

CMS10N03Q8-HF

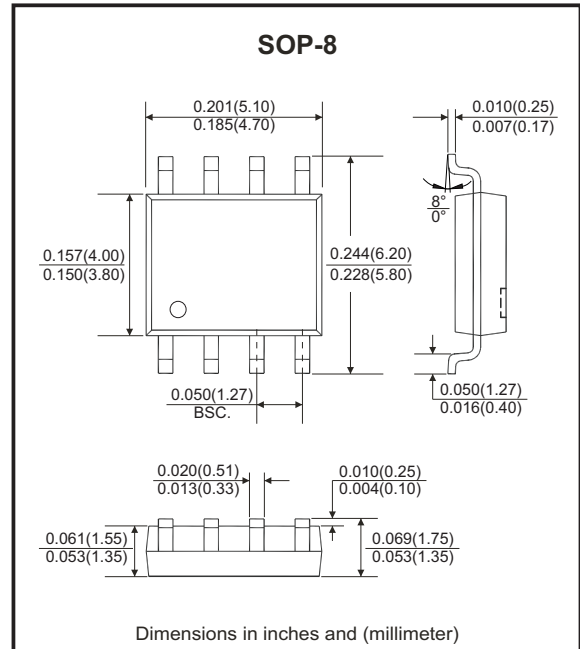
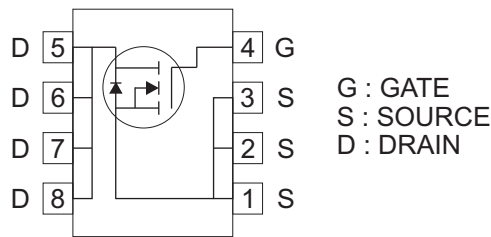
**N-Channel
RoHS Device
Halogen Free**



Features

- Single Drive Requirement.
- Low On-resistance.
- Fast Switching Characteristic.
- Dynamic dv/dt rating.
- Repetitive Avalanche Rated.

Circuit diagram



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

Parameter	Symbol	Value	Unit
Drain-source voltage	V _{DS}	30	V
Gate-source voltage	V _{GS}	±20	V
Continuous drain current	I _D	T _A = 25°C, V _{GS} = 10V	10.2
		T _A = 100°C, V _{GS} = 10V	6.5
Pulsed drain current (Note 1)	I _{DM}	40	A
Avalanche current	I _{AS}	10	A
Avalanche energy @ L=0.1mH, I _D =10A, R _G =25Ω	E _{AS}	5	mJ
Repetitive avalanche energy @ L=0.05mH (Note 2)	E _{AR}	1.6	mJ
Power dissipation	P _D	T _A = 25°C	3.1
		T _A = 100°C	1.2
Thermal resistance from junction to ambient (Note 3)	R _{θJA}	40	°C/W
Thermal resistance from junction to case	R _{θJC}	25	°C/W
Operating junction temperature	T _J	-55 to +150	°C
Storage temperature range	T _{STG}	-55 to +150	°C

Notes: 1. Pulse width limited by maximum junction temperature.

2. Duty cycle ≤ 1%.

3. 40°C/W when mounted on a 1 in² pad of 2 oz copper, t ≤ 10s; 125°C/W when mounted on minimum pad.

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.7	3.0	V
Gate-source leakage	I_{GSS}	$V_{GS}=\pm 20V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$			1	μA
		$V_{DS}=20V, V_{GS}=0V, T_J=125^{\circ}\text{C}$			25	
Static Drain-source on-state resistance (Note 1)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=9A$		13.6	18	m Ω
		$V_{GS}=4.5V, I_D=7A$		22.3	29	
Forward transconductance	G_{FS}	$V_{DS}=5V, I_D=8A$		9		S
Dynamic						
Input capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V$ $f=1\text{MHz}$		715		μF
Output capacitance	C_{oss}			76		
Reverse transfer capacitance	C_{rss}			66		
Turn-on delay time (Note 1 & 2)	$t_{d(ON)}$	$V_{DS}=15V, I_D=1A$ $V_{GS}=10V, R_G=6\Omega$		7.5		ns
Rise time (Note 1 & 2)	t_r			12		
Turn-off delay time (Note 1 & 2)	$t_{d(OFF)}$			21		
Fall time (Note 1 & 2)	t_f			7		
Total gate charge (Note 1 & 2)	Q_g	$V_{DS}=15V, I_D=9A, V_{GS}=10V$		11		nC
Total gate charge (Note 1 & 2)	Q_g	$V_{DS}=15V, I_D=9A, V_{GS}=5V$		6.4		
Gate-source charge (Note 1 & 2)	Q_{gs}	$V_{DS}=15V, I_D=9A, V_{GS}=10V$		1.9		
Gate-drain charge (Note 1 & 2)	Q_{gd}			3		
Gate resistance	R_g	$V_{DS}=0V, V_{GS}=15\text{mV}, f=1\text{MHz}$		2.2		Ω
Source-Drain Diode						
Continuous source-drain diode current (Note 1)	I_S				2.3	A
Pulse diode forward current (Note 3)	I_{SM}				9.2	
Diode forward voltage (Note 1)	V_{SD}	$I_F=2.3A, V_{GS}=0V$		0.78	1.2	V
Reverse recovery time	t_{rr}	$I_F=2.3A, dI_F/dt=100A/\mu s$		50		ns
Recovered charge	Q_{rr}				2	

Note: 1. Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 2. Independent of operating temperature.
 3. Pulse width limited by maximum junction temperature.

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TYPICAL RATING AND CHARACTERISTIC CURVES (CMS10N03Q8-HF)

Fig.1 - Typical Output Characteristics

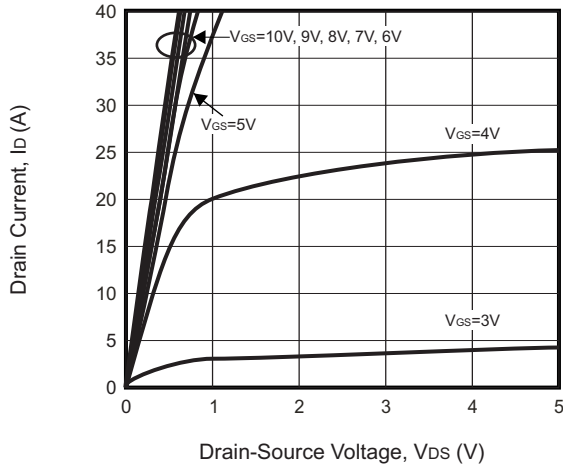


Fig.2 - Static Drain-Source On-State Resistance vs. Drain Current

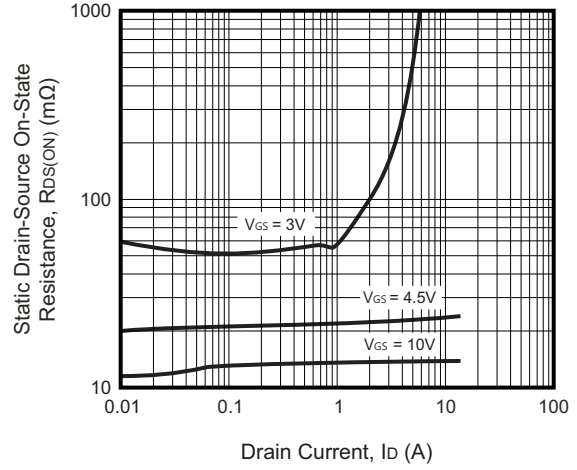


Fig.3 - Static Drain-Source On-State Resistance vs. Gate-Source Voltage

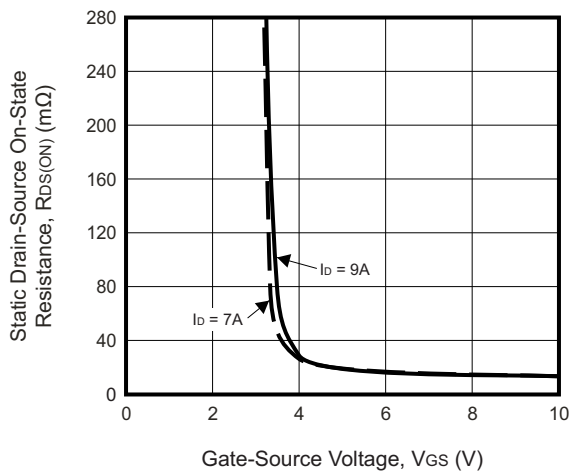


Fig.4 - Capacitance vs. Drain-Source Voltage

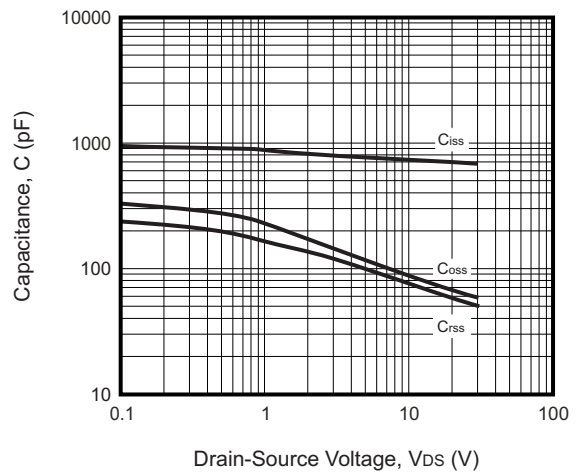


Fig.5 - Forward Transfer Admittance vs. Drain Current

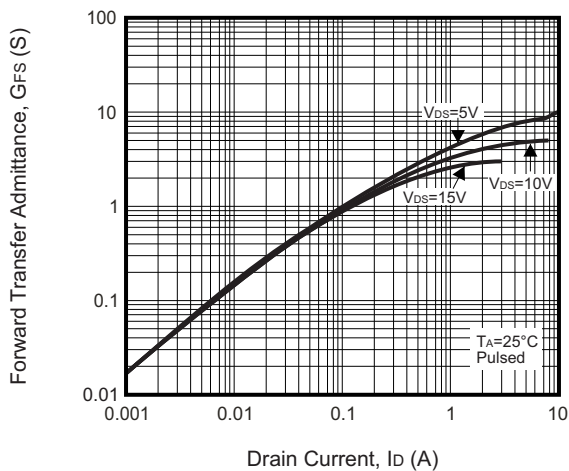
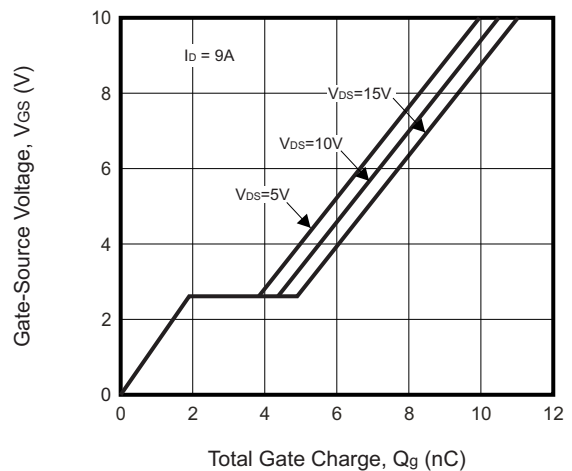
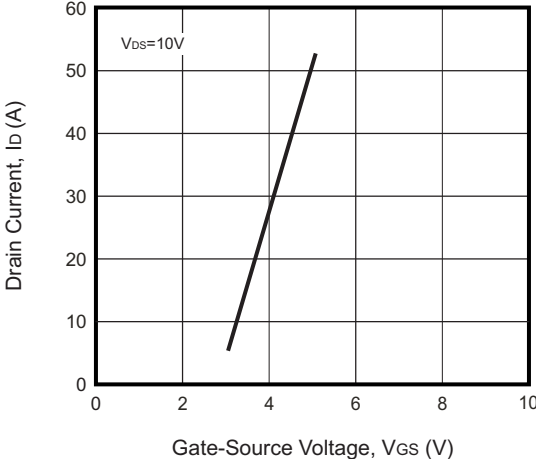


Fig.6 - Gate Charge Characteristics

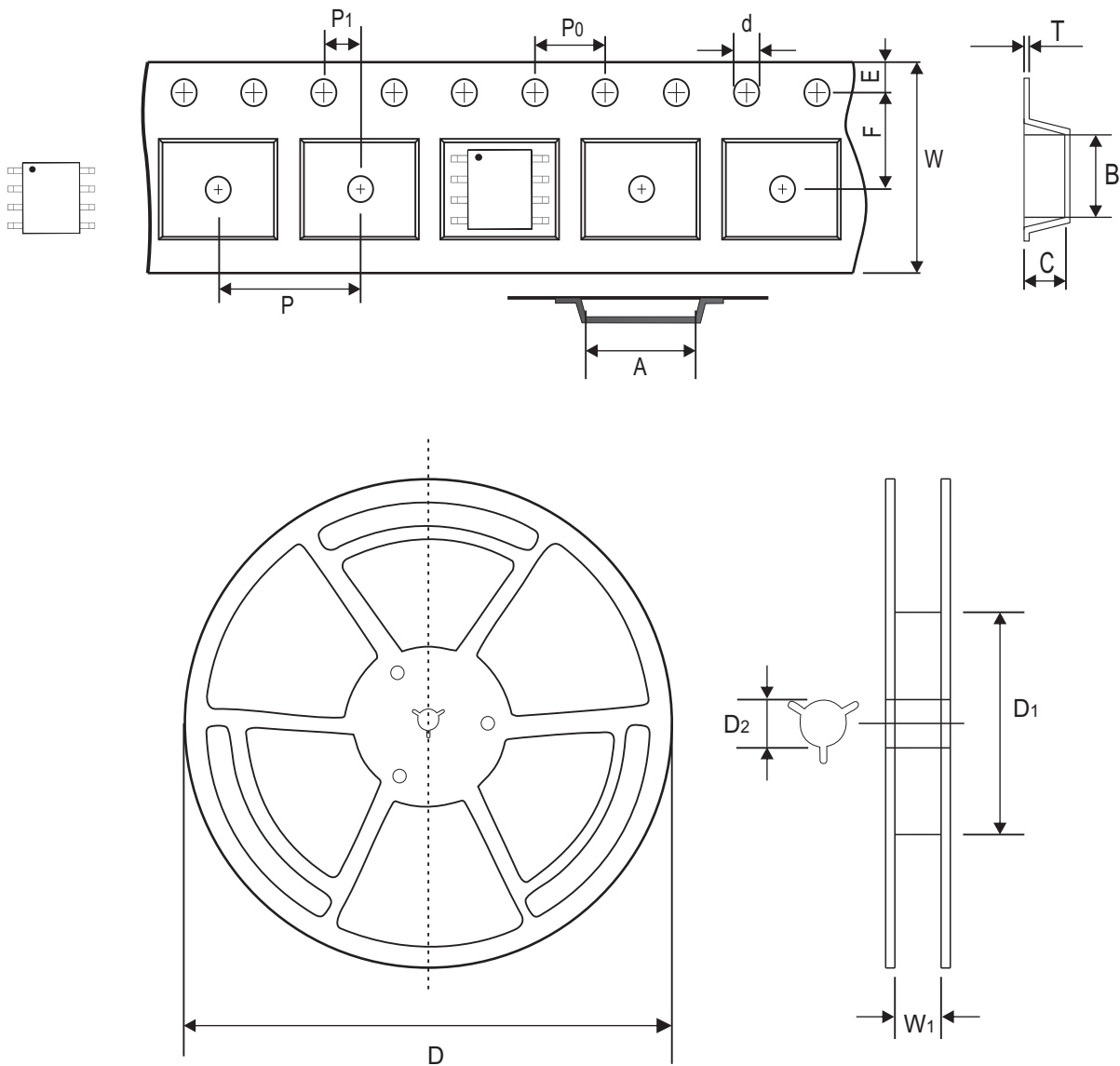


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Fig.7 - Typical Transfer Characteristics



Reel Taping Specification



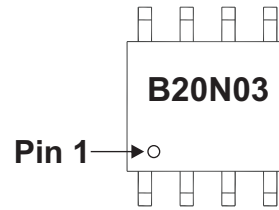
SOP-8	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	6.40 ± 0.10	5.20 ± 0.10	2.10 ± 0.10	1.50 + 0.10 - 0.00	330.00 ± 1.00	100.00 ± 0.50	13.00 ± 0.20
	(inch)	0.252 ± 0.004	0.205 ± 0.004	0.083 ± 0.004	0.059 + 0.004 - 0.000	12.992 ± 0.039	3.937 ± 0.020	0.512 ± 0.008

SOP-8	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 ± 0.02	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

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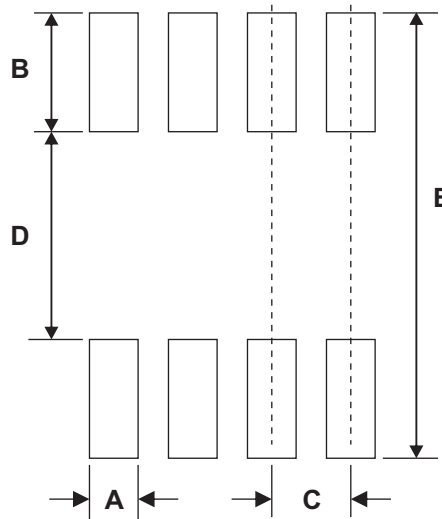
Marking Code

Part Number	Marking Code
CMS10N03Q8-HF	B20N03



Suggested PAD Layout

SIZE	SOP-8	
	(mm)	(inch)
A	0.60	0.024
B	1.52	0.060
C	1.27	0.050
D	4.00	0.157
E	7.00	0.275



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOP-8	2,500	13