuous body diode forward current @ T_C = 25°C (Note 1)		I_S	44	A
Avalanche current @ L=0.1mH		I_{AS}	30	A
Avalanche energy @ L=0.5mH		E_{AS}	81	mJ
Total power dissipation (Note 1)	T_C = 25°C	P_D	125	W
	T_C = 100°C		50	
Total power dissipation (Note 2)	T_A = 25°C		3.3	
	T_A = 70°C		2.1	
Thermal resistance from junction to case		$R_{\theta JC}$	1	°C/W
Thermal resistance from junction to ambient (Note 2)		$R_{\theta JA}$	38	°C/W
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (at T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	100			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1		2.5	V
Forward transconductance	g_{FS}	V_{DS} = 10V, I_D = 10A		25		S
Gate-body leakage current	I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1	μA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 10A		19	30	mΩ
		V_{GS} = 5V, I_D = 8A		20	35	
Dynamic						
Input capacitance	C_{iss}	V_{DS} = 50V, V_{GS} = 0V, f = 1MHz		1900		pF
Output capacitance	C_{oss}			146		
Reverse transfer capacitance	C_{rss}			75		
Gate resistance	R_g	f = 1MHz		0.8		Ω
Total gate charge (Note 4, 5)	Q_g	V_{DS} = 50V, I_D = 10A, V_{GS} = 10V		47		nC
Gate-source charge (Note 4, 5)	Q_{gs}			4.7		
Gate-drain charge (Note 4, 5)	Q_{gd}			12		
Turn-on delay time (Note 4, 5)	$t_{d(on)}$	V_{DS} = 50V, I_D = 1A, V_{GS} = 10V, R_{GS} = 6Ω		12		ns
Rise time (Note 4, 5)	tr			10		
Turn-off delay time (Note 4, 5)	$t_{d(off)}$			71		
Fall time (Note 4, 5)	t_f			17		
Source-Drain Diode						
Diode forward voltage (Note 4)	V_{SD}	I_S = I0A, V_{GS} = 0V		0.8	1.2	V
Reverse recovery time	trr	I_F = 10A, dI_F/d_t = 100A/μs		34		ns
Reverse recovery change	Q_{rr}			58		nC

Notes: 1. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction to case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. copper, in a still air environment with T_A=25°C. The power dissipation P_D is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

4. Pulse width ≤ 300μs, duty cycle ≤ 2%.

5. Independent of operating temperature.

Typical Rating and Characteristic Curves (CMS50N10D-HF)

Fig.1 - Typical Output Characteristics

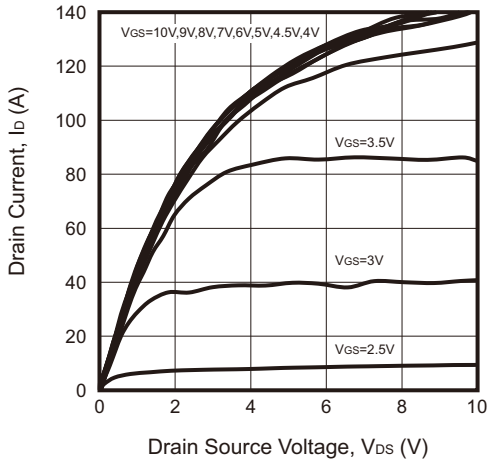


Fig.2 - Breakdown Voltage vs Ambient Temperature

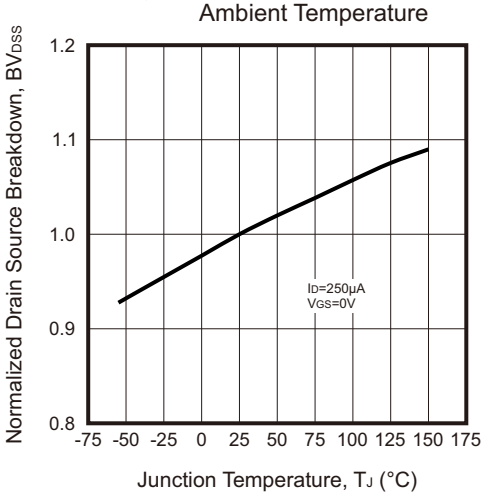


Fig.3 - Static Drain Source On-State Resistance vs Drain Current

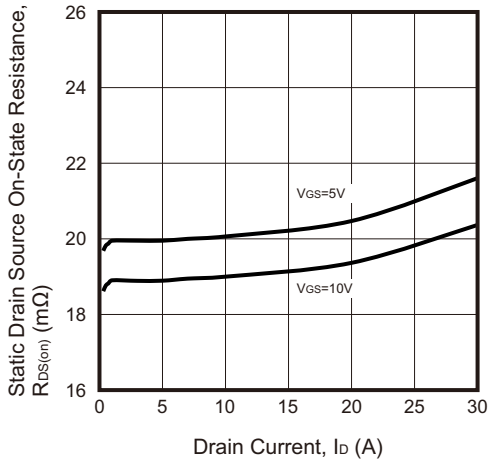


Fig.4 - Body Diode Current vs Source Drain Voltage

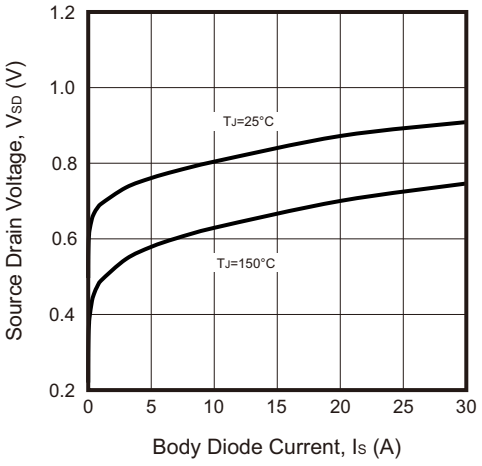


Fig.5 - Static Drain Source On-State Resistance vs Gate Source Voltage

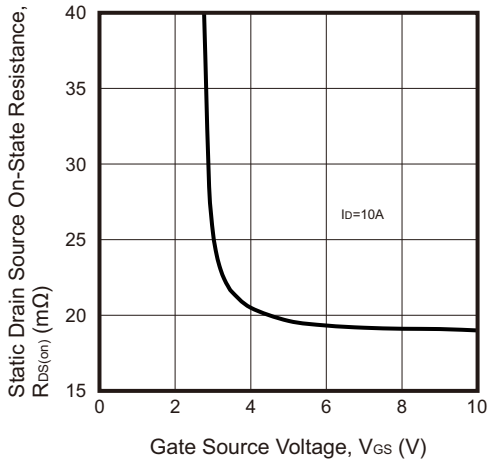
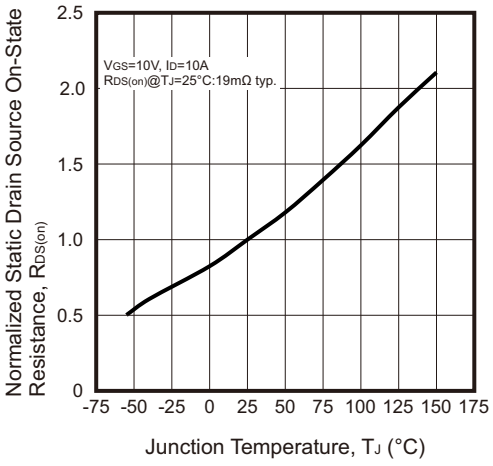


Fig.6 - Drain Source On-State Resistance vs Junction Temperature



Typical Rating and Characteristic Curves (CMS50N10D-HF)

Fig.7 - Capacitance vs Drain to Source Voltage

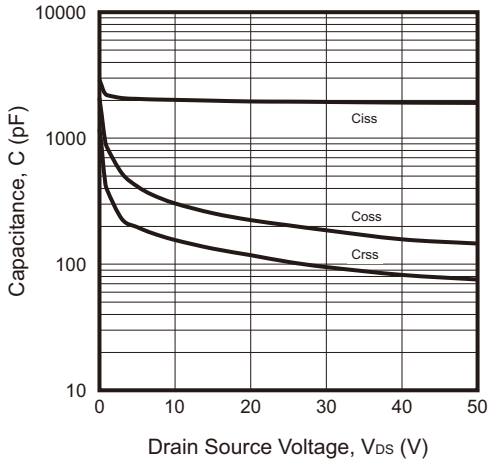


Fig.8 - Threshold Voltage vs Junction Temperature

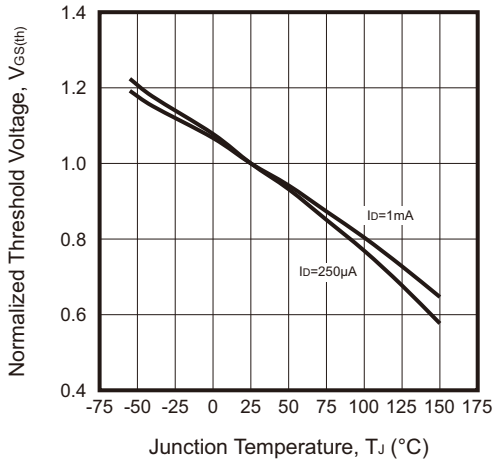


Fig.9 - Forward Transfer Admittance vs Drain Current

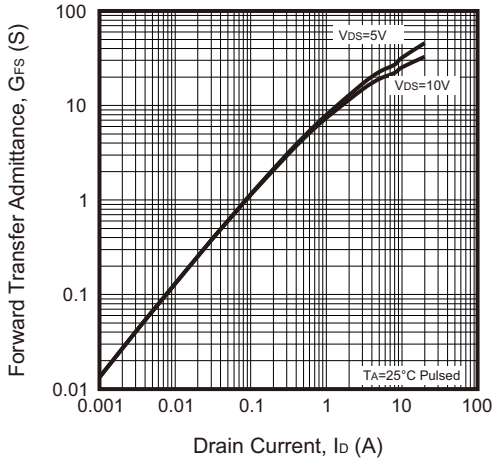


Fig.10 - Gate Charge Characteristics

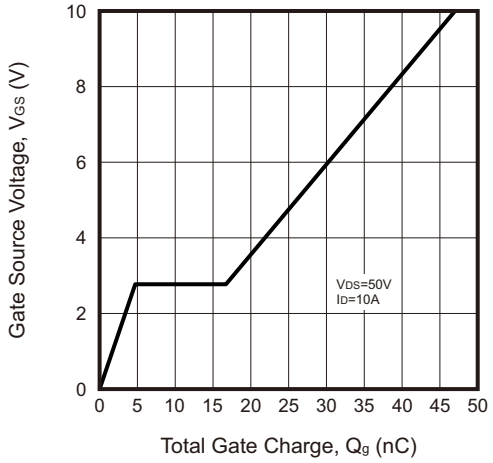


Fig.11 - Maximum Safe Operating Area

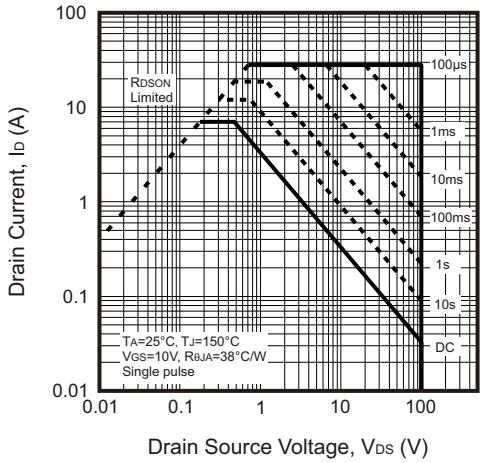
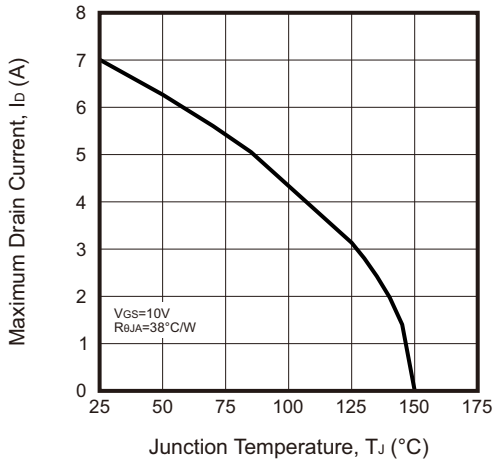
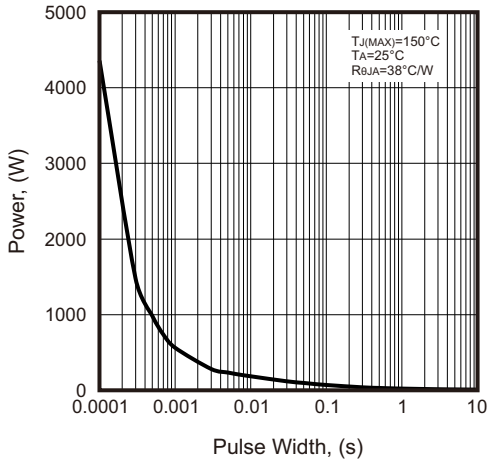


Fig.12 - Maximum Drain Current vs Junction Temperature

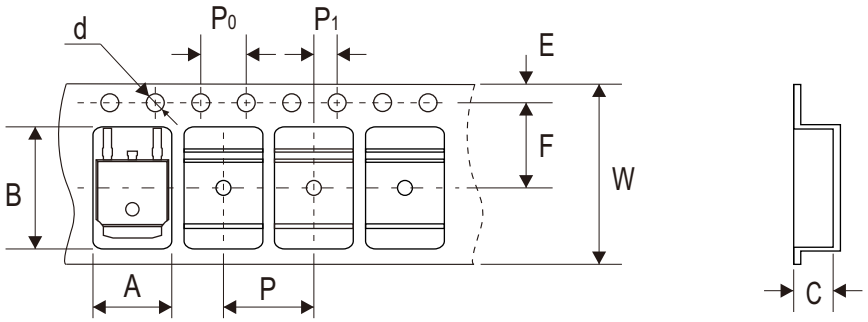


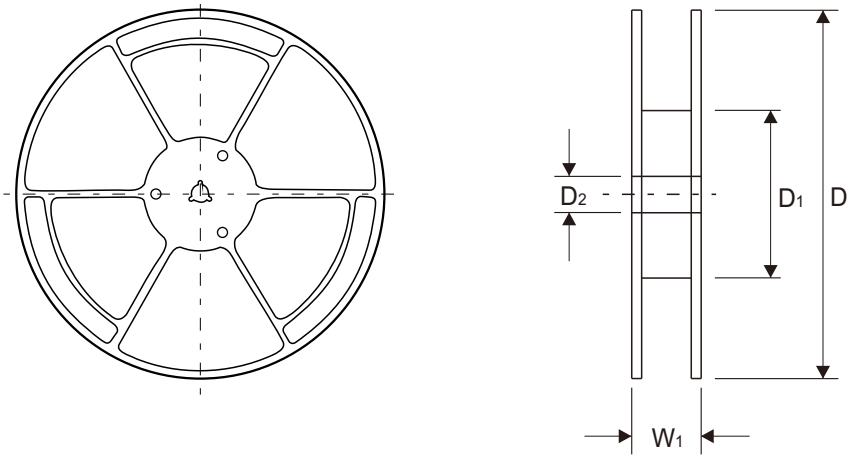
Typical Rating and Characteristic Curves (CMS50N10D-HF)

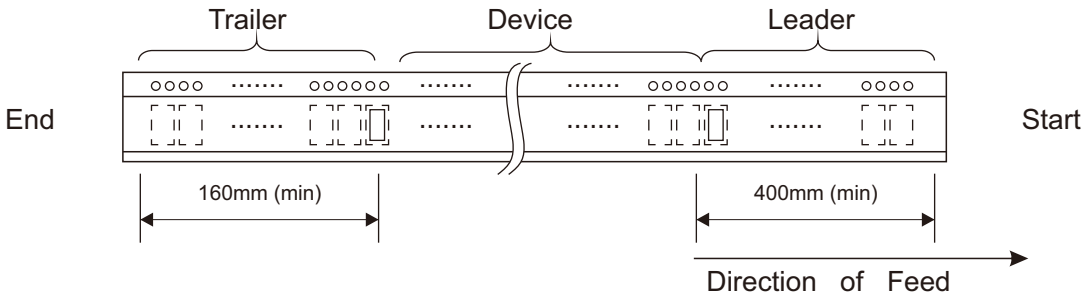
Fig.13 - Single Power Rating, Junction to Ambient



Reel Taping Specification





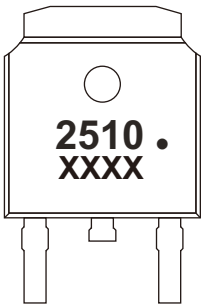


	SYMBOL	A	B	C	d	D	D_1	D_2
TO-252 (DPAK)	(mm)	6.90 ± 0.10	10.50 ± 0.10	2.70 ± 0.10	1.55 ± 0.05	330 ± 2.00	100 ± 1.00	21.00 ± 1.00
	(inch)	0.272 ± 0.004	0.413 ± 0.004	0.106 ± 0.004	0.061 ± 0.002	12.992 ± 0.079	3.937 ± 0.039	0.827 ± 0.039

	SYMBOL	E	F	P	P_0	P_1	W	W_1
TO-252 (DPAK)	(mm)	1.75 ± 0.10	7.50 ± 0.10	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	16.00 ± 0.10	21.00 ± 1.00
	(inch)	0.069 ± 0.004	0.295 ± 0.004	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.630 ± 0.004	0.827 ± 0.039

Marking Code

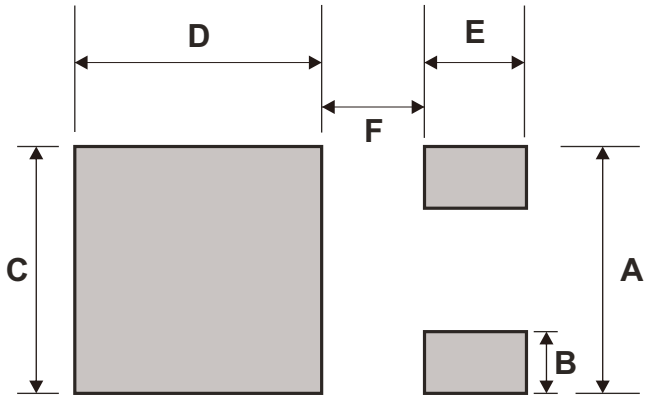
Part Number	Marking Code
CMS50N10D-HF	2510 •



XXXX = Control code

Suggested P.C.B. PAD Layout

SIZE	TO-252/DPAK	
	(mm)	(inch)
A	6.17	0.243
B	1.60	0.063
C	5.80	0.228
D	6.20	0.244
E	3.00	0.118
F	2.58	0.102



Standard Packaging

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