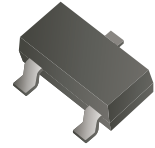


CMS2301T-HF

P-Channel
RoHS Device
Halogen Free



Features

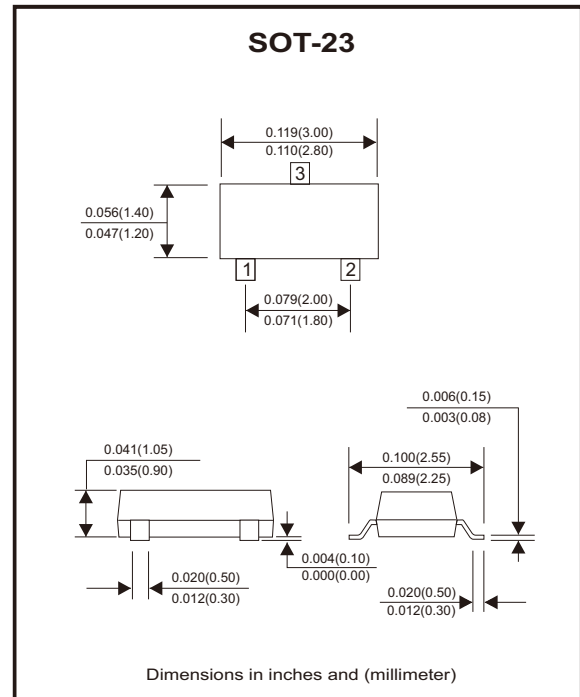
- $V_{DS} = -20V$, $I_D = -3A$.
 $R_{DS(ON)} < 140m\Omega$ @ $V_{GS} = -2.5V$
 $R_{DS(ON)} < 110m\Omega$ @ $V_{GS} = -4.5V$
- High power and current handling capability.
- Lead free product is acquired.
- Surface mount package.

Mechanical data

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

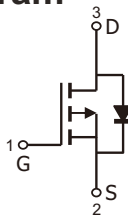
Description

The CMS2301T 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.

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}	± 12	V
Drain current-continuous	I_D	-3	A
Drain current-pulsed (Note 1)	I_{DM}	-10	A
Maximum power dissipation	P_D	1	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)	$R_{\theta JA}$	125	$^\circ C/W$
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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	-24		V
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20V, V _{GS} = 0V			-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±12V, V _{DS} = 0V			±100	nA
On Characteristics (Note 3)						
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.7	-1	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} = -4.5V, I _D = -3A		64	110	mΩ
		V _{GS} = -2.5V, I _D = -2A		89	140	
Forward transconductance	g _{FS}	V _{DS} = -5V, I _D = -2A	5			S
Dynamic Characteristics (Note 4)						
Input capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0, f = 1MHz		405		pF
Output capacitance	C _{oss}			75		
Reverse transfer capacitance	C _{rss}			55		
Switching Characteristics (Note 4)						
Turn-on delay time	t _{d(on)}	V _{DD} = -10V, I _D = -1A V _{GS} = -4.5V, R _{GEN} = 10Ω		11		nS
Turn-on rise time	t _r			35		
Turn-off delay time	t _{d(off)}			30		
Turn-off fall time	t _f			10		
Total gate charge	Q _g	V _{DS} = -10V, I _D = -3A, V _{GS} = -2.5V		3.3	12	nC
Gate-source charge	Q _{gs}			0.7		
Gate-drain charge	Q _{gd}			1.3		
Drain-Source Diode Characteristics						
Diode forward voltage (Note 3)	V _{SD}	V _{GS} = 0V, I _S = 1.3A			-1.2	V
Diode forward current (Note 2)	I _S				-3	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 (CMS2301T-HF)

Fig.1 - Switching Test Circuit

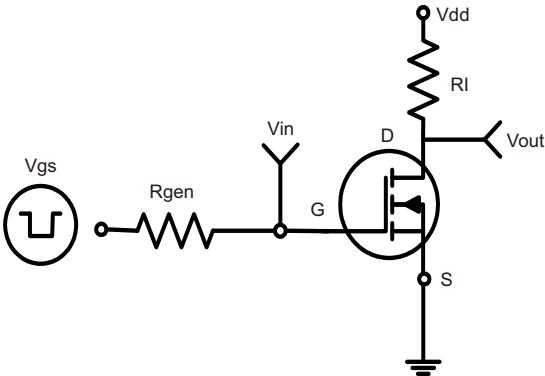


Fig.2 - Switching Waveforms

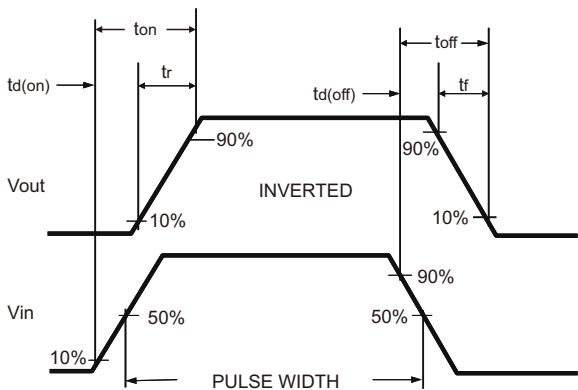


Fig.3 - Power Dissipation

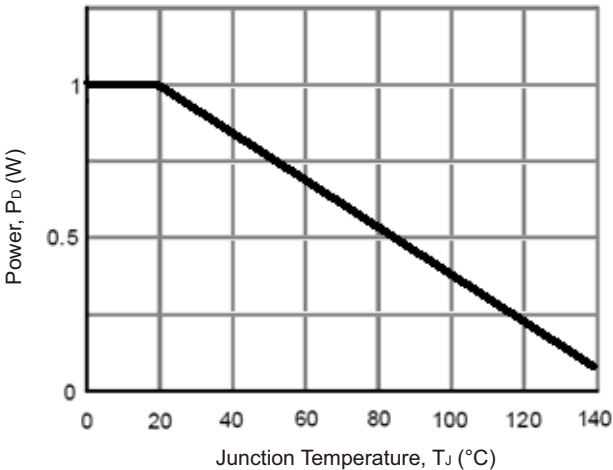


Fig.4 - Drain Current

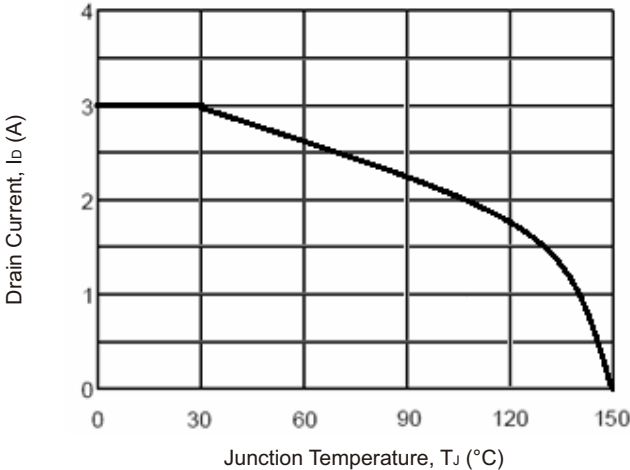


Fig.5 - Output Characteristics

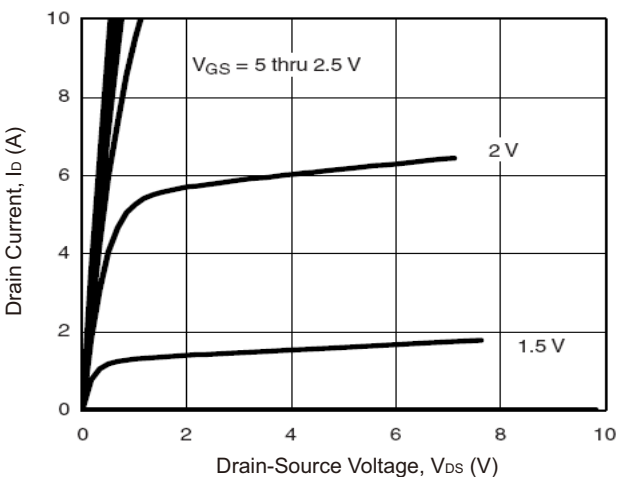
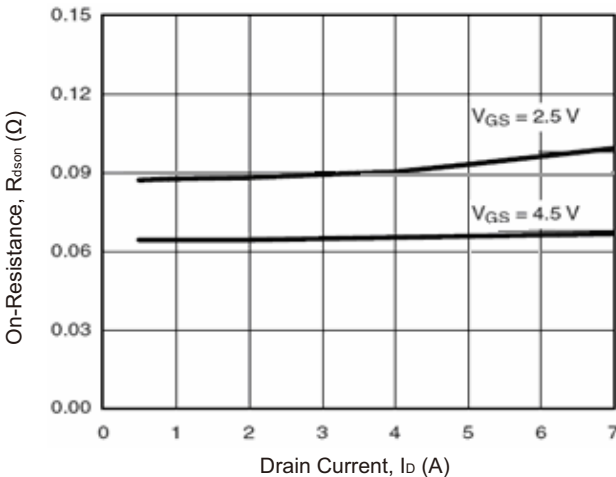


Fig.6 - Drain-Source On-Resistance



Typical Electrical and Thermal Characteristics (CMS2301T-HF)

Fig.7 - Transfer Characteristics

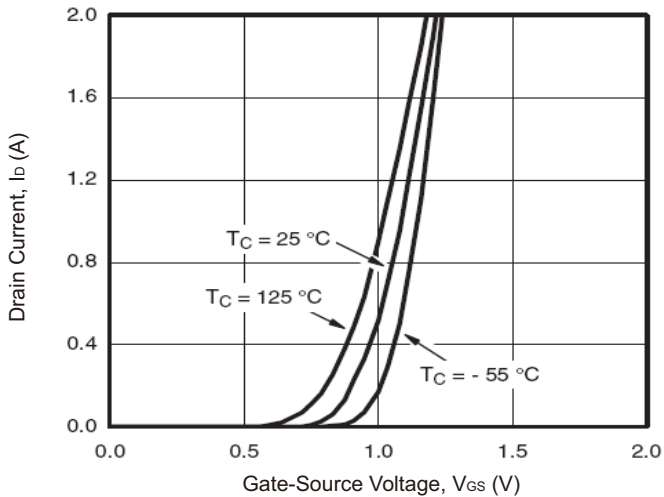


Fig.8 - Drain-Source On-Resistance

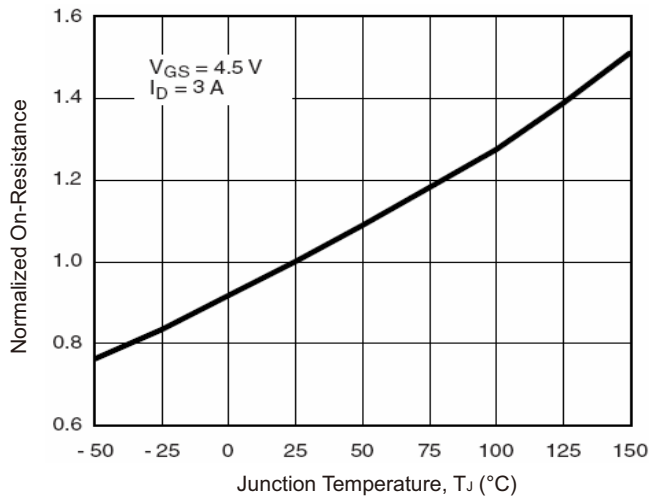


Fig.9 - $R_{DS(ON)}$ vs V_{GS}

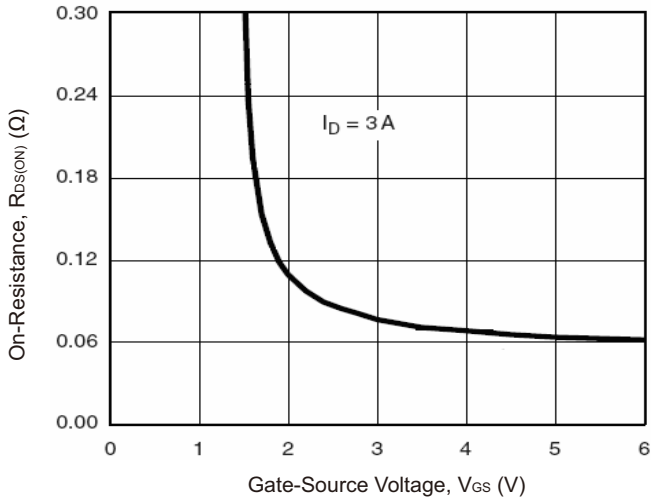


Fig.10 - Capacitance vs V_{DS}

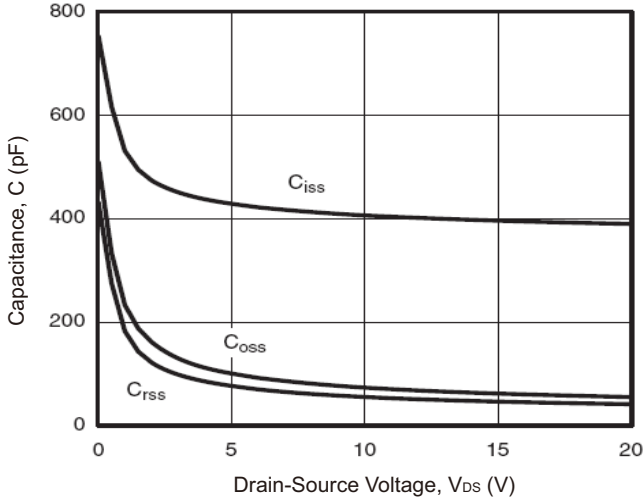


Fig.11 - Gate Charge

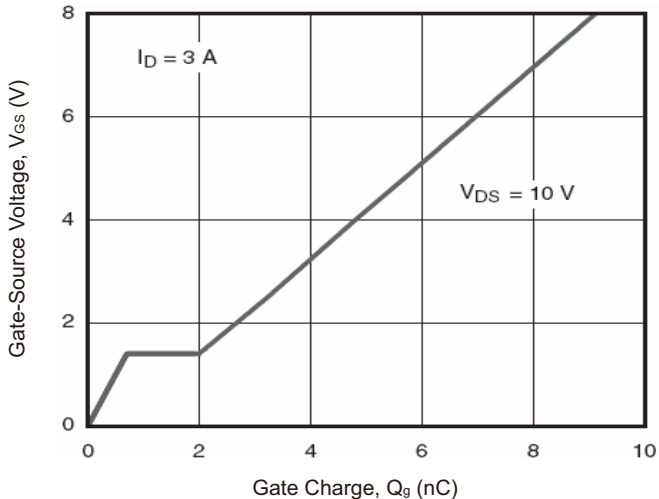
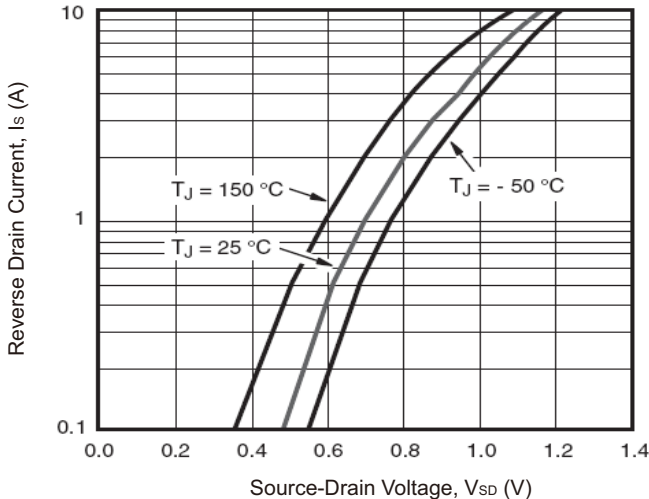


Fig.12 - Source-Drain Diode Forward



Typical Electrical and Thermal Characteristics (CMS2301T-HF)

Fig.13 - Safe Operation Area

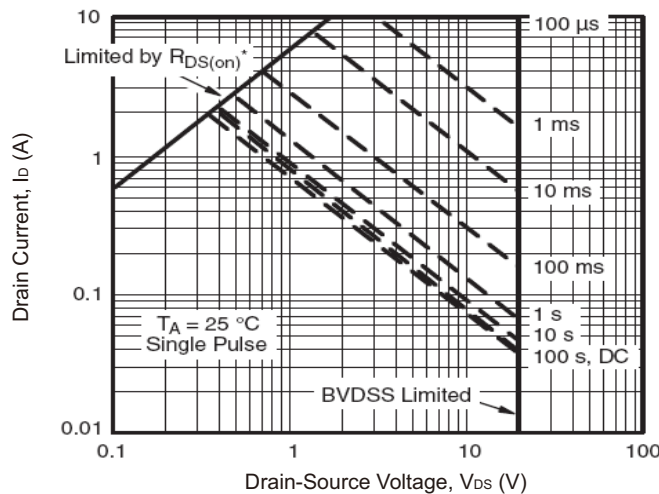
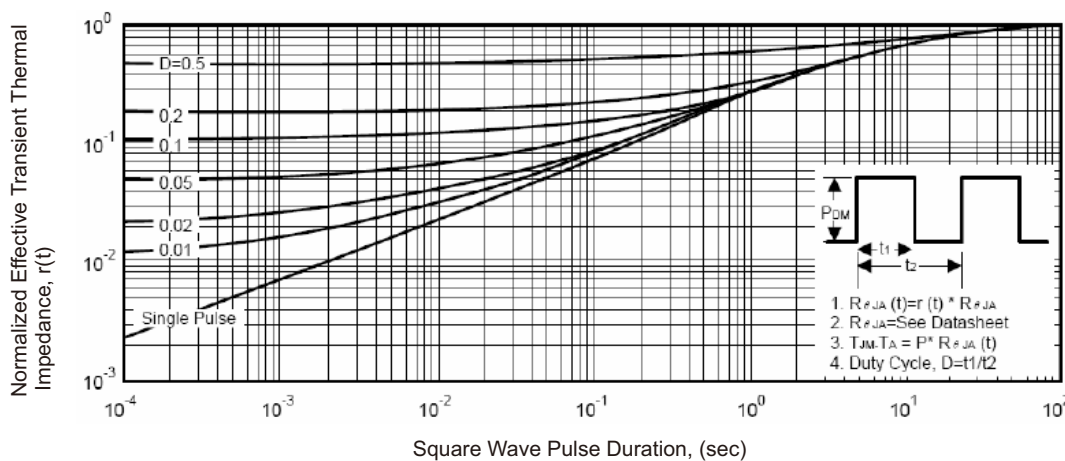
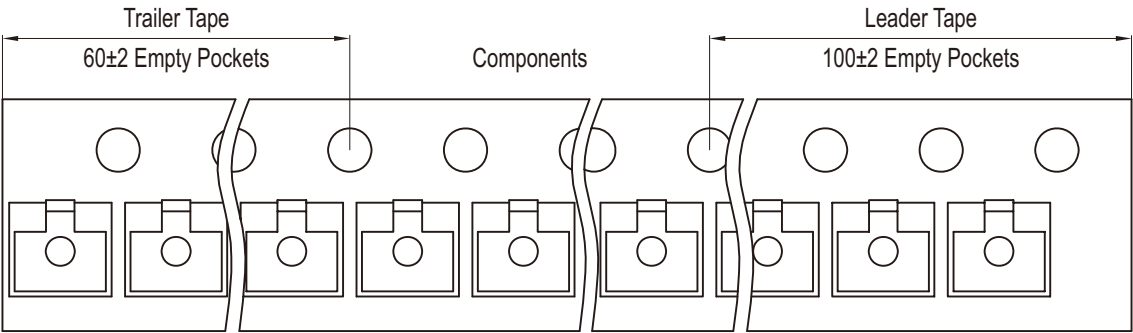
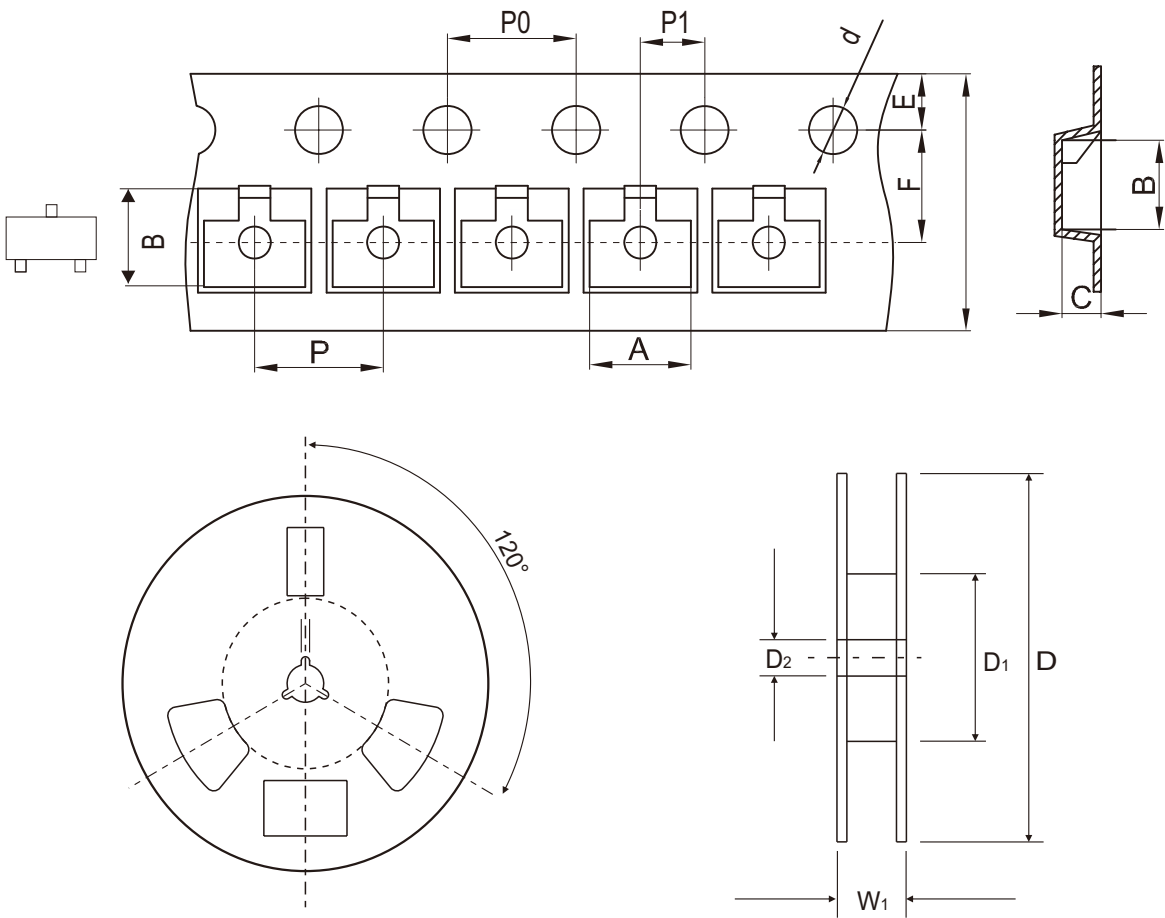


Fig.14 - Normalized Maximum Transient Thermal Impedance



Reel Taping Specification

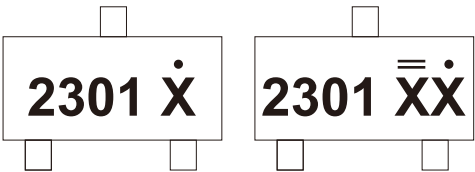


SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.10 ± 0.10	3.20 ± 0.10	1.37 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.122 ± 0.004	0.126 ± 0.004	0.054 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

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	8.40 + 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

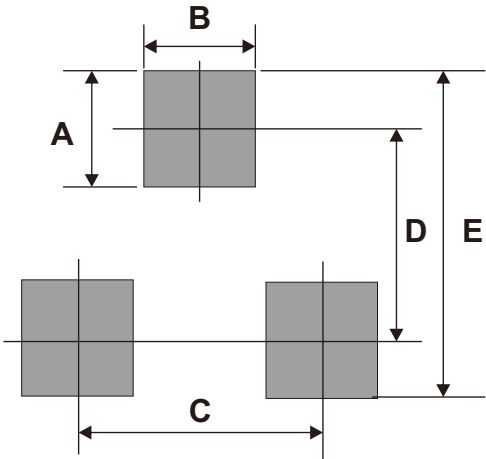
Part Number	Marking Code
CMS2301T-HF	2301



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