

# CEM3053-HF

**P-Channel**  
**RoHS Device**  
**Halogen Free**



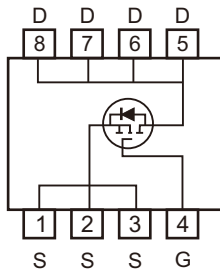
## Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed

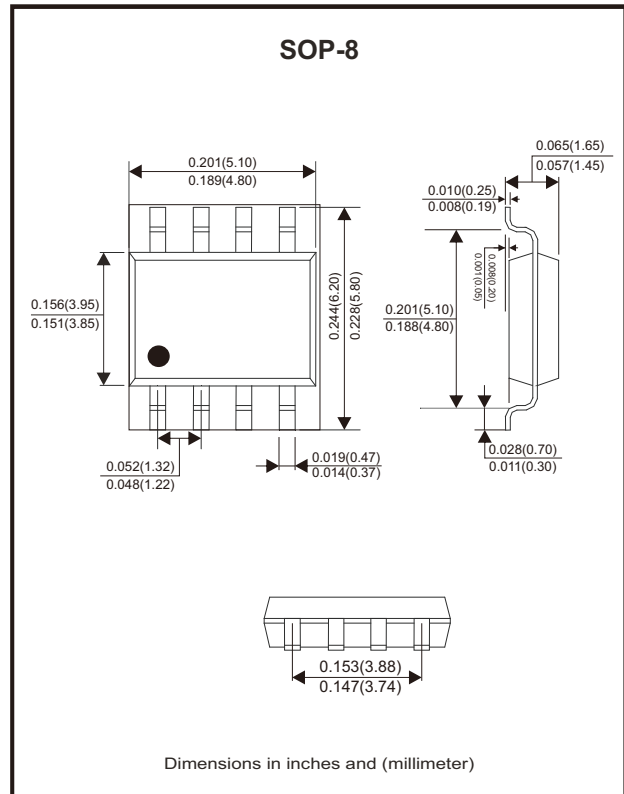
## Mechanical data

- Epoxy : UL 94V-0 rated flame retardant.
- Case : SOP-8, molded plastic.
- Lead : Pure tin plated.

## Circuit Diagram



G : Gate  
 S : Source  
 D : Drain



## Absolute Maximum Ratings (at Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-source breakdown voltage	BV <sub>DSS</sub>	-30	V
Gate-source voltage	V <sub>GS</sub>	±25	V
Continuous drain current @ T <sub>A</sub> =25°C	I <sub>D</sub>	-15	A
Continuous drain current @ T <sub>A</sub> =100°C	I <sub>D</sub>	-9.5	A
Pulsed drain current (Note 1)	I <sub>DM</sub>	-160	A
Avalanche current	I <sub>AS</sub>	-15	A
Avalanche energy @ L=0.1mH, I <sub>D</sub> =-15A, R <sub>G</sub> =25Ω	E <sub>AS</sub>	11.25	mJ
Power dissipation (Note 2)	P <sub>D</sub>	T <sub>A</sub> =25°C	3.1
		T <sub>A</sub> =100°C	1.2
Operating junction temperature range	T <sub>J</sub>	-55 to +150	°C
Storage temperature range	T <sub>STG</sub>	-55 to +150	°C

Note: 1. Pulse width limited by maximum junction temperature.  
 2. Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board, t ≤ 10s.

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## Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-30			V
Gate-source threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1	-1.5	-2.5	
Gate-source leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V			±100	nA
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V			-1	μA
	I <sub>DSS</sub>	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C			-10	
Drain-source on-state resistance (Note 1)	R <sub>DS(on)</sub>	I <sub>D</sub> = -15A, V <sub>GS</sub> = -10V		7.7	9	mΩ
		I <sub>D</sub> = -10A, V <sub>GS</sub> = -4.5V		11.4	18	
		I <sub>D</sub> = -10A, V <sub>GS</sub> = -3V		20.3	40	
Forward transconductance (Note 1)	G <sub>FS</sub>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -15A		28		S
<b>Dynamic</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz		4022		pF
Output capacitance	C <sub>oss</sub>			498		
Reverse transfer capacitance	C <sub>rss</sub>			442		
Turn-on delay time (Note 1&2)	t <sub>d(on)</sub>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V I <sub>D</sub> = -15A, R <sub>G</sub> = 3Ω		21		nS
Turn-on rise time (Note 1&2)	t <sub>r</sub>			19		
Turn-off delay time (Note 1&2)	t <sub>d(off)</sub>			57		
Turn-off fall time (Note 1&2)	t <sub>f</sub>			22		
Total gate charge (Note 1&2)	Q <sub>g</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -15A, V <sub>GS</sub> = 10V		56		nC
Total gate charge (Note 1&2)	Q <sub>g</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -15A, V <sub>GS</sub> = 4.5V		36		
Gate-source charge (Note 1&2)	Q <sub>gs</sub>	V <sub>DS</sub> = -15V, I <sub>D</sub> = -15A, V <sub>GS</sub> = -10V		15		
Gate-drain charge (Note 1&2)	Q <sub>gd</sub>			18		
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> = 15mV, V <sub>DS</sub> = 0, f = 1MHz		3		
<b>Source-Drain Diode</b>						
Continuous source-drain diode current	I <sub>S</sub>				-10	A
Pulse diode forward current (Note 3)	I <sub>SM</sub>				-40	
Body diode voltage (Note 1)	V <sub>SD</sub>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V		-0.81	-1.2	V
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = -10A, di/dt = 100A/μs		32		nS
Recovered charge	Q <sub>rr</sub>				26	
<b>Source-Drain Diode</b>						
Thermal resistance	R <sub>θJC</sub>	Junction to case		22	25	°C/W
	R <sub>θJA</sub>	Junction to ambient (Note 4)		33	40	

- Notes:**
1. Pulse test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
  2. Independent of operating temperature
  3. Pulse width limited by maximum junction temperature.
  4. W width mounted on a 1 in<sup>2</sup> pad of 2 oz copper, t ≤ 10s; 125°C/W when mounted on minimum copper pad.

## Rating and Characteristic Curves (CEM3053-HF)

Fig.1 - Typical Output Characteristics

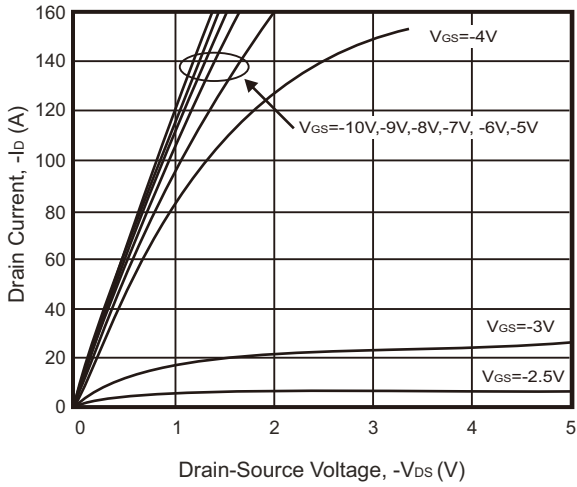


Fig.2 - Static Drain-Source On-State Resistance VS Drain Current

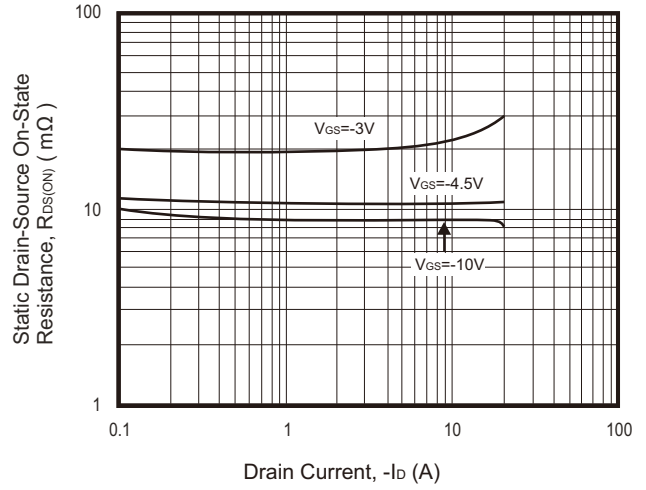


Fig.3 - Static Drain-Source On-State Resistance VS Gate-Source Voltage

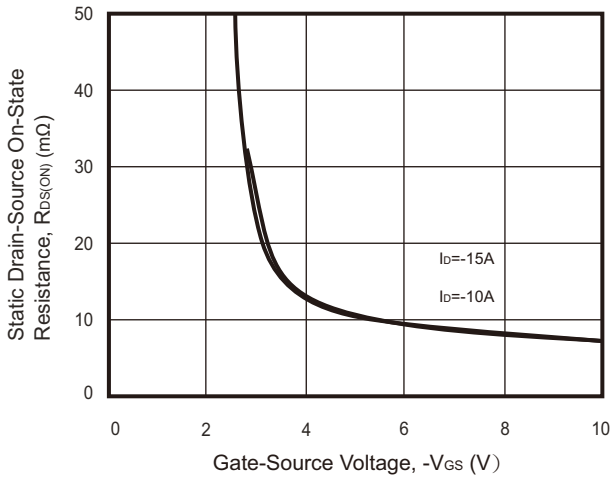


Fig.4 - Capacitance VS Drain-Source Voltage

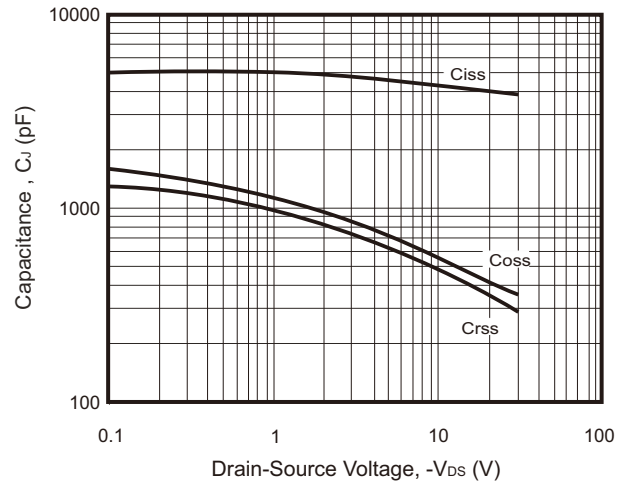


Fig.5 - Forward Transfer Admittance VS Drain Current

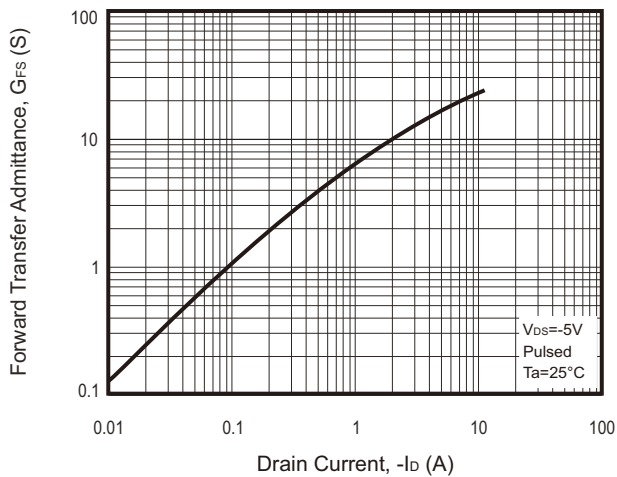
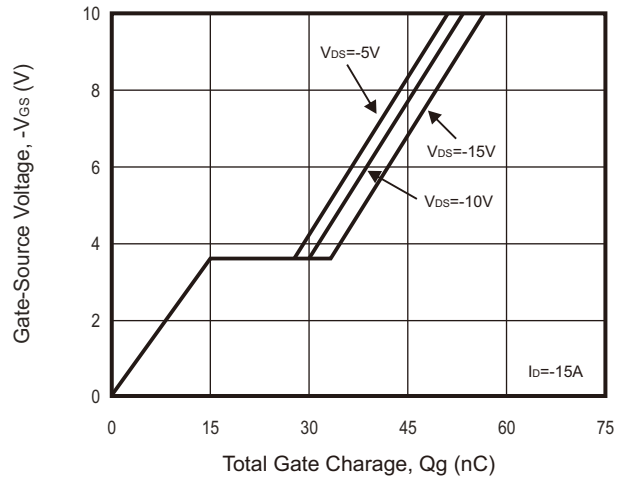
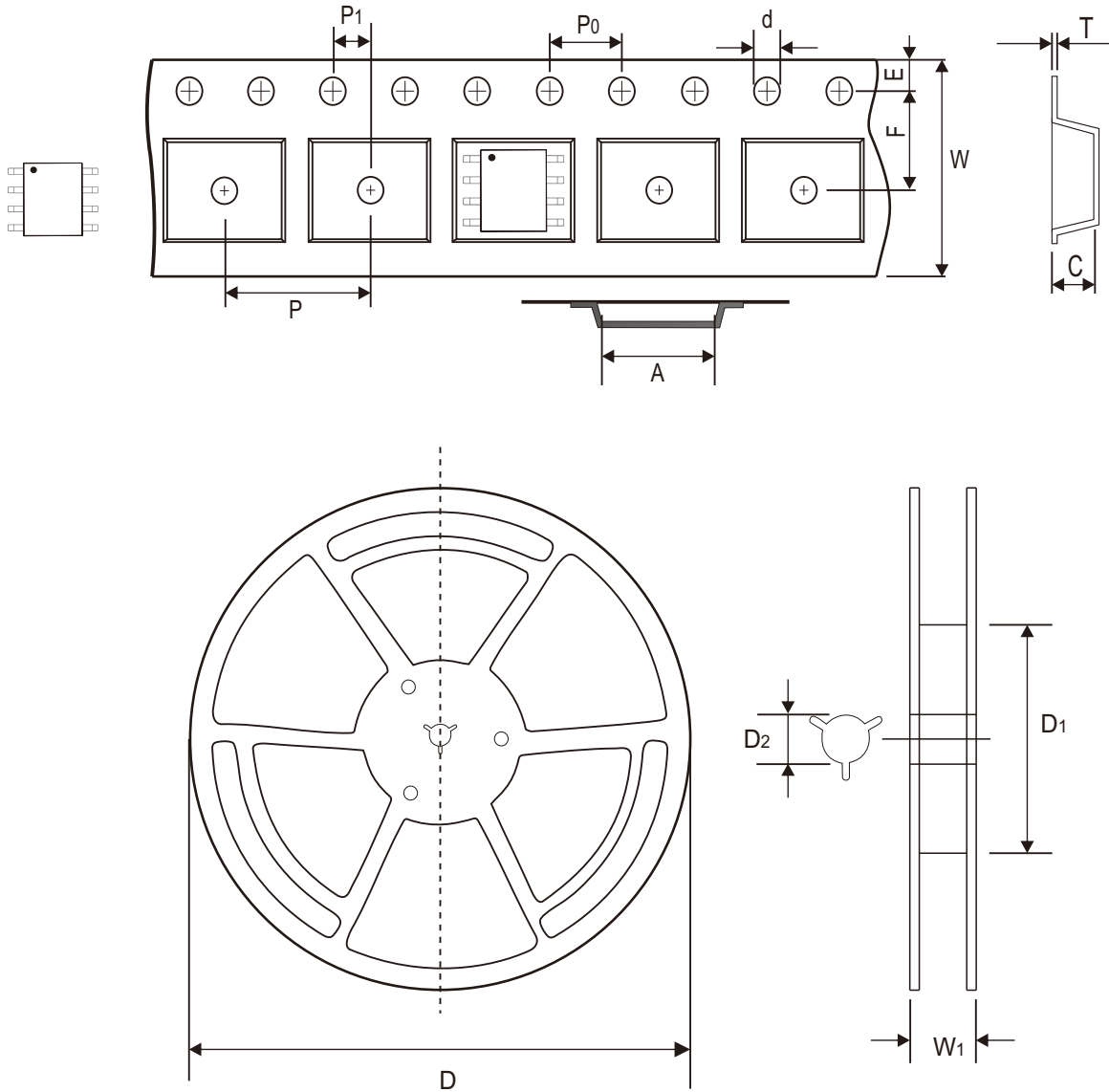


Fig.6 - Gate Charge Characteristics



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

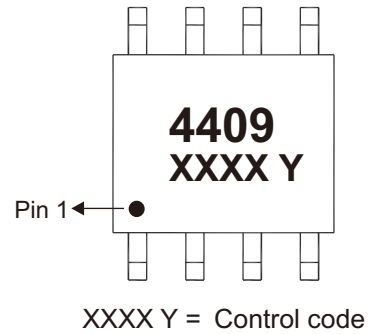
SOP-8	SYMBOL	E	F	P	P0	P1	T	W	W1
	(mm)	1.75 ± 0.10	5.50 ± 0.05	8.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	0.25 ± 0.02	12.00 + 0.30 - 0.10	17.60 + 1.00 - 0.00
	(inch)	0.069 ± 0.004	0.217 ± 0.002	0.315 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.010 ± 0.001	0.472 + 0.012 - 0.004	0.693 + 0.039 - 0.000

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REV:E

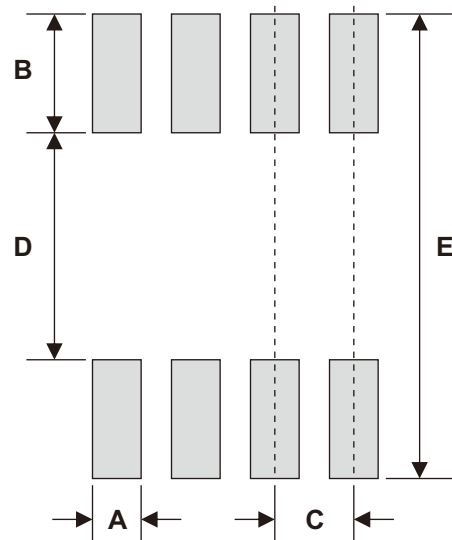
## Marking Code

Part Number	Marking Code
CEM3053-HF	4409



## Suggested P.C.B. 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	0.276



## Standard Packaging

Case Type	REEL PACK	
	REEL ( pcs )	Reel Size (inch)
SOP-8	4,000	13