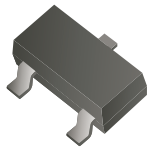
MOSFET

CMS3401T-HF

P-Channel
RoHS Device
Halogen Free



Features

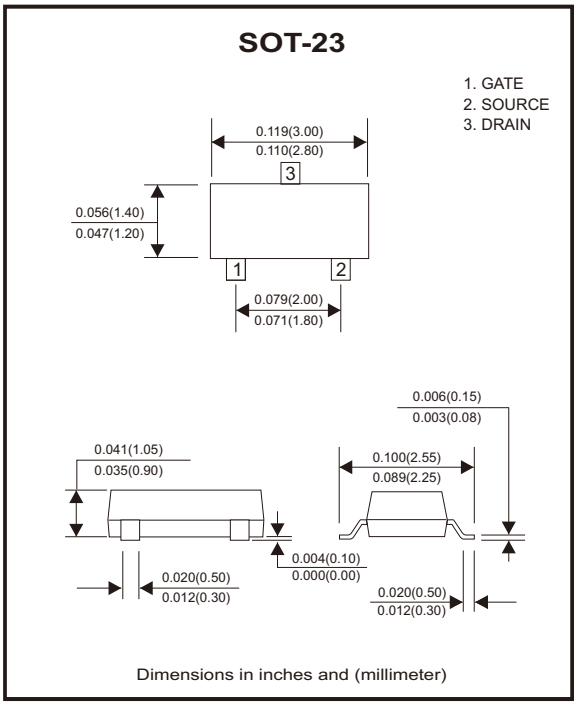
- V_{DS} = -30V, I_D = -4.2A
  $R_{DS(ON)}$ < 90mΩ @ V_{GS} = -2.5V
  $R_{DS(ON)}$ < 75mΩ @ V_{GS} = -4.5V
  $R_{DS(ON)}$ < 55mΩ @ V_{GS} = -10V
- High power and current handling capability.
- Lead free product is acquired.
- Surface mount package.

Mechanical data

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

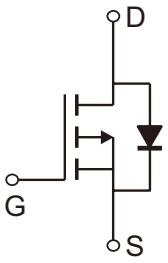
Description

The CMS3401T 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.



Circuit Diagram

- G : Gate
- S : Source
- D : Drain



Application

- PWM applications
- Load switch
- Power management

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

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	-30	V
Gate-source voltage	V_{GS}	±12	V
Drain current-continuous	I_D	-4.2	A
Drain current-pulsed (Note 1)	I_{DM}	-30	A
Maximum power dissipation	P_D	1.2	W
Operating junction and storage temperature range	T_J, T_{STG}	-55 to 150	°C

Thermal Characteristic

Thermal resistance, junction-to-ambient (Note 2)	$R_{\theta JA}$	104	°C/W

Electrical Characteristics (T_A=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	-30			V
Zero gate voltage drain current	I_{DSS}	V_{DS} = -24V, V_{GS} = 0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{DS} = ±10V, V_{DS} = 0V			±100	nA
On Characteristics (Note 3)						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-0.7	-1	-1.3	V
Drain-source on-state resistance	$V_{DS(ON)}$	V_{GS} = -10V, I_D = -4.2A		48	55	mΩ
		V_{GS} = -4.5V, I_D = -4A		56	75	
		V_{GS} = -2.5V, I_D = -1A		72	90	
Forward transconductance	g_{FS}	V_{DS} = -5V, I_D = -4.2A		10		S
Dynamic Characteristics (Note 4)						
Input capacitance	C_{iss}	V_{DS} = -15V, V_{GS} = 0V, f = 1MHz		880		pF
Output capacitance	C_{oss}			105		
Reverse transfer capacitance	C_{rss}			65		
Switching Characteristics (Note 4)						
Turn-on delay time	$t_{d(on)}$	V_{DD} = -15V, I_D = -4.2A V_{GS} = -10V, R_{GEN} = 6Ω		7		nS
Turn-on rise time	t_r			3		
Turn-off delay time	$t_{d(off)}$			30		
Turn-off rise time	t_f			12		
Total gate charge	Q_g	V_{DS} = -15V, I_D = -4.2A, V_{GS} = -4.5V		8.5		nC
Gate-source charge	Q_{gs}			1.8		
Gate-drain charge	Q_{gd}			2.7		
Drain-Source Diode Characteristics						
Diode forward voltage (Note 3)	V_{SD}	V_{GS} = 0V, I_S = -4.2A			-1.2	V

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

Typical Electrical and Thermal Characteristics (CMS3401T-HF)

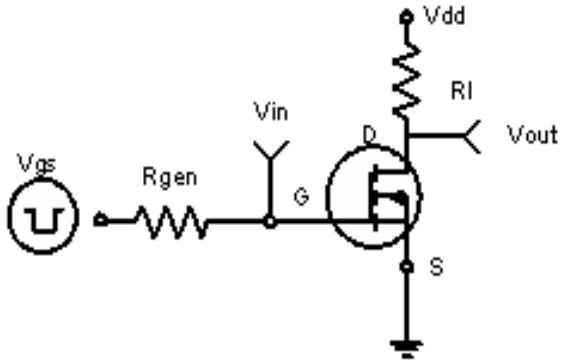


Figure 1:Switching Test Circuit

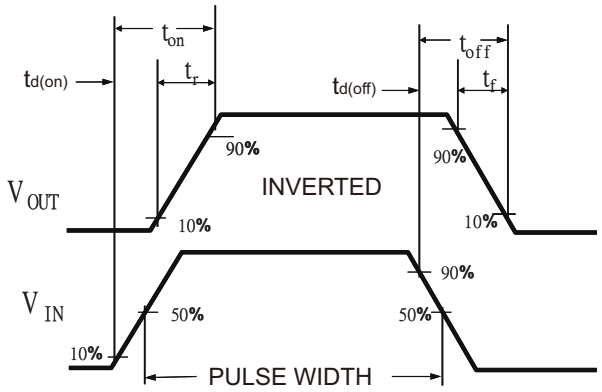


Figure 2:Switching Waveforms

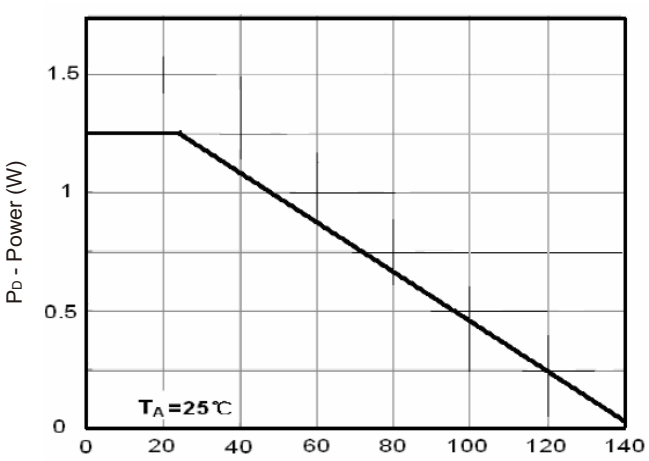


Figure 3: Power Dissipation

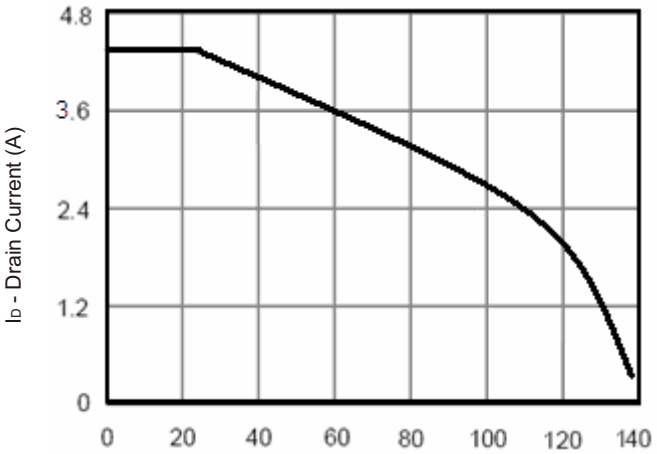


Figure 4: Drain Current

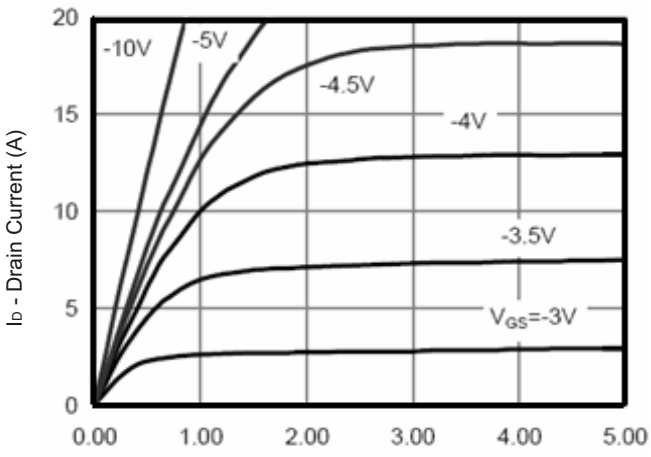


Figure 5: Output Characteristics

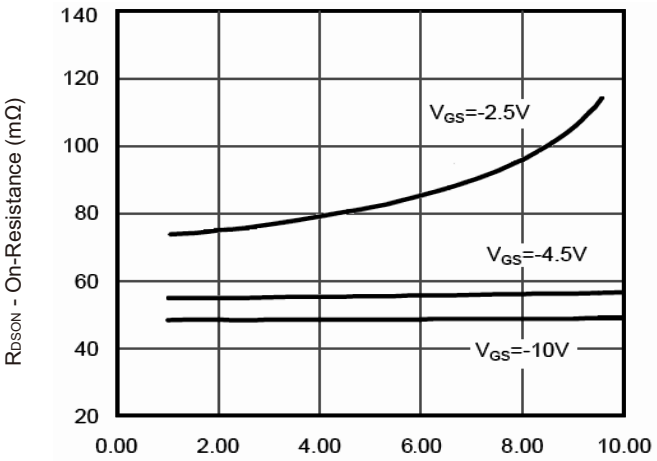


Figure 6: Drain-source On-Resistance

Typical Electrical and Thermal Characteristics (CMS3401T-HF)

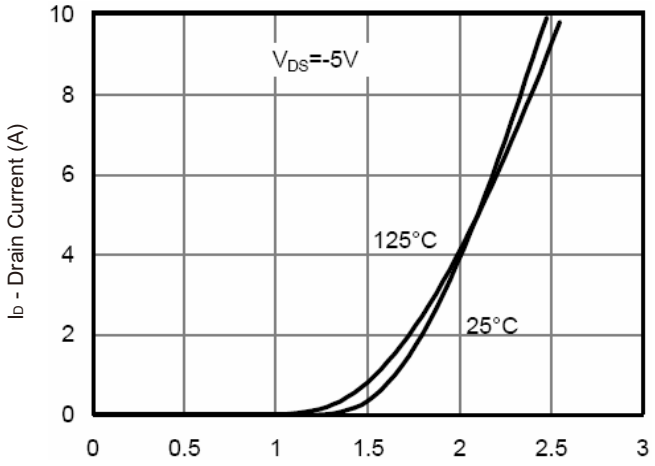


Figure 7:Transfer Characteristics

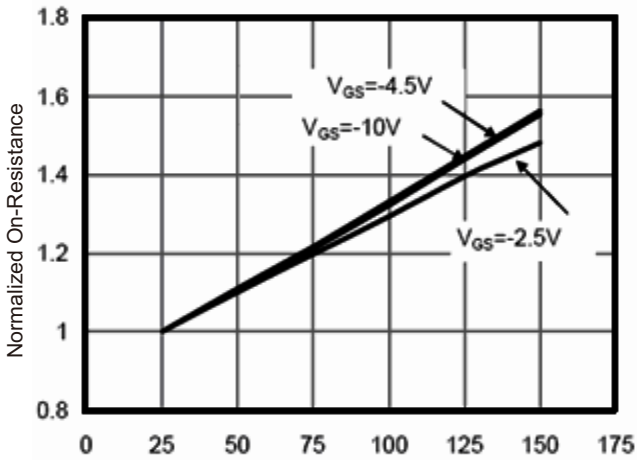


Figure 8:Drain-Source On-Resistance

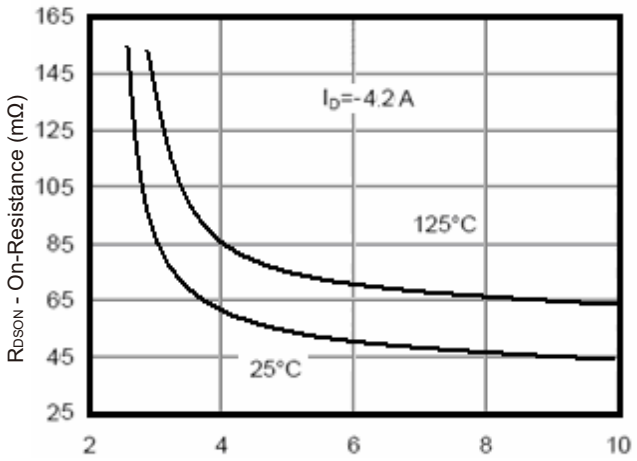


Figure 9:R_{DSON} vs V_{GS}

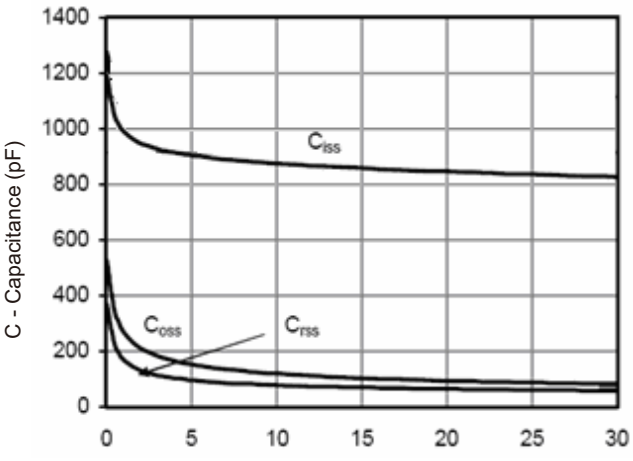


Figure 10:Capacitance vs V_{DS}

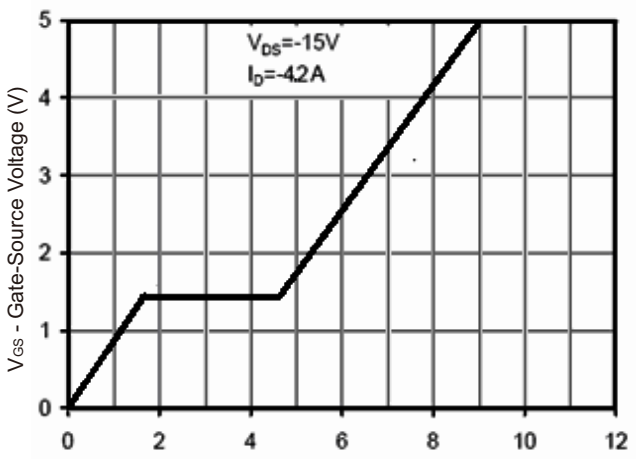


Figure 11:Gate Charge

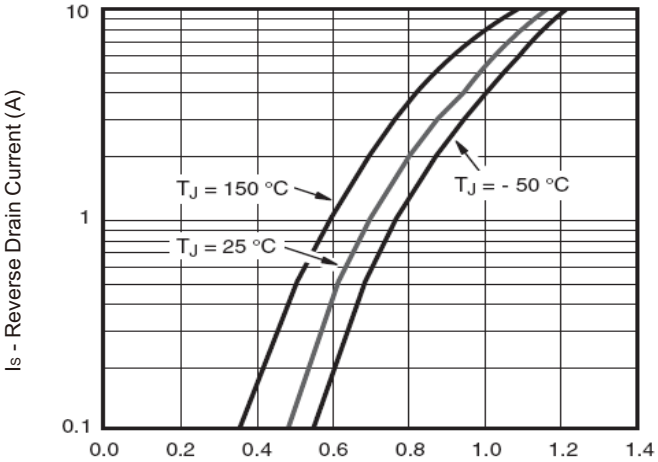


Figure 12:Source-Drain Diode Forward

Typical Electrical and Thermal Characteristics (CMS3401T-HF)

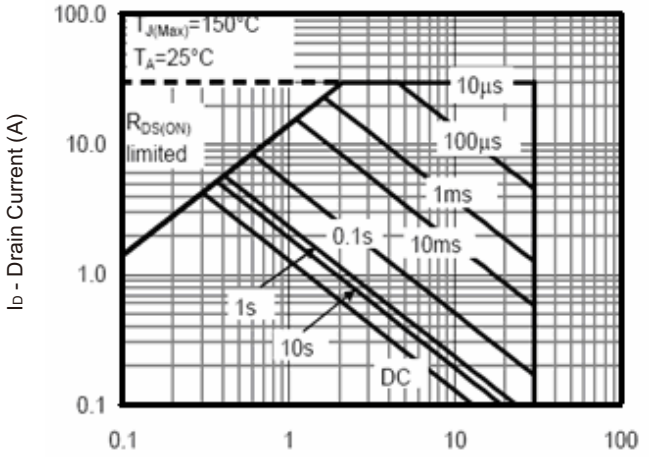


Figure 13:Safe Operation Area

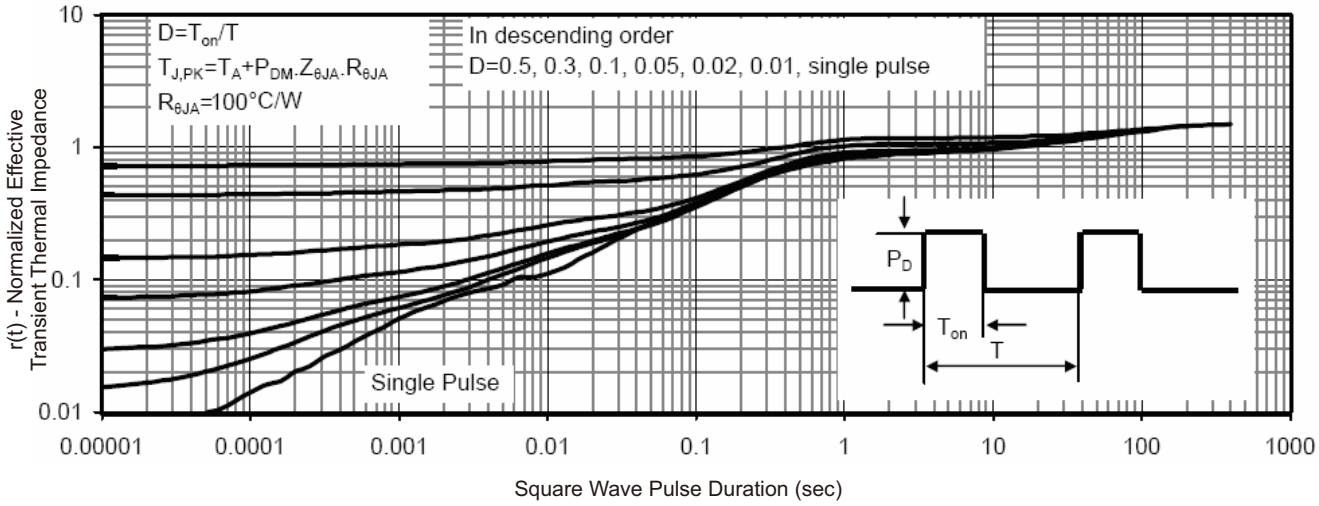
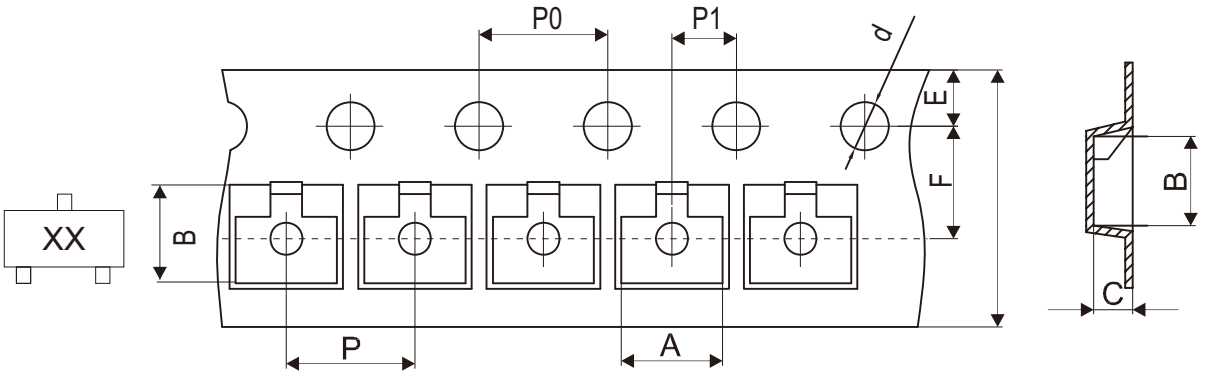
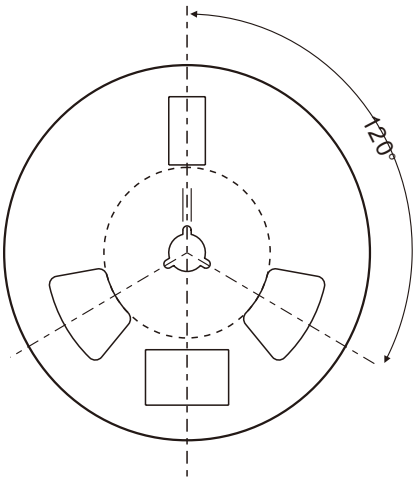
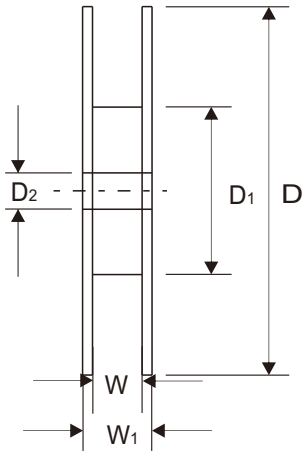


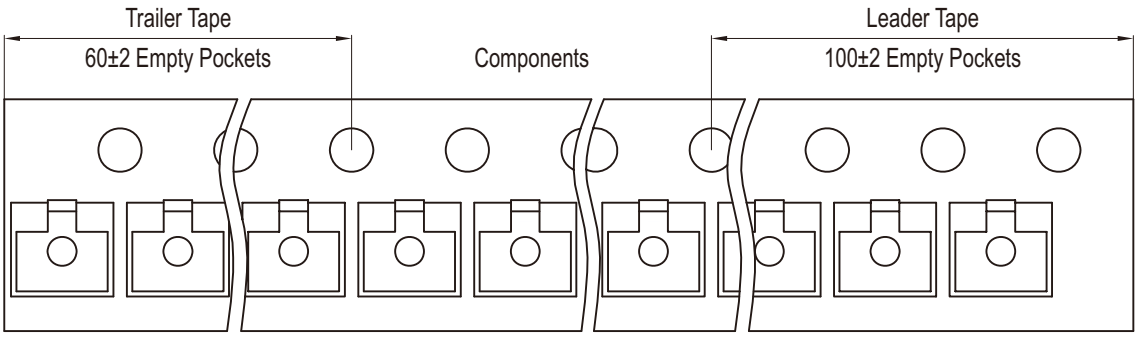
Figure 14:Normalized Maximum Transient Thermal Impedance

Reel Taping Specification







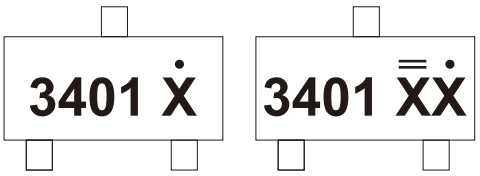


	SYMBOL	A	B	C	d	D	D_1	D_2
SOT-23	(mm)	3.10 ± 0.10	3.20 ± 0.10	1.37 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.122 ± 0.004	0.126 ± 0.004	0.054 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

	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	8.40 + 1.50 / - 0.50	12.00 ± 1.50
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.330 + 0.012 / - 0.004	0.472 ± 0.039

Marking Code

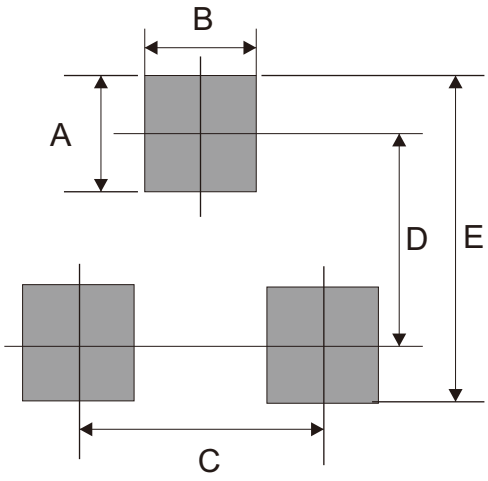
Part Number	Marking Code
CMS3401T-HF	3401



Ẋ / X̿Ẋ = Control code

Suggested P.C.B. PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.80	0.031
B	0.60	0.024
C	2.20	0.087
D	2.37	0.093
E	2.97	0.117



Standard Packaging

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