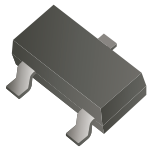
CMS3415-HF

P-Channel
RoHS Device
Halogen Free



Features

- V_{DS}= -20V, I_D= -4A.
  $R_{DS(ON)}$ < 60mΩ @ V_{GS}= -2.5V
  $R_{DS(ON)}$ < 45mΩ @ V_{GS}= -4.5V
  ESD rating: 2500V HBM
- High power and current handling capability.
- Lead free product is acquired.
- Surface mount package.

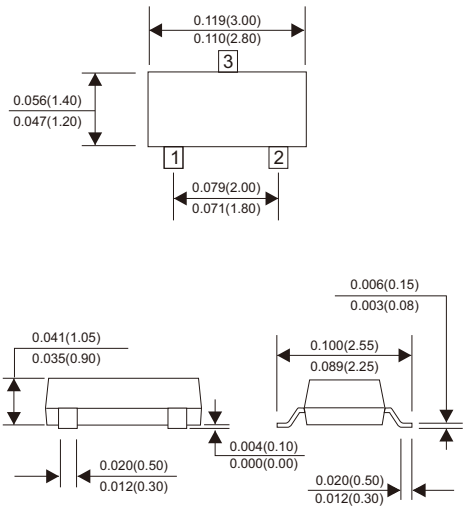
Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.

Description

The CMS3415 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD protested.

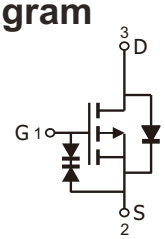
SOT-23



Dimensions in inches and (millimeter)

Circuit Diagram

G : Gate
S : Source
D : Drain



Application

- PWM applications.
- Load switch.

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

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	-20	V
Gate-source voltage	V_{GS}	±10	V
Drain current-continuous	I_D	-4	A
Drain current-pulsed (Note 1)	I_{DM}	-30	A
Maximum power dissipation	P_D	1.4	W
Operating junction and storage temperature range	T_J, T_{STG}	-55 to 150	°C

Thermal Characteristic

Thermal resistance, junction to ambient (Note 2)	$R_{\theta JA}$	89.3	°C/W

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			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	nA
On Characteristics (Note 3)						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-0.35	-0.55	-0.9	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS} = -4.5V, I_D = -4A		34	45	mΩ
		V_{GS} = -2.5V, I_D = -4A		44	60	
Forward transconductance	g_{FS}	V_{DS} = -5V, I_D = -4A	8			S
Dynamic Characteristics (Note 4)						
Input capacitance	C_{iss}	V_{DS} = -10V, V_{GS} = 0, f = 1MHz		950		pF
Output capacitance	C_{oss}			165		
Reverse transfer capacitance	C_{rss}			120		
Switching Characteristics (Note 4)						
Turn-on delay time	$t_{d(on)}$	V_{DD} = -10V, R_L = 2.5Ω V_{GS} = -4.5V, R_{GEN} = 3Ω		12		nS
Turn-on rise time	t_r			10		
Turn-off delay time	$t_{d(off)}$			19		
Turn-off fall time	t_f			25		
Total gate charge	Q_g	V_{DS} = -10V, I_D = -4A, V_{GS} = -4.5V		12		nC
Gate-source charge	Q_{gs}			1.4		
Gate-drain charge	Q_{gd}			3.6		
Drain-Source Diode Characteristics						
Diode forward voltage (Note 3)	V_{SD}	V_{GS} = 0V, I_S = -4A			-1.2	V
Diode forward current (Note 2)	I_S				-4	A

Notes: 1. Repetitive rating: Pulse width limited by maximum junction temperature.
2. Surface mounted on FR4 board, t ≤ 10 sec.
3. Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2% .
4. Guaranteed by design, not subject to production.

Typical Electrical and Thermal Characteristics (CMS3415-HF)

Fig.1 - Switching Test Circuit

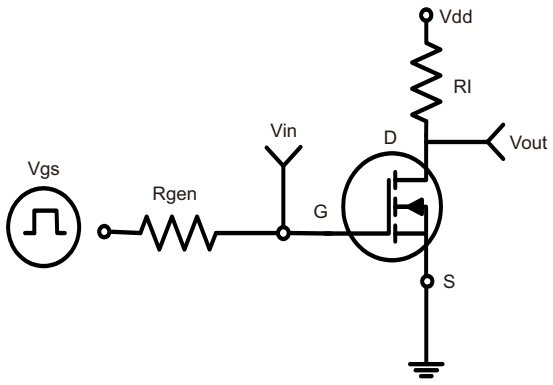


Fig.2 - Switching Waveforms

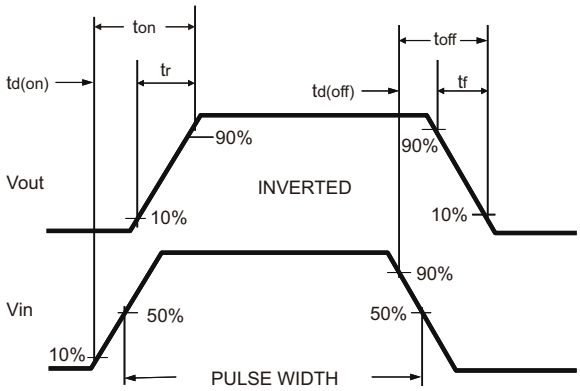


Fig.3 - Power Dissipation

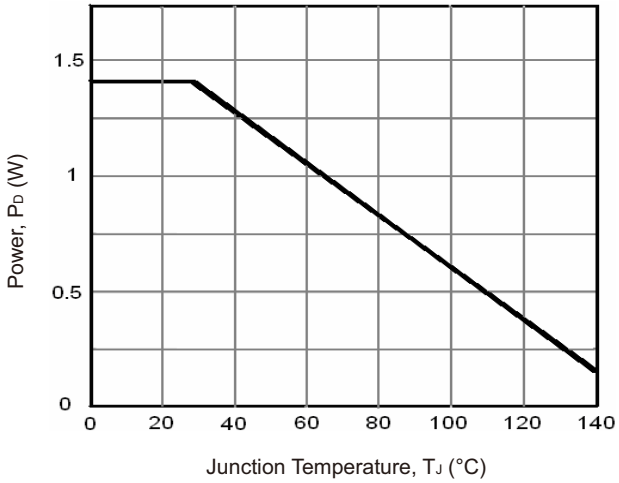


Fig.4 - Safe Operation Area

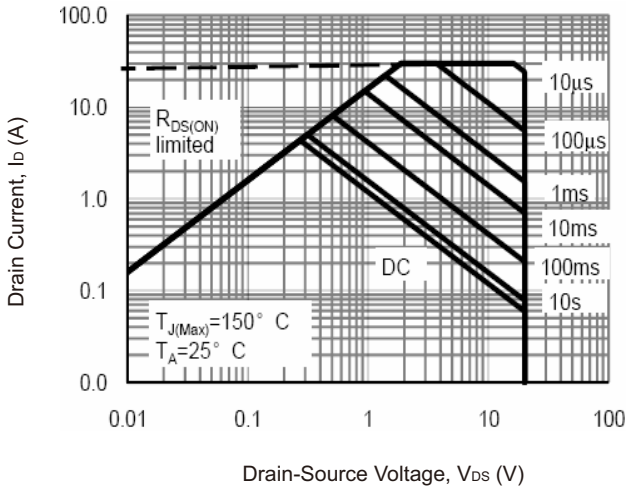


Fig.5 - Output Characteristics

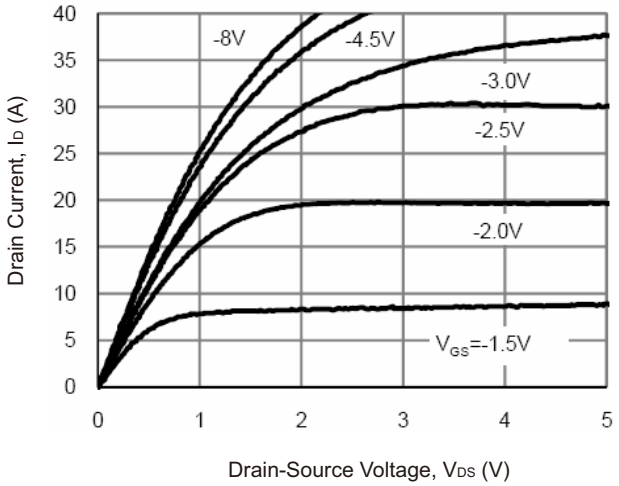
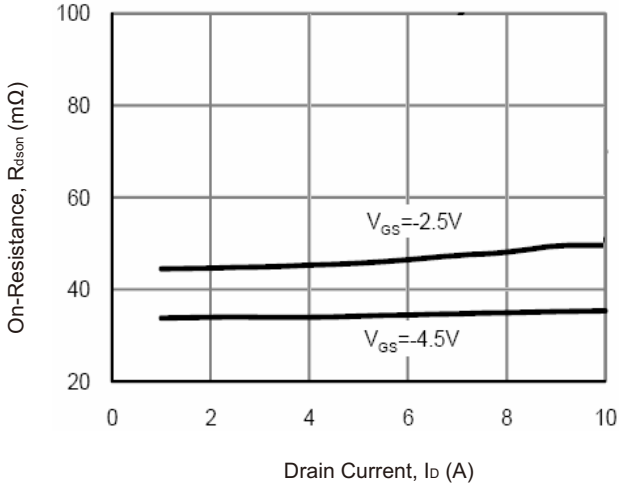


Fig.6 - Drain-Source On-Resistance



Typical Electrical and Thermal Characteristics (CMS3415-HF)

Fig.7 - Transfer Characteristics

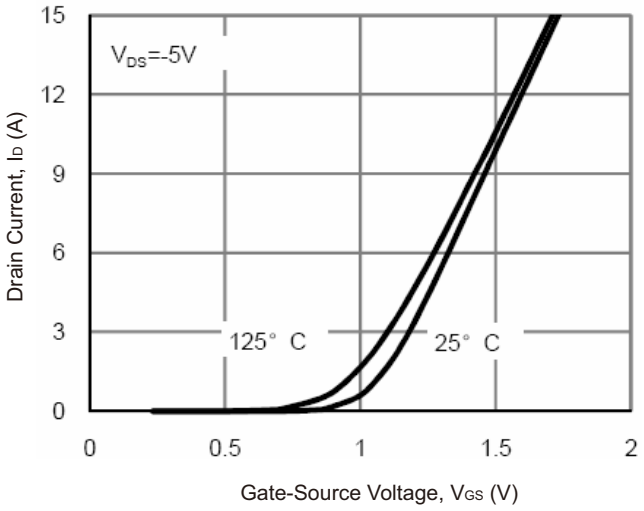


Fig.8 - Drain-Source On-Resistance

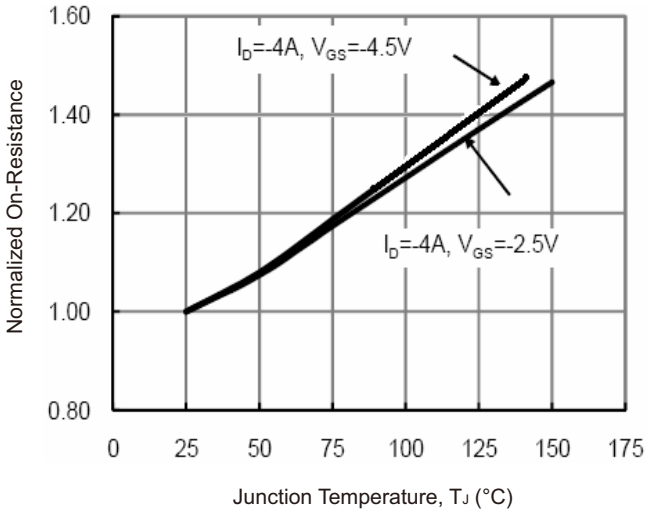


Fig.9 - $R_{DS(ON)}$ vs V_{GS}

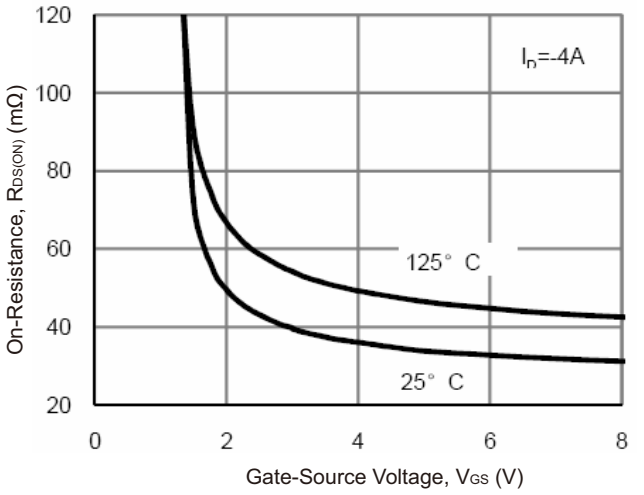


Fig.10 - Capacitance vs V_{DS}

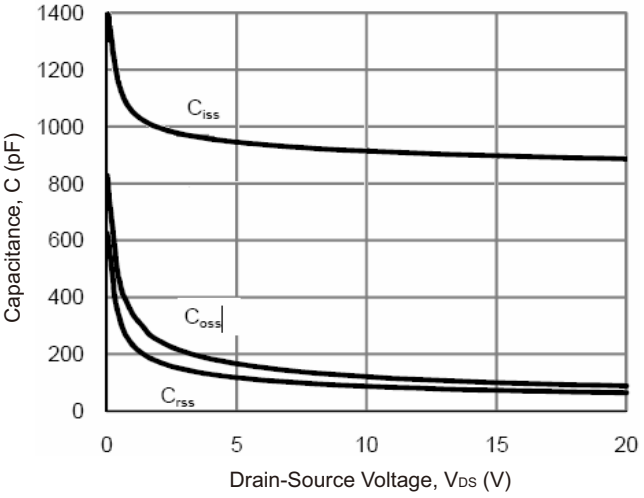


Fig.11 - Gate Charge

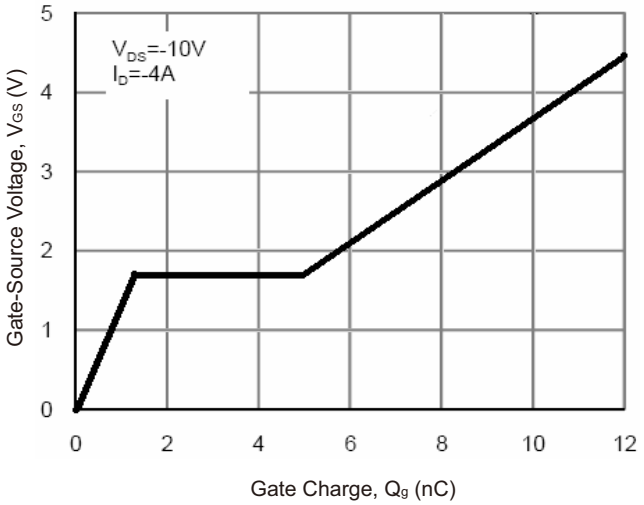
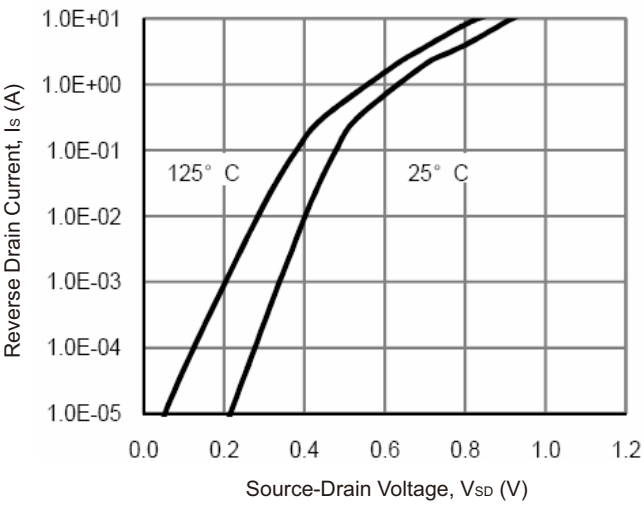
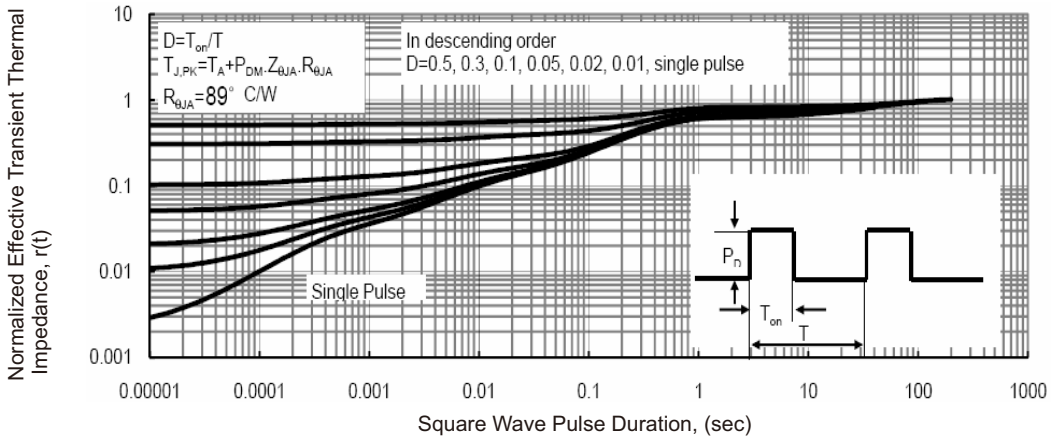


Fig.12 - Source-Drain Diode Forward

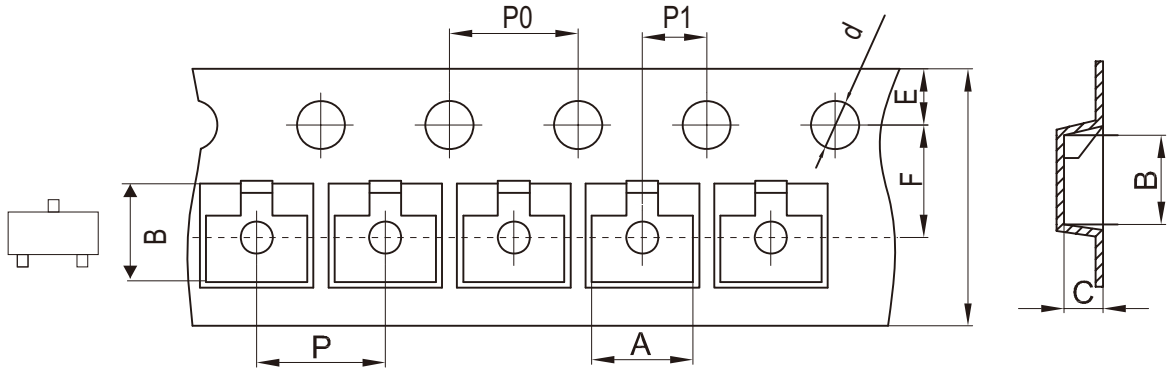


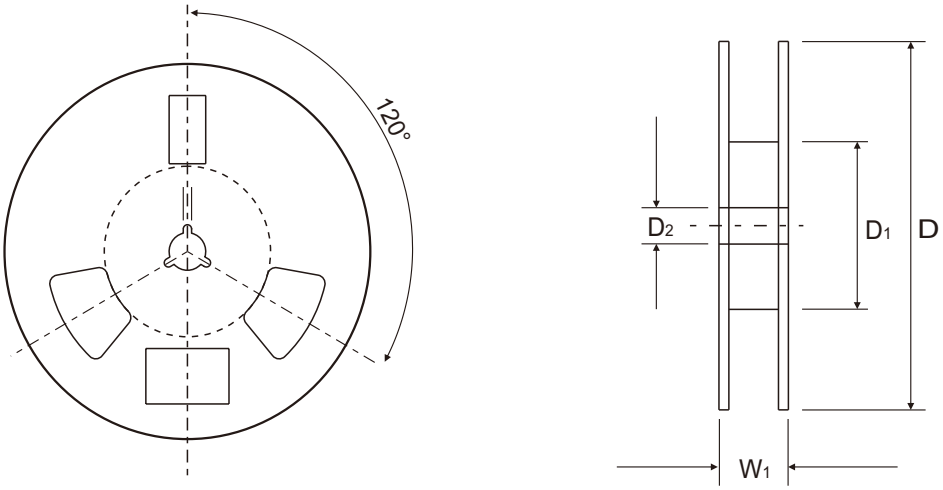
Typical Electrical and Thermal Characteristics (CMS3415-HF)

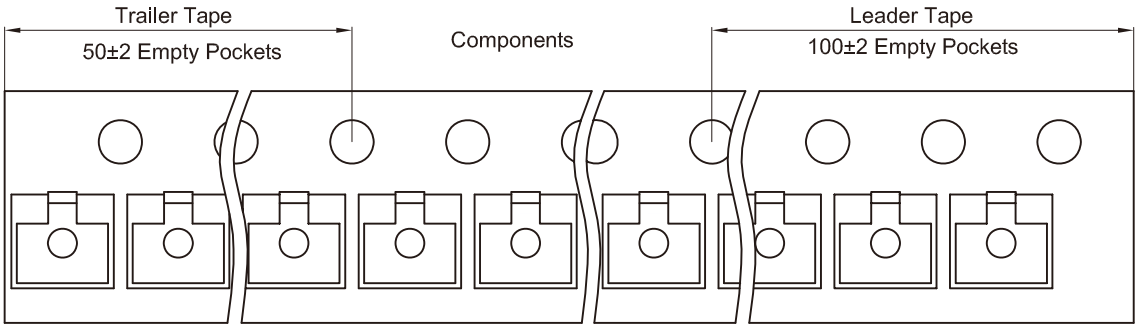
Fig.13 - Normalized Maximum Transient Thermal Impedance



Reel Taping Specification





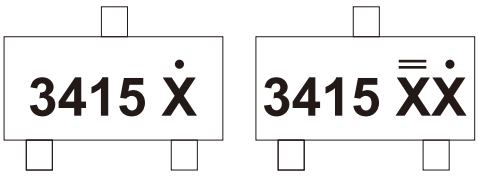


	SYMBOL	A	B	C	d	D	D_1	D_2
SOT-23	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

	SYMBOL	E	F	P	P_0	P_1	W	W_1
SOT-23	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	8.00 + 0.30 / - 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.315 + 0.012 / - 0.004	0.484 ± 0.039

Marking Code

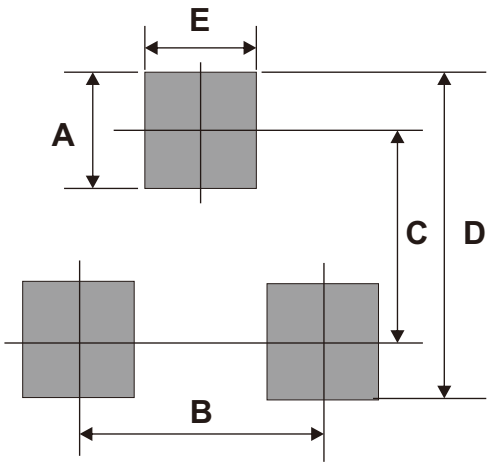
Part Number	Marking Code
CMS3415-HF	3415



Ẋ / X̿Ẋ = Control code

Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.80	0.031
B	1.90	0.075
C	2.02	0.080
D	2.82	0.111
E	0.60	0.024



Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7