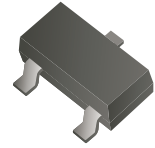


CMS3415-HF

P-Channel
RoHS Device
Halogen Free



Features

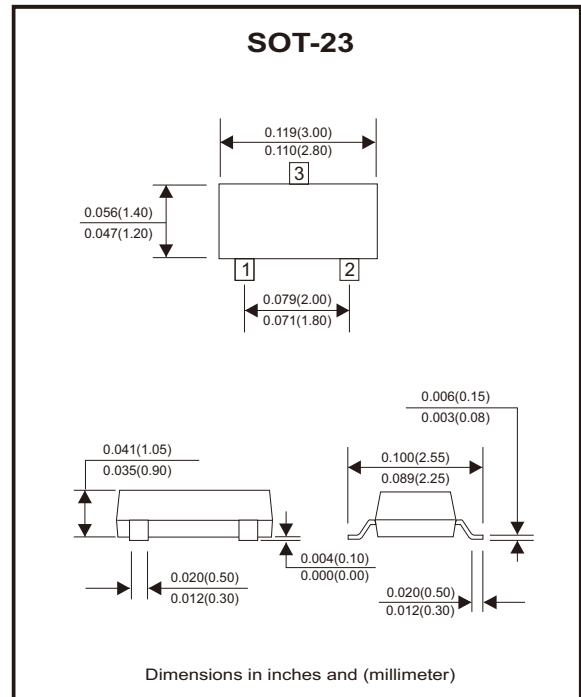
- $V_{DS} = -20V$, $I_D = -4A$.
 $R_{DS(ON)} < 60m\Omega$ @ $V_{GS} = -2.5V$
 $R_{DS(ON)} < 45m\Omega$ @ $V_{GS} = -4.5V$
 ESD rating: 2500V HBM
- High power and current handling capability.
- Lead free product is acquired.
- Surface mount package.

Mechanical data

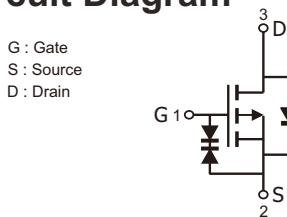
- Case: SOT-23, molded plastic.
- Mounting position: Any.

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 protected.



Circuit Diagram



Application

- PWM applications.
- Load switch.

Maximum Ratings ($T_a = 25^\circ C$ 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	$^\circ C$

Thermal Characteristic

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

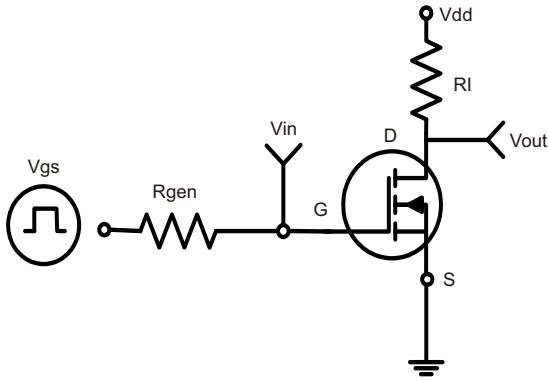


Fig.2 - Switching Waveforms

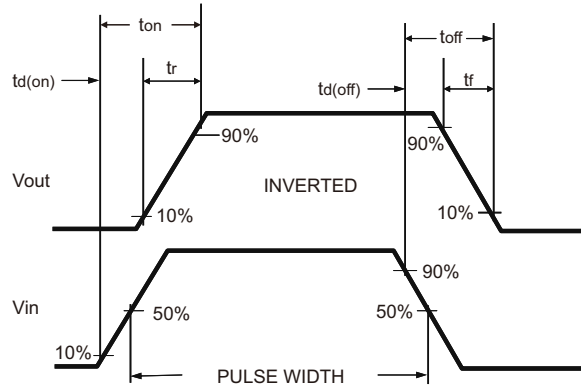


Fig.3 - Power Dissipation

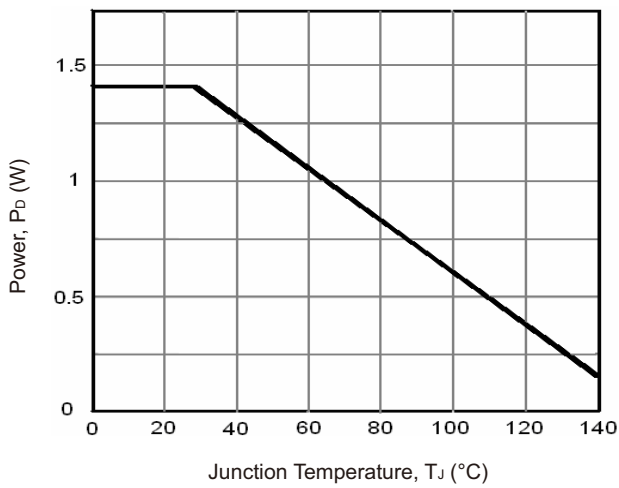


Fig.4 - Safe Operation Area

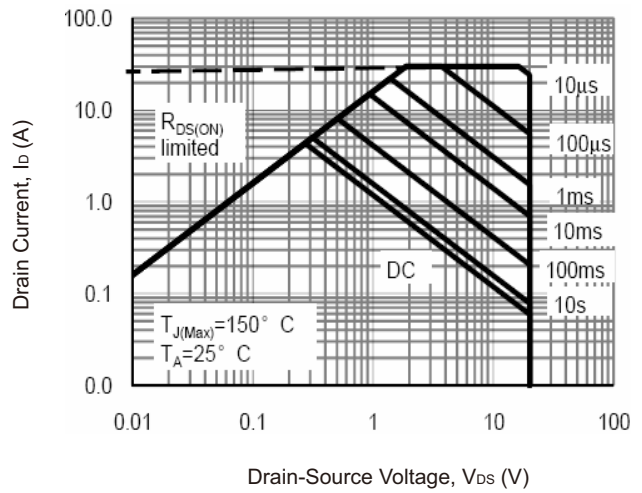


Fig.5 - Output Characteristics

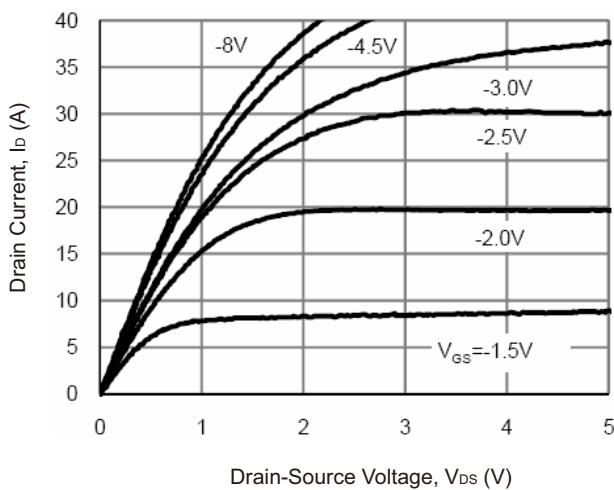
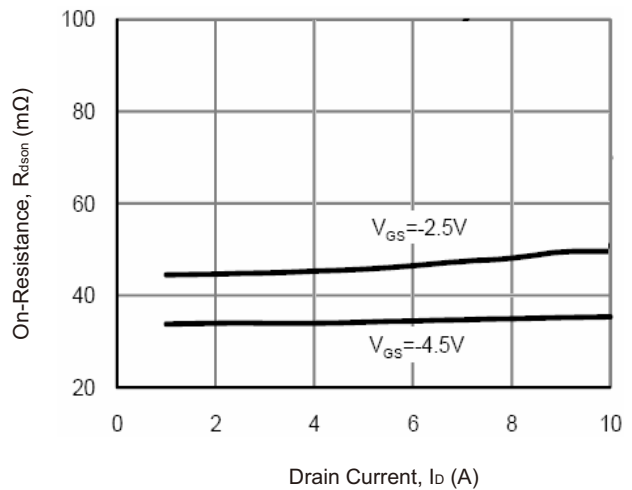


Fig.6 - Drain-Source On-Resistance



Typical Electrical and Thermal Characteristics (CMS3415-HF)

Fig.7 - Transfer Characteristics

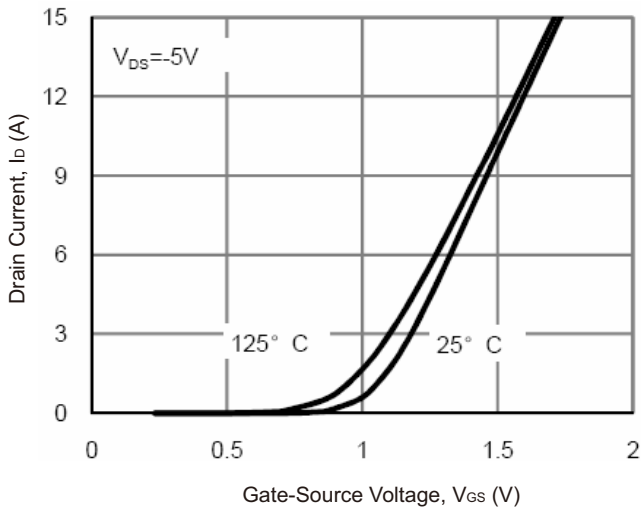


Fig.9 - $R_{DS(ON)}$ vs V_{GS}

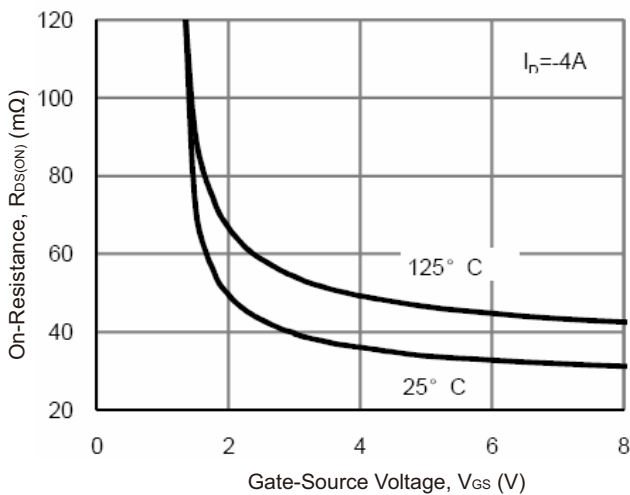


Fig.11 - Gate Charge

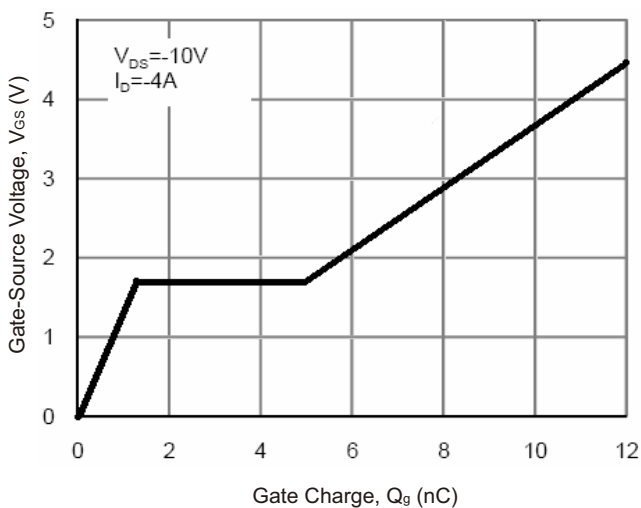


Fig.8 - Drain-Source On-Resistance

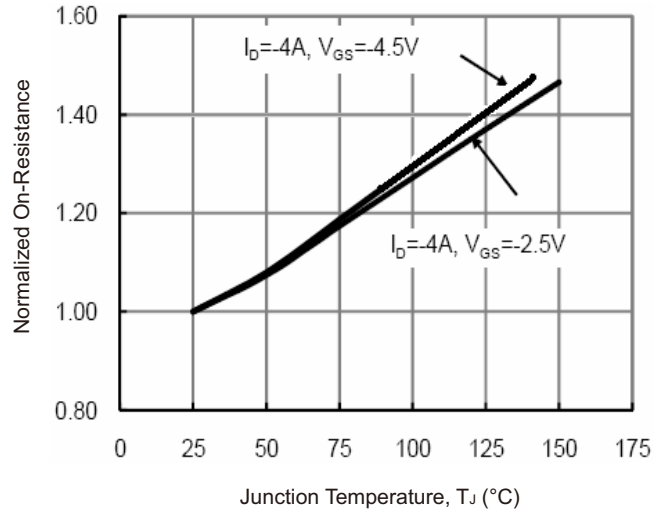


Fig.10 - Capacitance vs V_{DS}

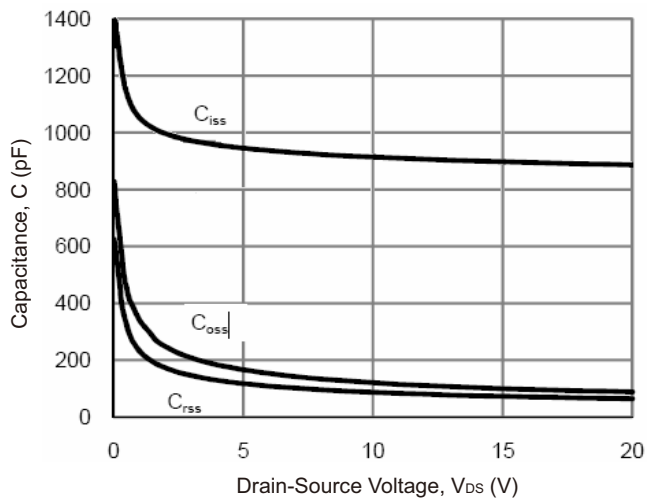
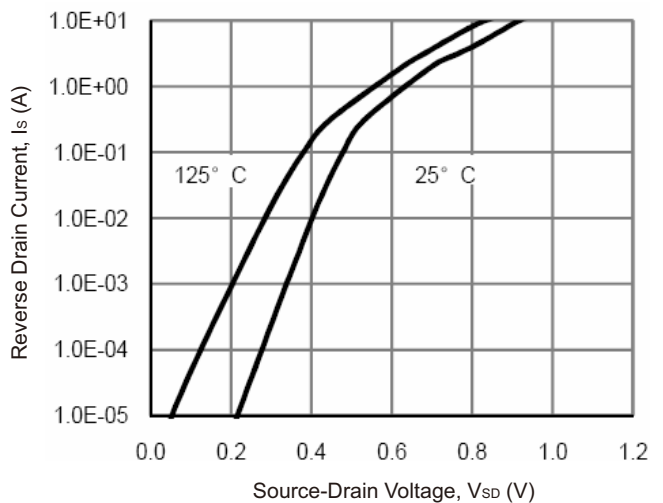
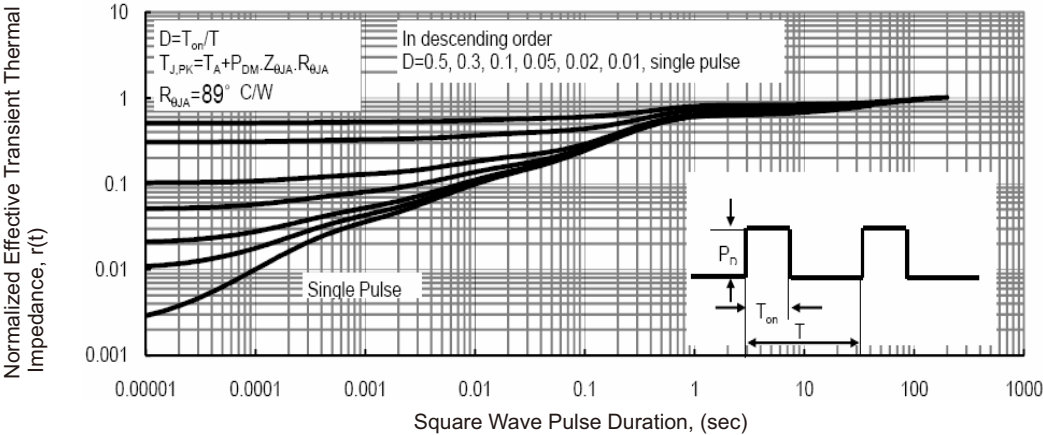


Fig.12 - Source-Drain Diode Forward

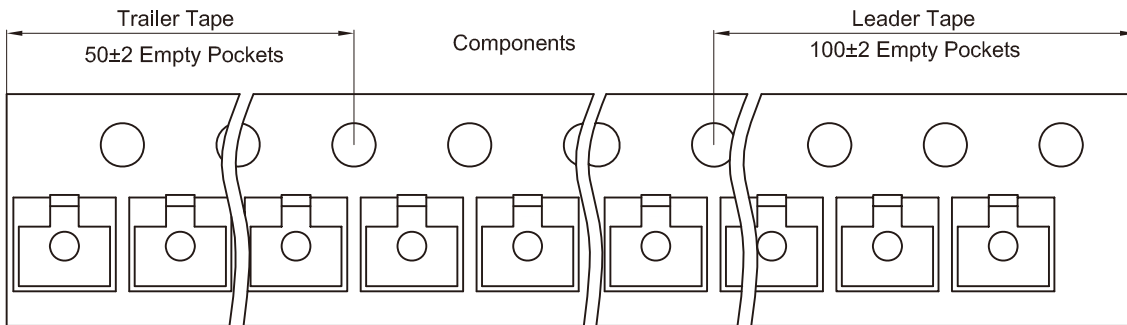
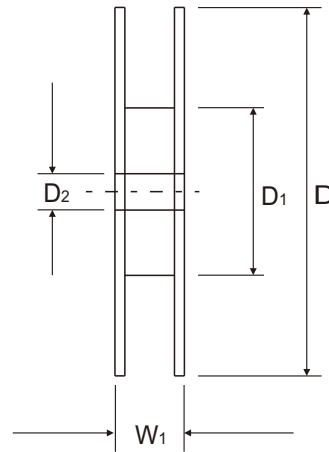
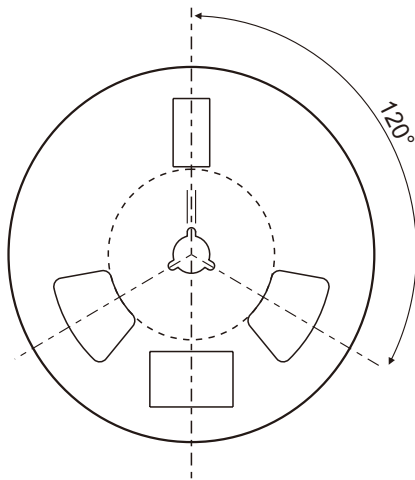
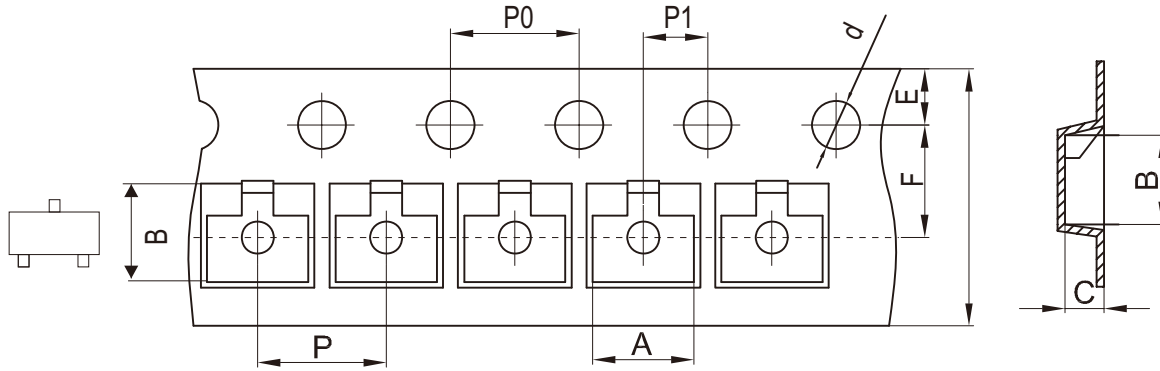


Typical Electrical and Thermal Characteristics (CMS3415-HF)

Fig.13 - Normalized Maximum Transient Thermal Impedance



Reel Taping Specification

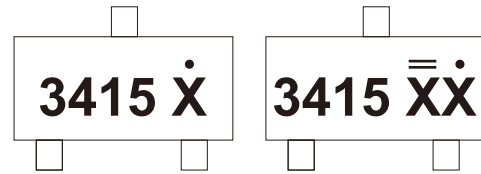


SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-23	SYMBOL	E	F	P	P0	P1	W	W1
	(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

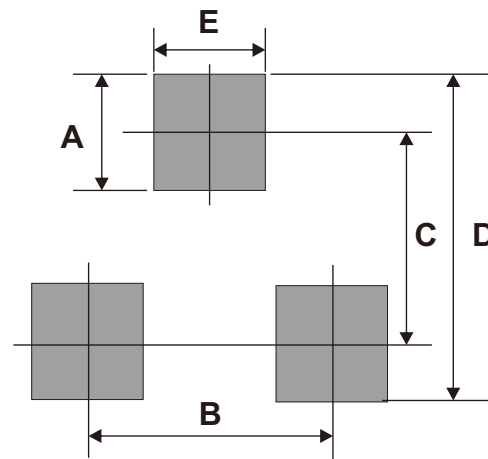
Part Number	Marking Code
CMS3415-HF	3415



$\dot{X} / \bar{\bar{X}}\dot{X}$ = 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

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[DMN16M9UCA6-7](#) [STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#)
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[BXP7N65D](#) [BXP4N65F](#) [AOL1454G](#) [WMJ80N60C4](#) [BXP2N20L](#) [BXP2N65D](#) [BXT1150N10J](#) [BXT1700P06M](#) [TSM60NB380CP](#) [ROG](#)
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