

CMS2010-HF

N-Channel RoHS Device Halogen Free

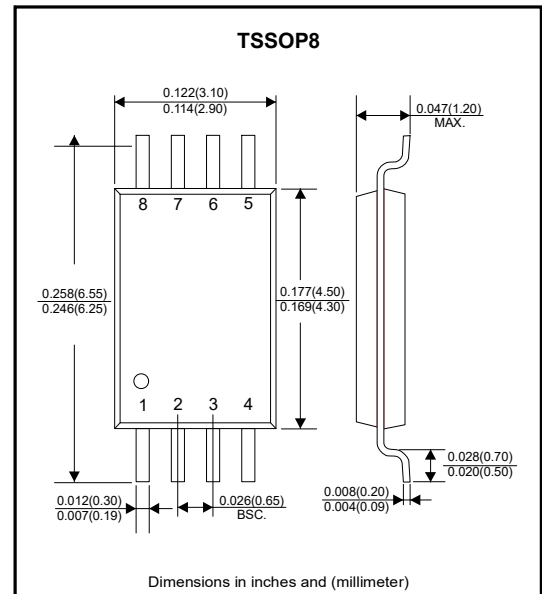
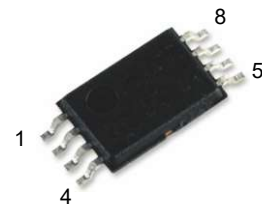
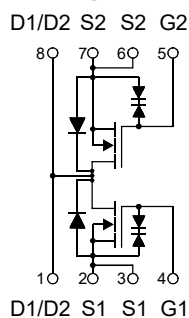
Features

- $V_{DS} = 20V, I_D = 7A$
- $R_{DS(ON)} < 24m\Omega @ V_{GS}=2.5V$
- $R_{DS(ON)} < 18m\Omega @ V_{GS}=4.5V$
- ESD Rating: 2000V HBM
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Description

The NCE2010E uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications. It is ESD protested.

Circuit diagram



Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	7	A
Drain Current-Pulsed (Note 1)	I_{DM}	30	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	83.3	°C/W
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Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	20	21.5	23	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V,V _{DS} =0V	-	-	±10	μA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	0.5	0.7	0.9	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =6.5A	-	13	18	mΩ
		V _{GS} =2.5V, I _D =5.5A	-	17	24	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =7A	-	20	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =10V,V _{GS} =0V, F=1.0MHz	-	1150	-	PF
Output Capacitance	C _{Oss}		-	185	-	PF
Reverse Transfer Capacitance	C _{rss}		-	145	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V,R _L =1.35Ω V _{GS} =5V,R _{GEN} =3Ω	-	6		nS
Turn-on Rise Time	t _r		-	13		nS
Turn-Off Delay Time	t _{d(off)}		-	52		nS
Turn-Off Fall Time	t _f		-	16		nS
Total Gate Charge	Q _g	V _{DS} =10V,I _D =7A, V _{GS} =4.5V	-	15		nC
Gate-Source Charge	Q _{gs}		-	0.8	-	nC
Gate-Drain Charge	Q _{gd}		-	3.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =1A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	7	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

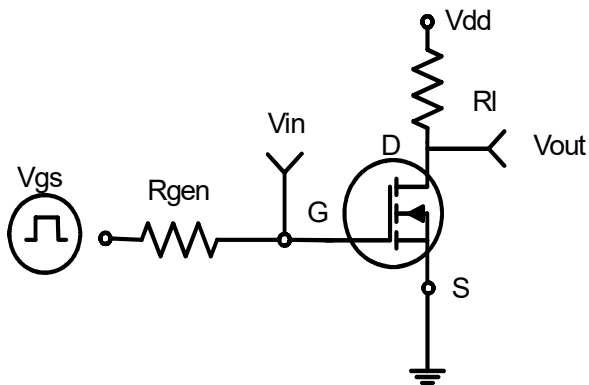


Figure 1: Switching Test Circuit

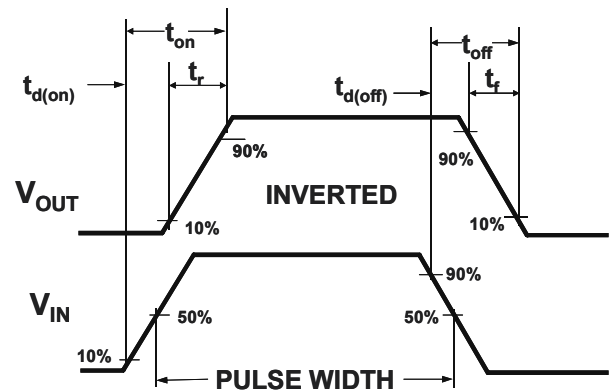


Figure 2: Switching Waveforms

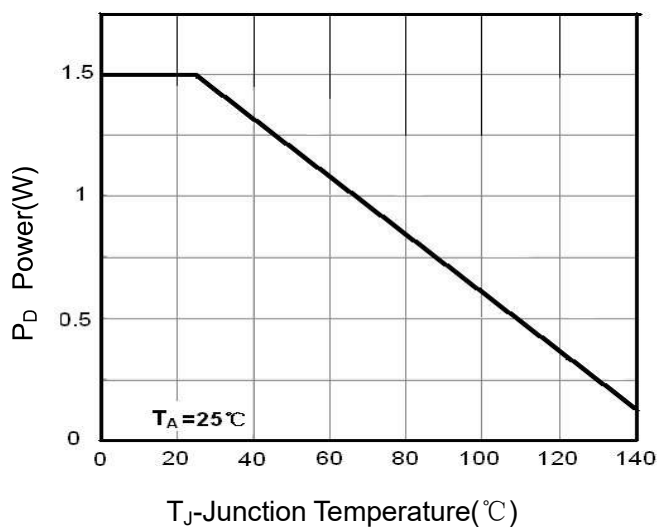


Figure 3 Power Dissipation

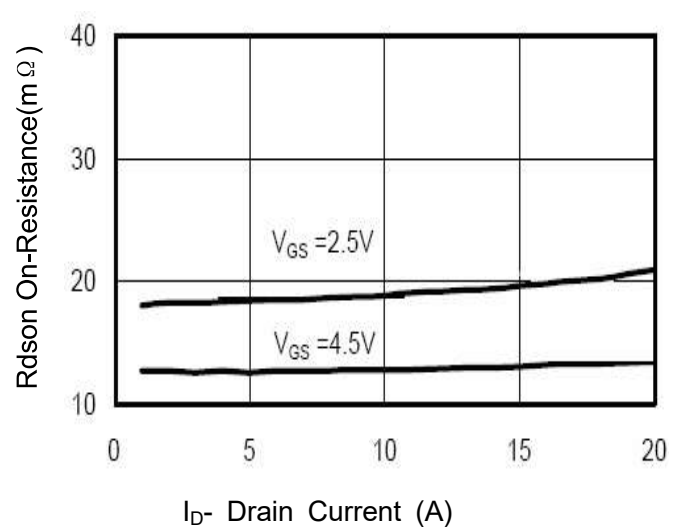


Figure 6 Drain-Source On-Resistance

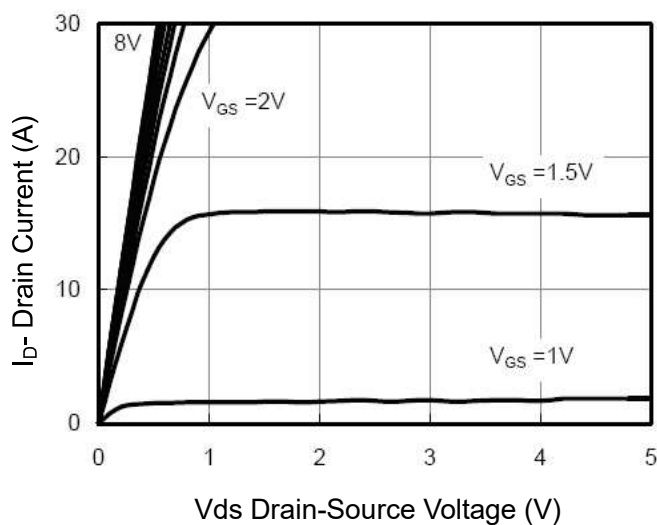


Figure 5 Output Characteristics

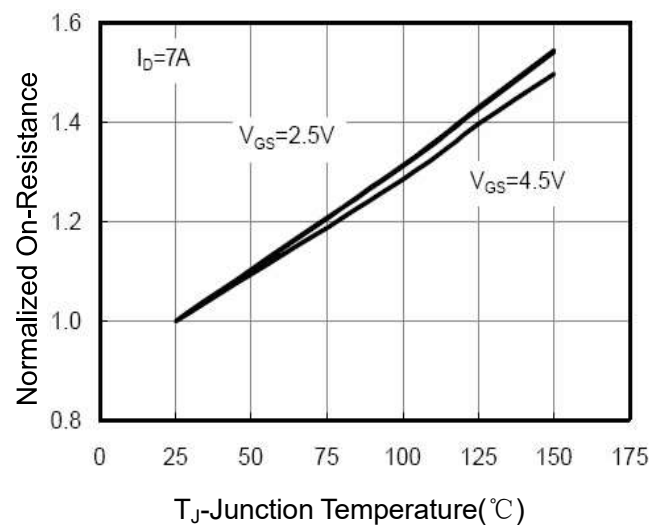
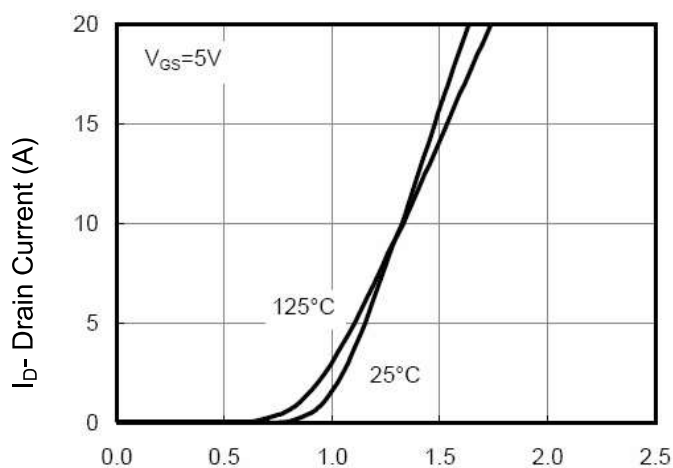
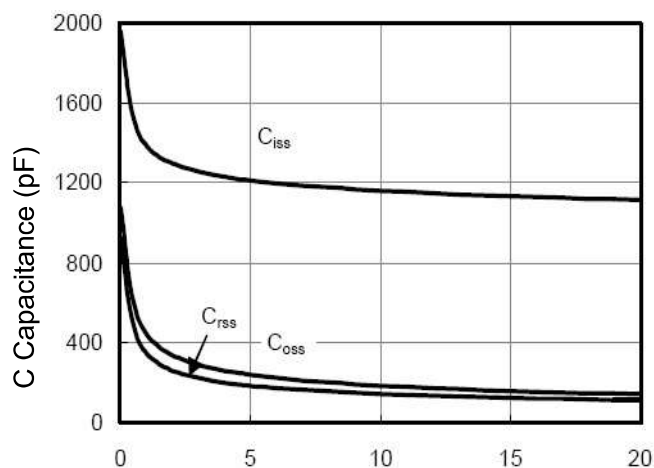


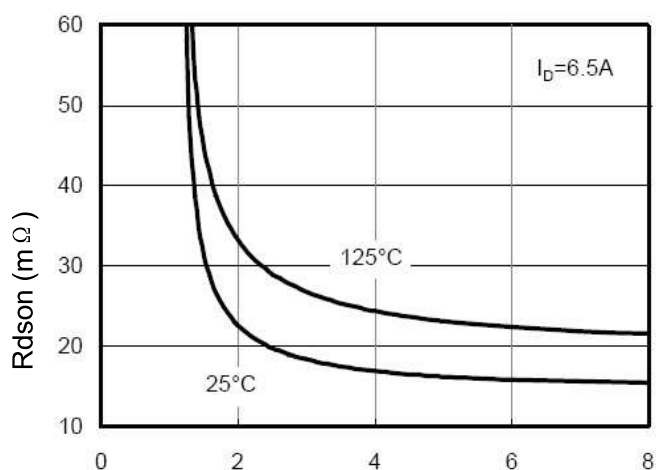
Figure 8 Drain-Source On-Resistance



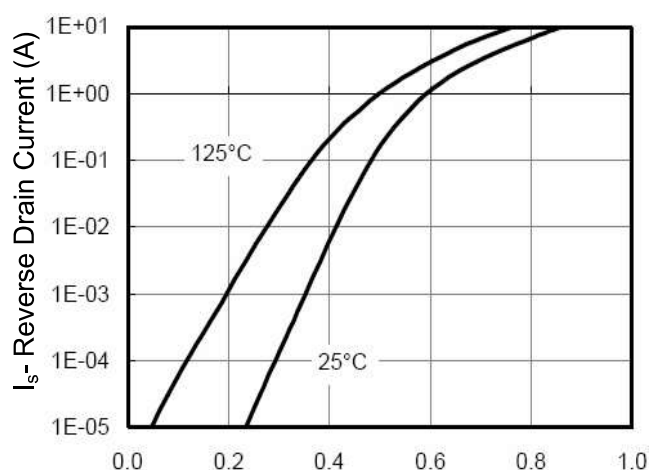
Vgs Gate-Source Voltage (V)
Figure 7 Transfer Characteristics



Vds Drain-Source Voltage (V)
Figure 8 Capacitance vs Vds



Vgs Gate-Source Voltage (V)
Figure 9 Rdson vs Vgs



Vds Drain-Source Voltage (V)
Figure 10 Capacitance vs Vds

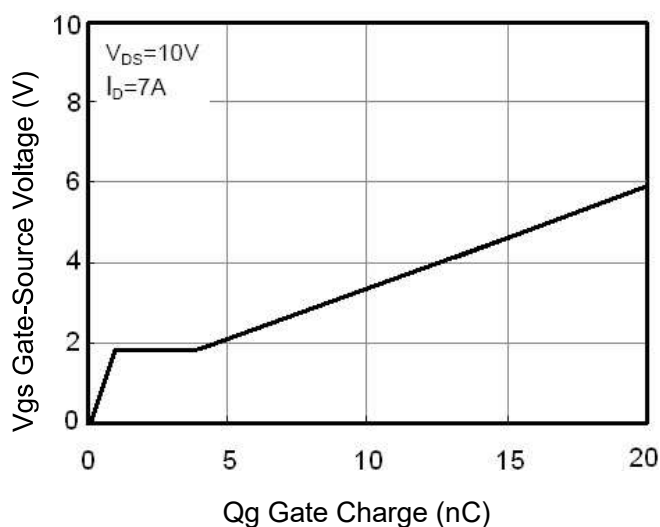


Figure 11 Gate Charge

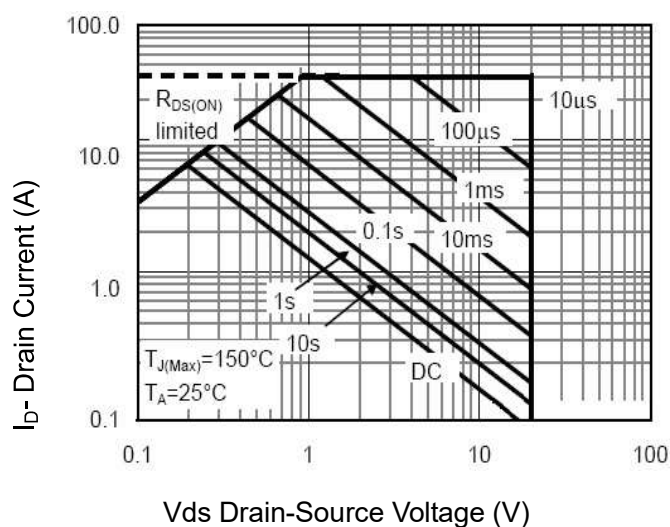


Figure 13 Safe Operation Area

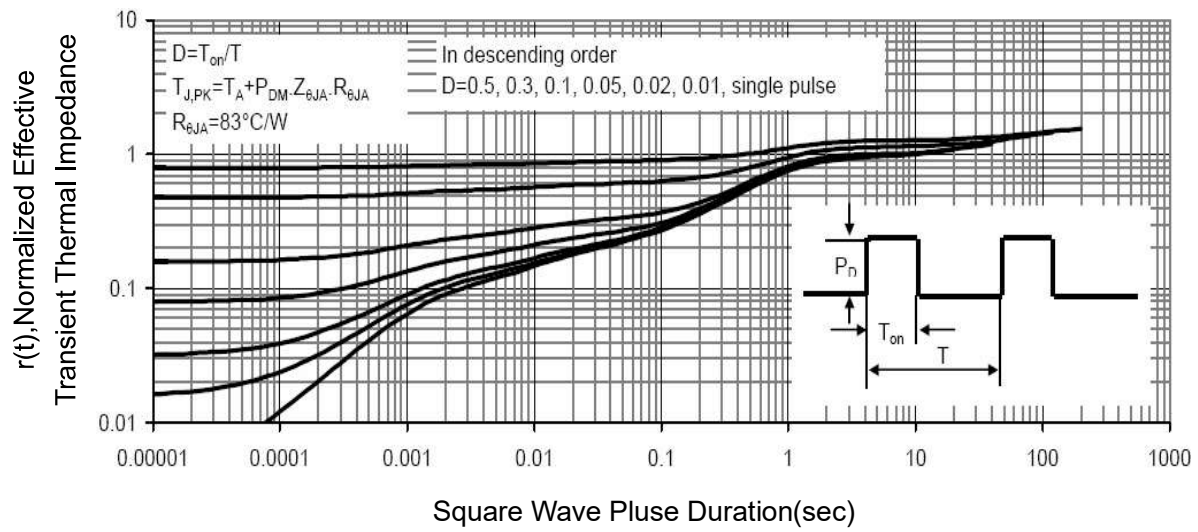
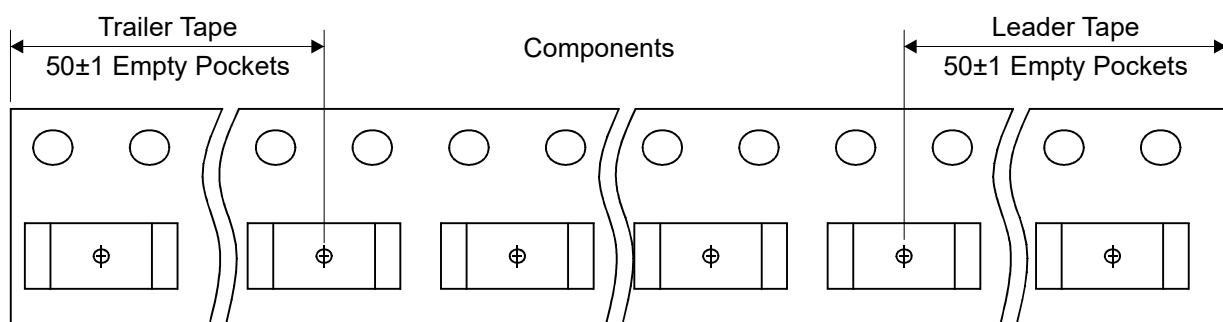
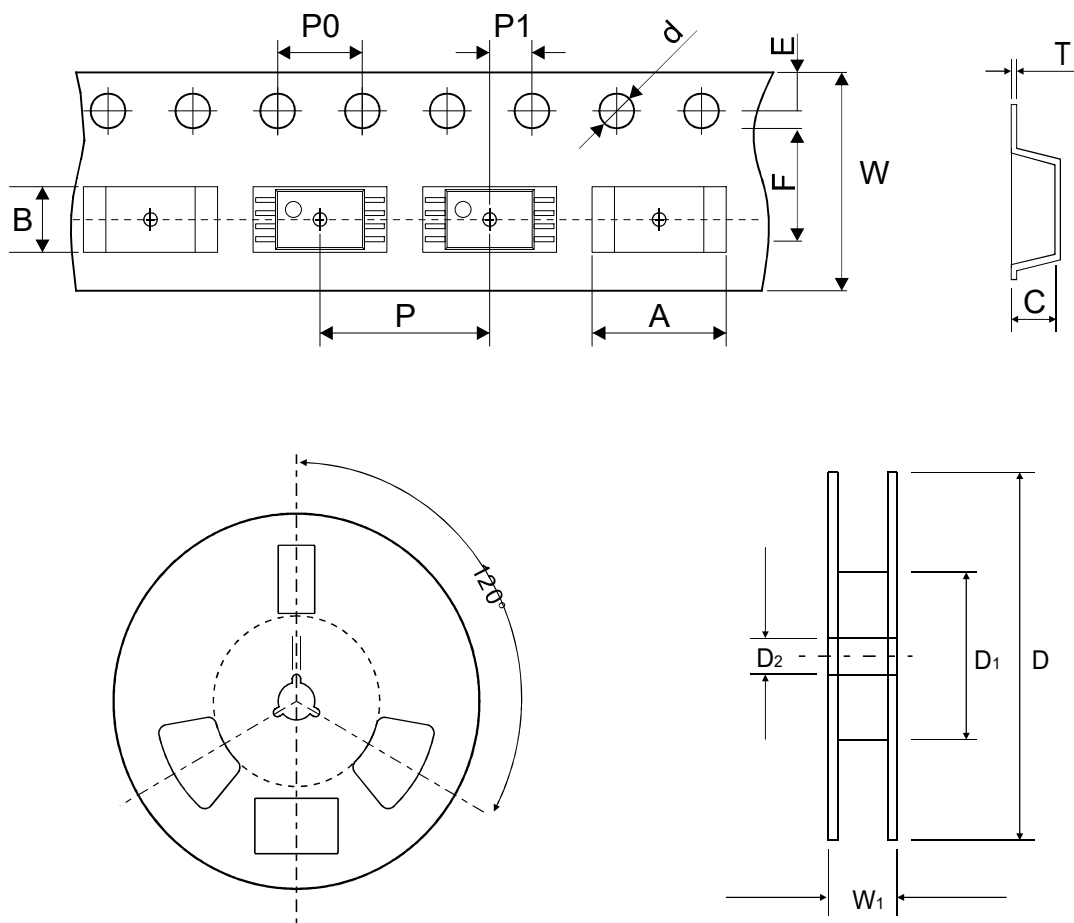


Figure 14 Normalized Maximum Transient Thermal Impedance

Reel Taping Specification



TSSOP8	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	6.76 ± 0.10	3.30 ± 0.10	1.20 ± 0.10	1.50 ± 0.10	330 ± 1.00	100 ± 1.00	13.00 ± 1.00
	(inch)	0.266 ± 0.004	0.130 ± 0.004	0.047 ± 0.004	0.059 ± 0.004	13.00 ± 0.039	3.937 ± 0.039	0.512 ± 0.039

TSSOP8	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	5.50 ± 0.10	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	$12.00 + 1.00 / - 0.10$	17.60 ± 1.00
	(inch)	0.069 ± 0.004	0.217 ± 0.004	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	$0.472 + 0.039 / - 0.004$	0.693 ± 0.039

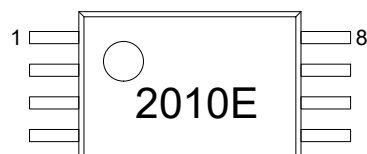
Company reserves the right to improve product design , functions and reliability without notice.

REV: A

CMS2010-HF

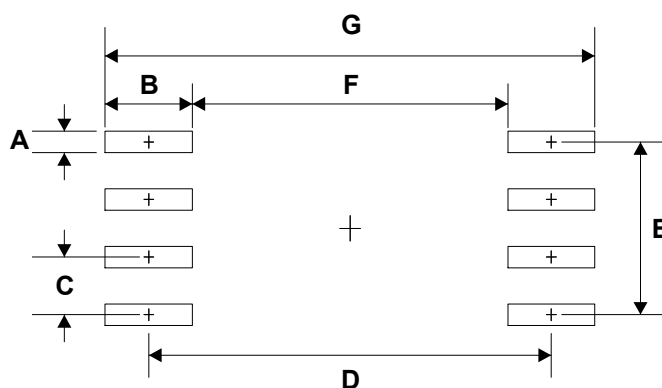
Marking Code

Part Number	Marking Code
CMS2010-HF	2010E



Suggested PAD Layout

SIZE	TSSOP8	
	(mm)	(inch)
A	0.32	0.013
B	1.60	0.063
C	0.65	0.026
D	5.60	0.220
E	1.95	0.077
F	4.00	0.157
G	7.20	0.283



Note:

1. General tolerance: $\pm 0.05\text{mm}$.

2. The pad layout is for reference purposes only.

Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
TSSOP8	3,000	13