

CMS02P20Y-HF

P-Channel
RoHS Device
Halogen Free



Features

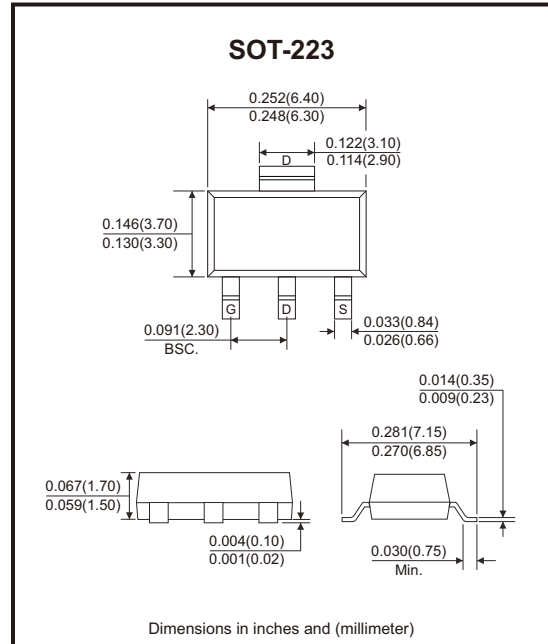
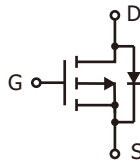
- Low gate charge.
- Fast switching characteristic.

Mechanical data

- Case: SOT-223, molded plastic.
- Mounting position: Any.

Circuit Diagram

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



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

Parameter	Conditions	Symbol	Value	Unit
Drain-source voltage		V_{DS}	-200	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	$V_{GS} = -10\text{V}$, $T_c = 25^\circ\text{C}$ (Note 1)	I_D	-2.5	A
	$V_{GS} = -10\text{V}$, $T_c = 100^\circ\text{C}$ (Note 1)	I_D	-1.6	
	$V_{GS} = -10\text{V}$, $T_A = 25^\circ\text{C}$ (Note 2)	I_D	-1	
	$V_{GS} = -10\text{V}$, $T_A = 70^\circ\text{C}$ (Note 2)	I_D	-0.8	
Pulsed drain current	(Note 3)	I_{DM}	-9	A
Continuous body diode forward current	$T_c = 25^\circ\text{C}$ (Note 1)	I_S	-2.5	A
Pulsed body diode forward current	$T_c = 25^\circ\text{C}$ (Note 1)	I_{SM}	-9	A
Avalanche current	$L=0.1\text{mH}$	I_{AS}	-9	A
Avalanche energy	$L=0.5\text{mH}$	E_{AS}	15	mJ
Total power dissipation	$T_c = 25^\circ\text{C}$ (Note 1)	P_D	13	W
	$T_c = 100^\circ\text{C}$ (Note 1)	P_D	5	
	$T_A = 25^\circ\text{C}$ (Note 2)	P_D	2.1	
	$T_A = 70^\circ\text{C}$ (Note 2)	P_D	1.3	
Operating junction and storage temperature range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$
Thermal resistance junction-case		$R_{\theta JC}$	9.5	$^\circ\text{C/W}$
Thermal resistance junction-ambient	(Note 2)	$R_{\theta JA}$	60	

- Notes: 1. The power dissipation P_D is based on $T_J(\text{MAX})=150^\circ\text{C}$, 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 $T_A=25^\circ\text{C}$. 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 $T_J(\text{MAX})=150^\circ\text{C}$. Ratings are based on low frequency and low duty cycles to keep initial $T_J=25^\circ\text{C}$.

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-200			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-2		-4	V
Forward transconductance	g_{fs}	$V_{DS} = -10V, I_D = -1A$		3		S
Gate-source leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
Drain-source leakage current	I_{DSS}	$V_{DS} = -160V, V_{GS} = 0V$			-1	μA
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -1A$		0.8	1	Ω
Dynamic						
Input capacitance	C_{iss}	$V_{DS} = -100V, V_{GS} = 0V, f = 1MHz$		680		pF
Output capacitance	C_{oss}			30		
Reverse transfer capacitance	C_{rss}			25		
Gate resistance	R_g	$f = 1MHz$		11		Ω
Total gate charge (Note 1,2)	Q_g	$V_{DS} = -100V, I_D = -1A, V_{GS} = -10V$		15		nC
Gate-source charge (Note 1,2)	Q_{gs}			3.4		
Gate-drain charge (Note 1,2)	Q_{gd}			3.8		
Turn-on delay time (Note 1,2)	$t_{d(on)}$	$V_{DS} = -100V, I_D = -1A, V_{GS} = -10V$ $R_{GS} = 1\Omega$		11		nS
Rise time (Note 1,2)	t_r			18		
Turn-off delay time (Note 1,2)	$t_{d(off)}$			37		
Fall time (Note 1,2)	t_f			80		
Source-drain diode						
Diode forward voltage (Note 1)	V_{SD}	$I_S = -1A, V_{GS} = 0V$		-0.79	-1.2	V
Reverse recovery time	t_{rr}	$I_F = -1A, dI_F/dt = 100A/\mu s$		43		nS
Reverse recovery charge	Q_{rr}			73		nC

Notes: 1. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 2. Independent of operating temperature.

Typical Rating and Characteristic Curves (CMS02P20Y-HF)

Fig.1 - Typical Output Characteristics

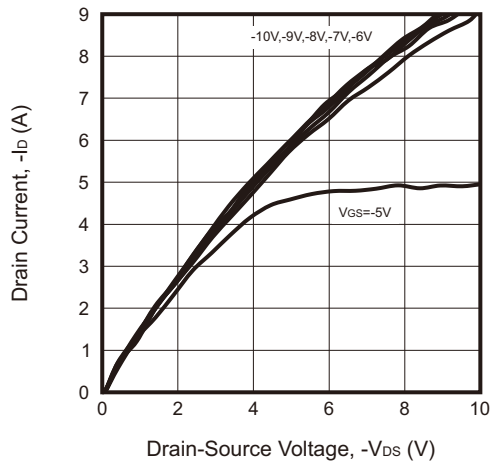


Fig.2 - Breakdown Voltage vs Ambient Temperature

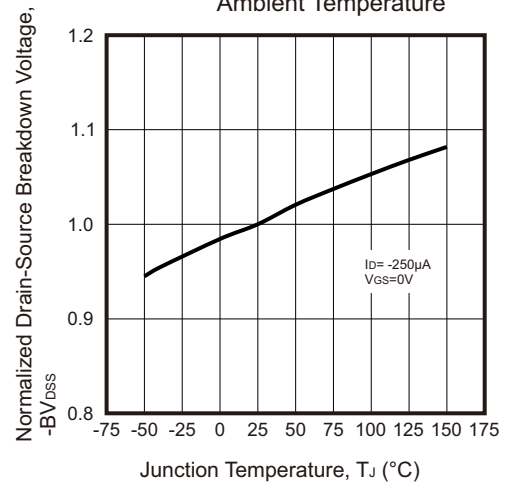


Fig.3 - Static Drain-Source On-State Resistance vs Drain Current

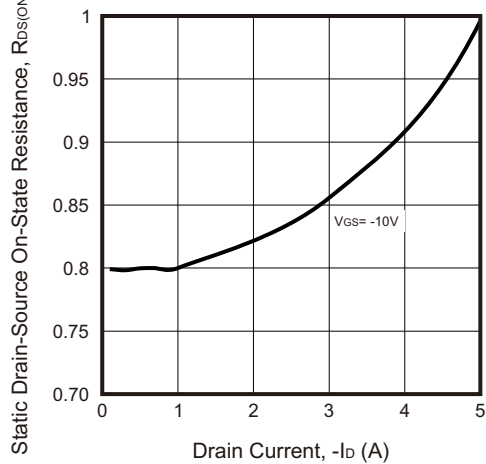


Fig.4 - Body Diode Current vs Source-Drain Voltage

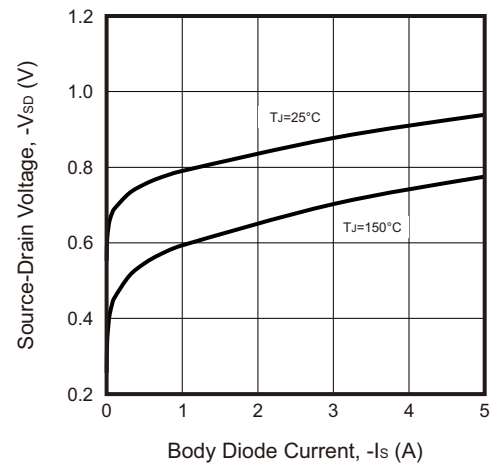


Fig.5 - Static Drain-Source On-State Resistance vs Gate-Source Voltage

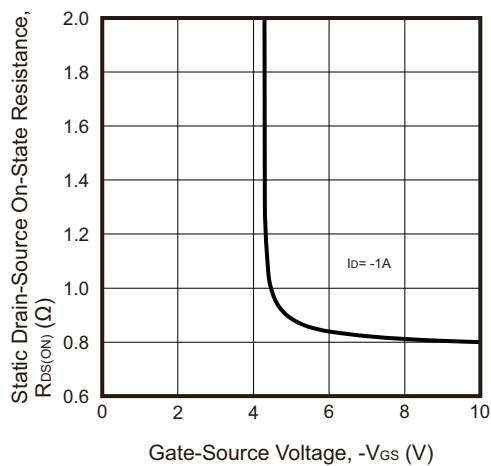
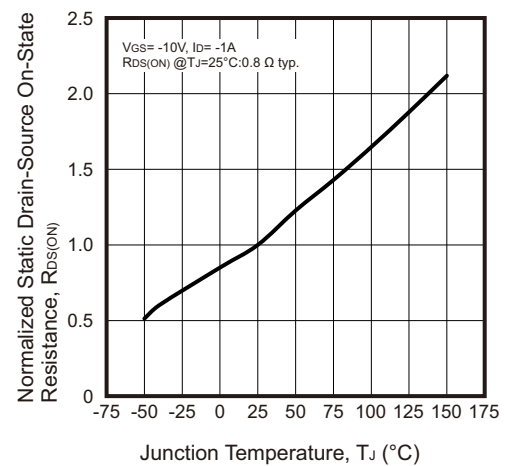


Fig.6 - Drain-Source On-State Resistance vs Junction Temperature



Typical Rating and Characteristic Curves (CMS02P20Y-HF)

Fig.7 - Capacitance vs Drain-to-Source Voltage

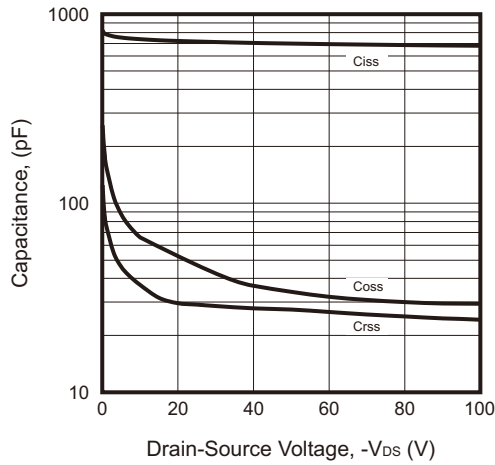


Fig.8 - Threshold Voltage vs Junction Temperature

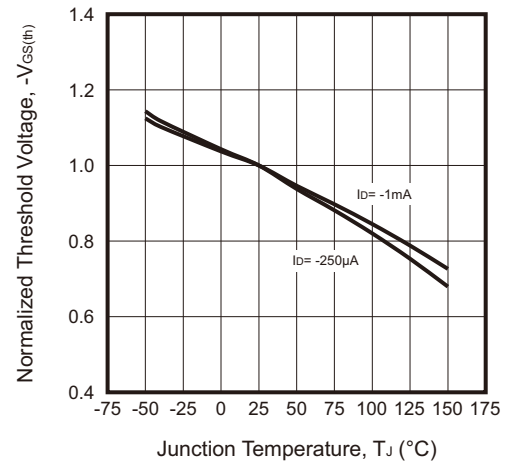


Fig.9 - Forward Transfer Admittance vs Drain Current

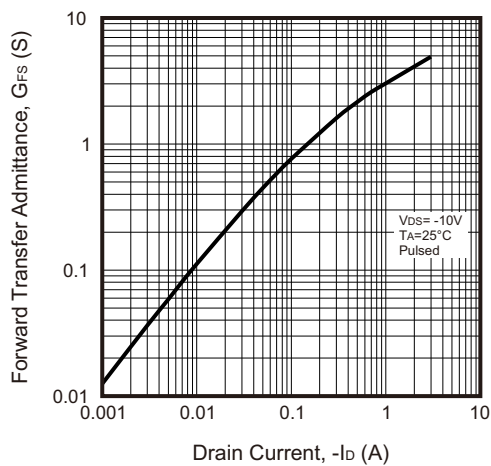


Fig.10 - Gate Charge Characteristics

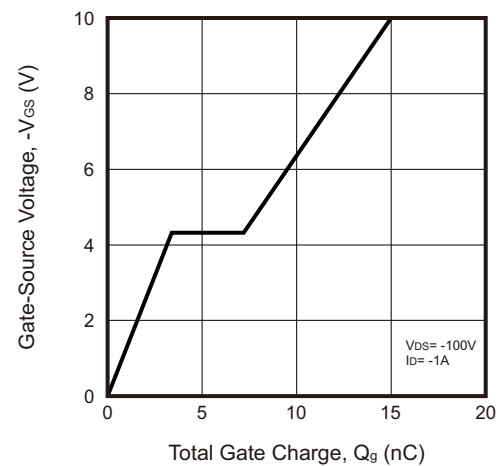


Fig.11 - Maximum Safe Operating Area

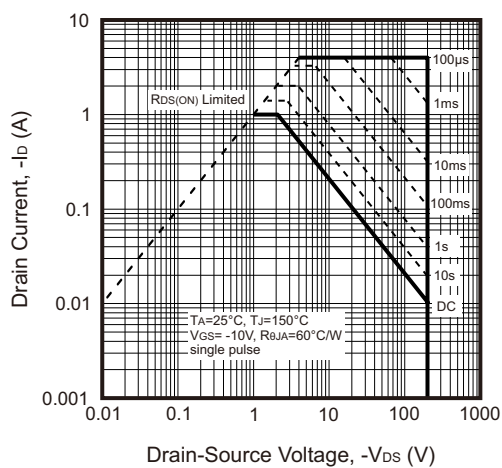
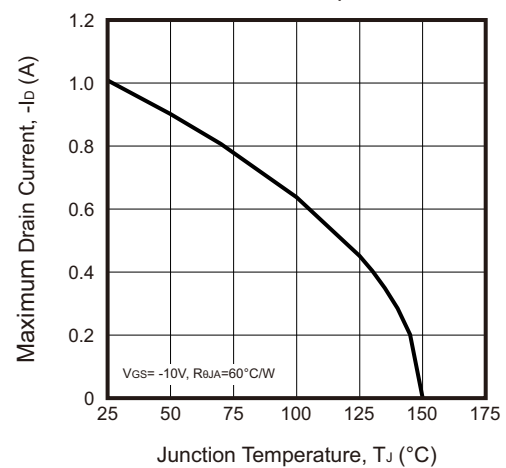
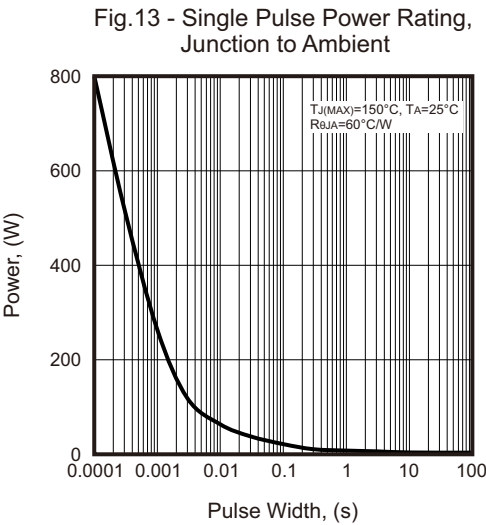


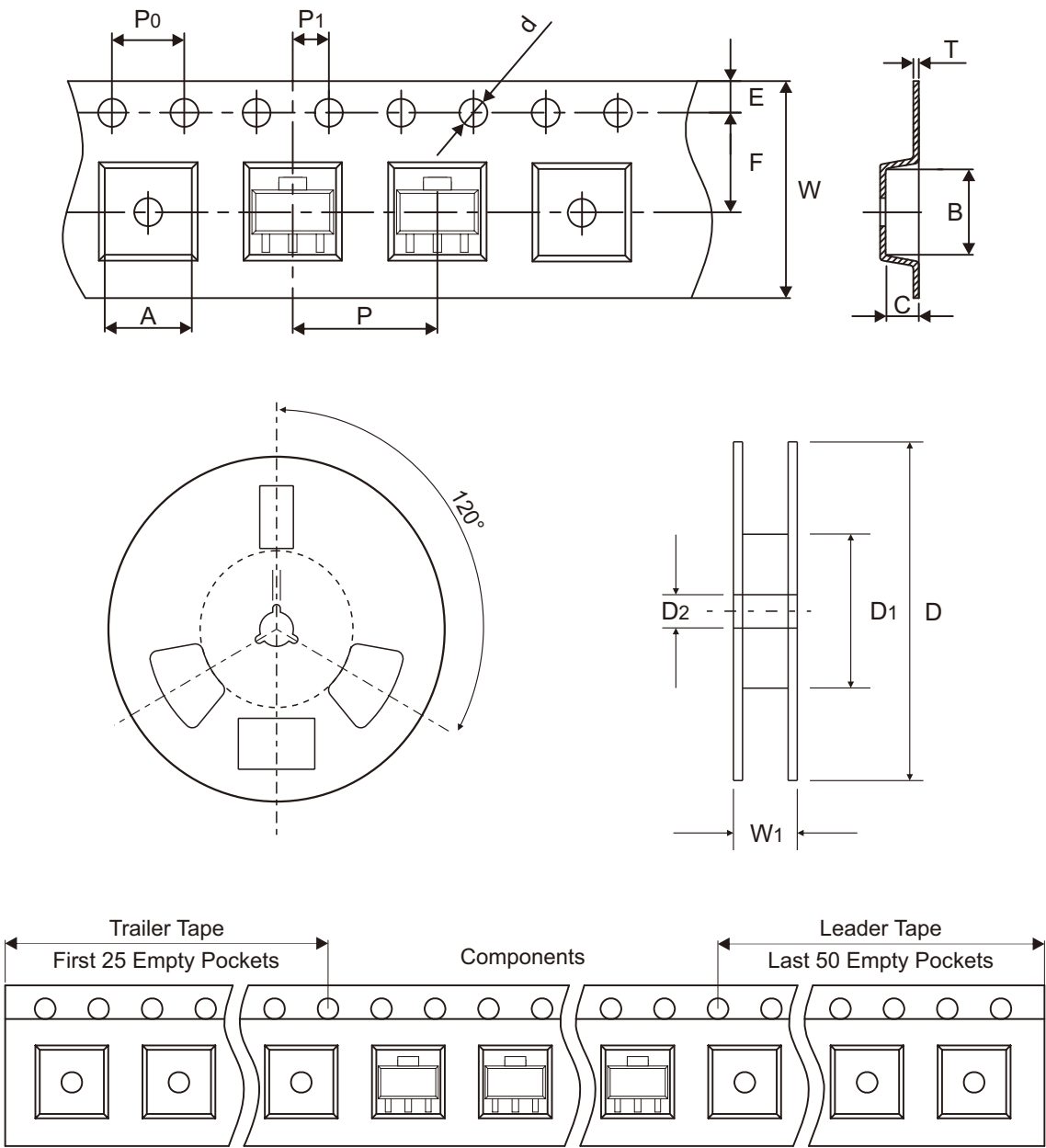
Fig.12 - Maximum Drain Current vs Junction Temperature



Typical Rating and Characteristic Curves (CMS02P20Y-HF)



Reel Taping Specification

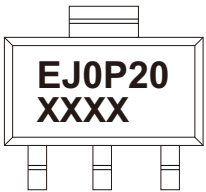


SOT-223	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	6.55 ± 0.10	7.25 ± 0.10	1.90 ± 0.10	1.50 + 0.10 - 0.00	330.00 ± 1.00	100.00 ± 0.50	13.00 ± 0.20
	(inch)	0.258 ± 0.004	0.285 ± 0.004	0.075 ± 0.004	0.059 + 0.004 - 0.000	12.992 ± 0.039	3.937 ± 0.020	0.512 ± 0.008

SOT-223	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.25 ± 0.03	12.00 + 0.30 - 0.10	17.60 + 1.00 - 0.00
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.010 ± 0.001	0.472 + 0.012 - 0.004	0.693 + 0.039 - 0.000

Marking Code

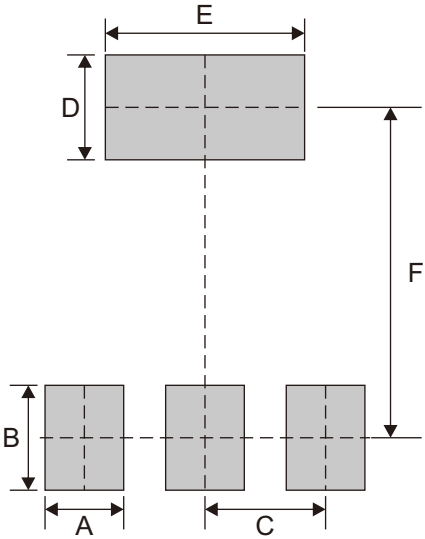
Part Number	Marking Code
CMS02P20Y-HF	EJ0P20 XXXX



XXXX = Control code

Suggested P.C.B. PAD Layout

SIZE	SOT-223	
	(mm)	(inch)
A	1.50	0.059
B	2.00	0.079
C	2.30	0.091
D	2.00	0.079
E	3.80	0.150
F	6.30	0.248



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-223	2,500	13