MOSFET

CMS50P04D-HF

P-Channel
RoHS Device
Halogen Free

Features

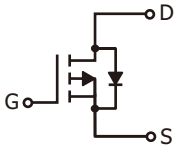
- Single drive requirement.
- Low On-resistance.
- Fast switching characteristic.

Mechanical data

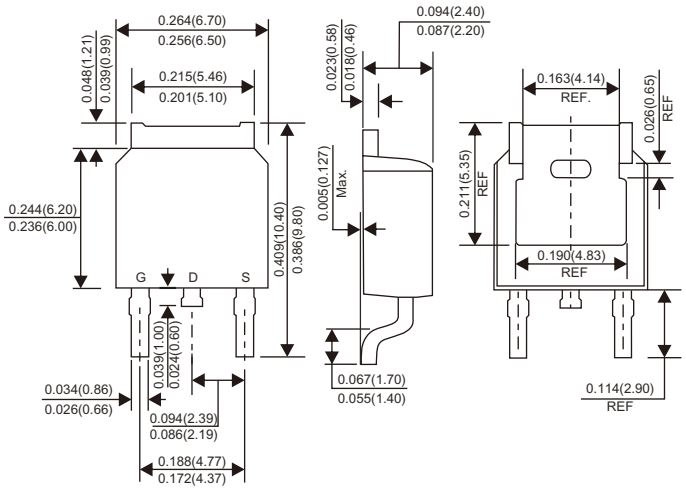
- Case: D-PAK/TO-252, molded plastic.

Circuit Diagram

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



D-PAK(TO-252)



Dimensions in inches and (millimeters)

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

Parameter	Conditions	Symbol	Value	Unit
Drain-source voltage		V_{DS}	-40	V
Gate-source voltage		V_{GS}	±20	V
Continuous drain current	V_{GS} = -10V, T_C = 25°C (package limited)	I_D	-50	A
	V_{GS} = -10V, T_C = 25°C (silicon limited)		-59	
	V_{GS} = -10V, T_C = 100°C		-37	
	V_{GS} = -10V, T_A = 25°C		-11	
	V_{GS} = -10V, T_A = 100°C		-7	
Pulsed drain current	Pulse width limited by safe operating area	I_{DM}	-100	A
Power dissipation	T_C = 25°C (Note 2)	P_D	69	W
	T_C = 100°C (Note 2)		28	
	T_A = 25°C		2.5	
	T_A = 100°C		1.0	
Single pulse avalanche energy	T_J = 25°C, V_{DD} = -15V, L = 1mH, R_G = 25Ω	E_{AS}	200	mJ
Single pulse avalanche current		I_{AS}	-20	A
Maximum thermal resistance	Junction to case	$R_{\theta JA}$	1.8	°C/W
	Junction to ambient (Note 1)	$R_{\theta JA}$	50	°C/W
Operating junction temperature range		T_J	-55 to +150	°C
Storage temperature range		T_{STG}	-55 to +150	°C

Notes: 1. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

2. The power dissipation P_D is more useful in setting the upper dissipation limit for cases where additional heatsinking is used. It is used to determined the current rating , when this rating falls below the package limit.

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Electrical Characteristics (at T_J=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	-40			V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.2	-2.5	
Forward transconductance	G_{FS}	V_{DS} = -5V, I_D = -25A		42		S
Gate-source leakage	I_{GSS}	V_{GS} = ±20V			±100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = -32V, V_{GS} = 0V			-1	μA
	I_{DSS}	V_{DS} = -32V, V_{GS} = 0V, T_j = 70°C			-25	
Drain-source on-state resistance	* $R_{DS(on)}$	I_D = -25A, V_{GS} = -10V		9.7	13	mΩ
		I_D = -15A, V_{GS} = -4.5V		12.7	18	
Dynamic						
Total gate charge	* Q_g	V_{DS} = -20V, I_D = -25A, V_{GS} = -10V		40		nC
Gate-source charge	* Q_{gs}			13		
Gate-drain charge	* Q_{gd}			16		
Turn-on delay time	* $t_{d(on)}$	V_{DS} = -20V, V_{GS} = -10V I_D = -25A, Rg = 6Ω		24		nS
Turn-on rise time	* t_r			15		
Turn-off delay time	* $t_{d(off)}$			120		
Turn-off fall time	* t_f			40		
Input capacitance	C_{iss}	V_{DS} = -20V , V_{GS} = 0V, f = 1MHz		3987		pF
Output capacitance	C_{oss}			325		
Reverse transfer capacitance	C_{rss}			263		
Source-Drain Diode						
Continuous source-drain diode current	* I_S				-50	A
Diode forward voltage	* V_{SD}	V_{GS} = 0V, I_S = -25A		-0.9	-1.2	V
Reverse recovery time	* t_{rr}	I_F = -25A ,V_{GS} = 0V dI_F/dt = 100A/μs		36		nS
Reverse recovery charge	* Q_{rr}			32		nC

*Pulse test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

Rating and Characteristic Curves (CMS50P04D-HF)

Fig.1 - Typical Output Characteristics

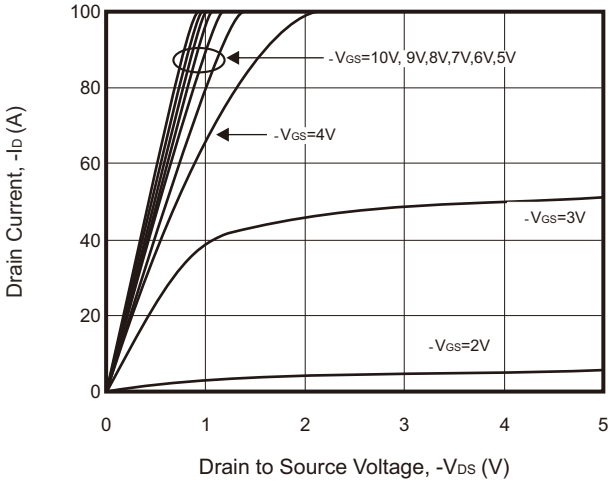


Fig.2 - Static Drain-Source On-State Resistance VS Drain Current

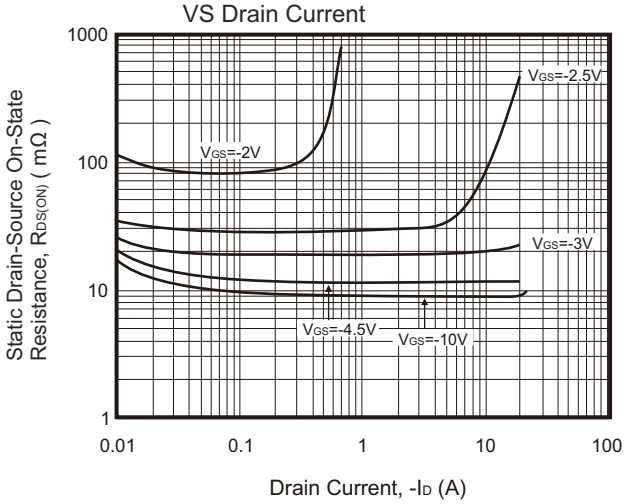


Fig.3 - Static Drain-Source On-State Resistance VS. Gate-Source Voltage

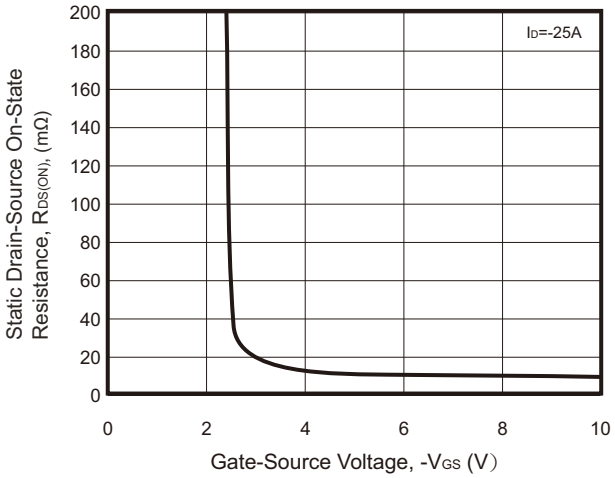


Fig.4 - Capacitance VS Drain-to-Source Voltage

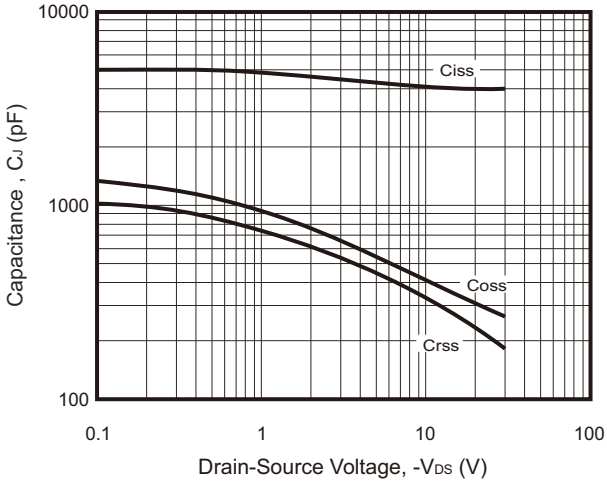


Fig.5 - Forward Transfer Admittance vs Drain Current

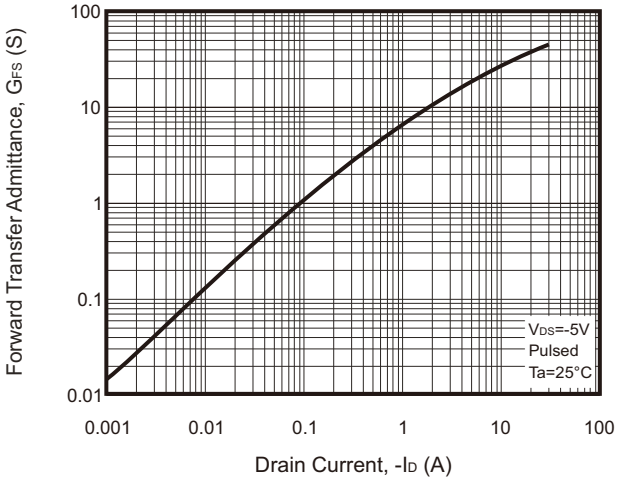
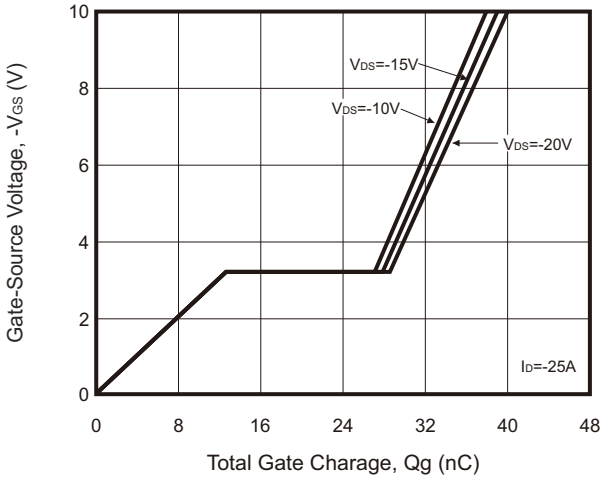


Fig.6 - Gate Charge Characteristics



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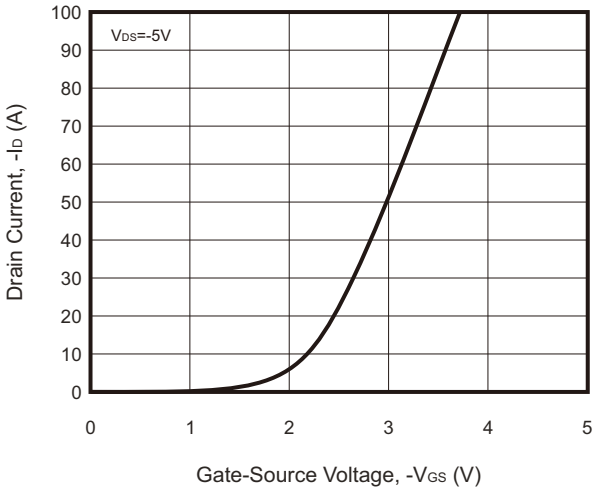
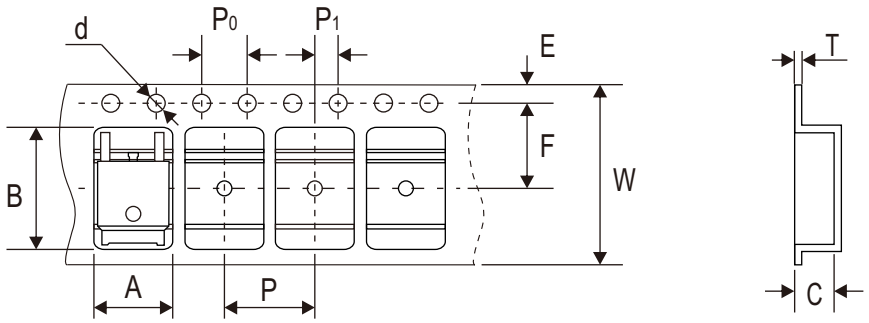
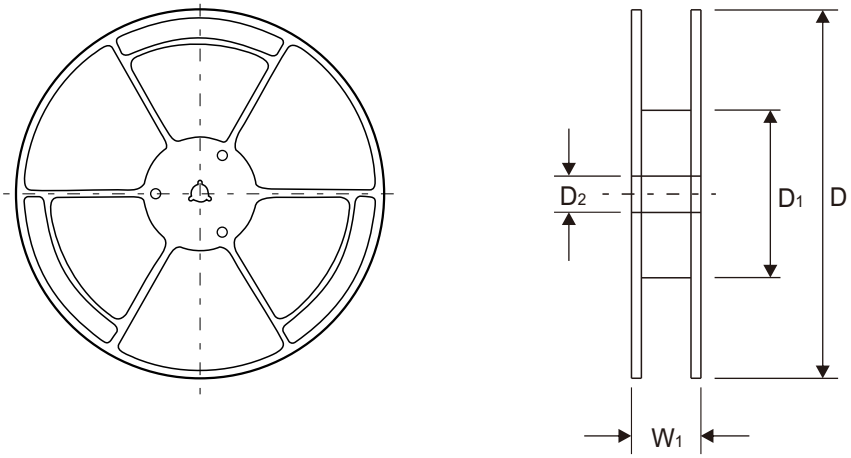
Rating and Characteristic Curves (CMS50P04D-HF)

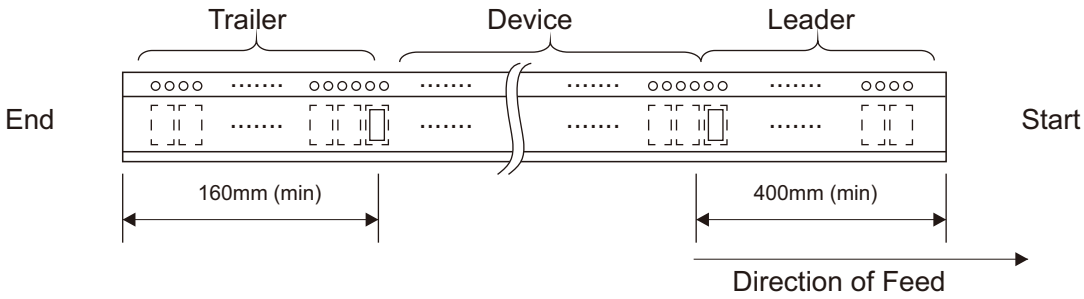
Fig.7 - Typical Transfer Characteristics



Reel Taping Specification





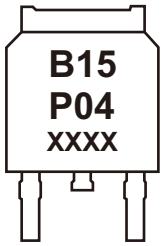


	SYMBOL	A	B	C	d	D	D1	D2
TO-252 (D-PAK)	(mm)	6.90 ± 0.10	10.50 ± 0.10	2.70 ± 0.10	1.55 ± 0.05	330.00 ± 2.00	100.00 ± 1.00	13.00 ± 1.00
	(inch)	0.272 ± 0.004	0.413 ± 0.004	0.106 ± 0.004	0.061 ± 0.002	12.992 ± 0.079	3.937 ± 0.039	0.512 ± 0.039

	SYMBOL	E	F	P	P0	P1	T	W	W1
TO-252 (D-PAK)	(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 ± 0.10	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	0.012 ± 0.002	0.630 ± 0.004	0.827 ± 0.039

Marking Code

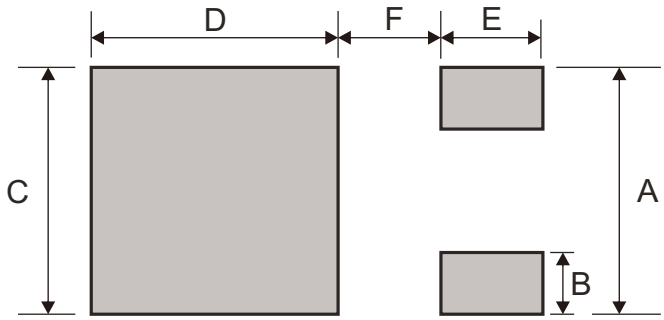
Part Number	Marking Code
CMS50P04D-HF	B15P04



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	0.101



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	REEL SIZE (inch)
TO-252/D-PAK	2,500	13