N -Channel Logic Level Enhancement Mode MOSFET

MTN0410L3

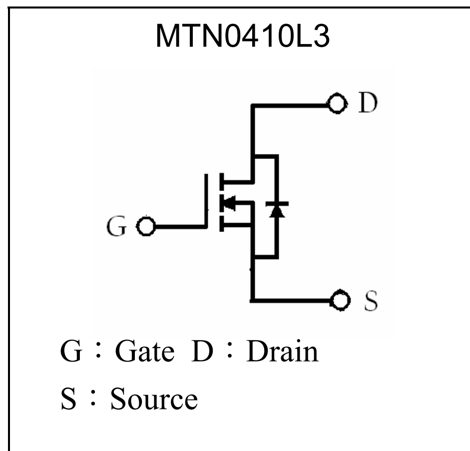
BV_{DSS}	100V
I_D	3A
$R_{DSON(MAX)}$	280mΩ

Features

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating package

Equivalent Circuit

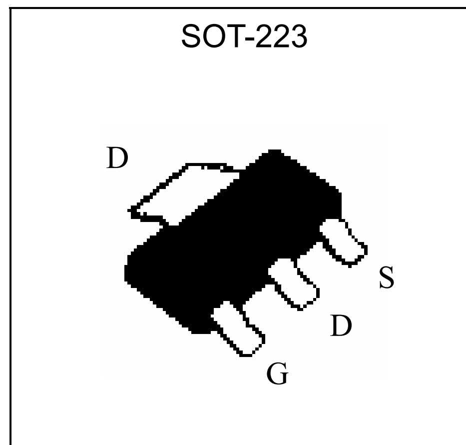
MTN0410L3



G：Gate D：Drain
S：Source

Outline

SOT-223



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

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	
Continuous Drain Current @ T_C=25°C	I_D	3	A
Continuous Drain Current @ T_C=100°C	I_D	2	
Pulsed Drain Current *1, 2	I_{DM}	12	
Total Power Dissipation @T_C=25℃	Pd	2.7	W
Linear Derating Factor		0.02	W/°C
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+175	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. Pulse width≤ 300μs, Duty cycle ≤2%

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	20	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	45 (Note)	°C/W

Note : When mounted on a 1 in^2 pad of 2 oz. copper; 120°C/W when mounted on minimum copper pad.

Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0, I_D=1mA
$V_{GS(th)}$	1	-	2.5	V	V_{DS} =10V, I_D=1mA
G_{FS} *1	-	4	-	S	V_{DS} =10V, I_D=2.5A
I_{GSS}	-	-	±100	nA	V_{GS}=±20, V_{DS}=0
I_{DSS}	-	-	10	μA	V_{DS} =80V, V_{GS} =0
$R_{DS(ON)}$ *1	-	-	280	mΩ	V_{GS} =10V, I_D=2A
	-	-	320	mΩ	V_{GS} =5V, I_D=1A
Dynamic					
Qg *1, 2	-	11.2	-	nC	V_{DS}=80V, V_{GS}=5V, I_D=3.5A
Qgs *1, 2	-	4.4	-		
Qgd *1, 2	-	3	-		
$t_{d(ON)}$ *1, 2	-	9	-	ns	V_{DS}=30V, I_D=1A, V_{GS}=10V, R_G=6Ω, R_L=30Ω
tr *1, 2	-	9.4	-		
$t_{d(OFF)}$ *1, 2	-	26.8	-		
t_f *1, 2	-	2.6	-		
Ciss	-	975	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	38	-		
Crss	-	27	-		
Source-Drain Diode					
I_S *1	-	-	2	A	
I_{SM} *3	-	-	8		
V_{SD} *1	-	-	1.5	V	I_S=3A, V_{GS}=0V, Tj=25°C

Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Ordering Information

Device	Package	Shipping
MTN0410L3	SOT-223 (Pb-free lead plating package)	2500 pcs / Tape & Reel

Typical Characteristics

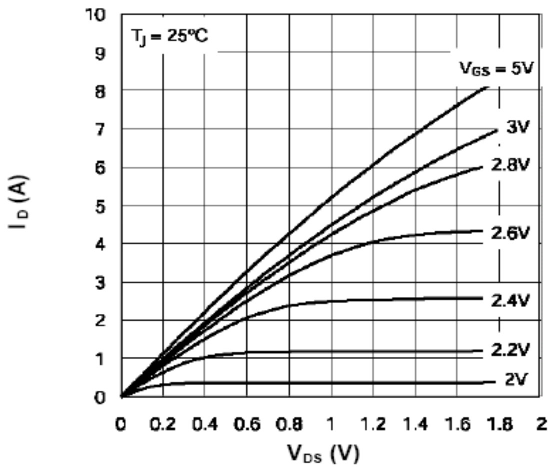


Fig 1. Typical Output Characteristics

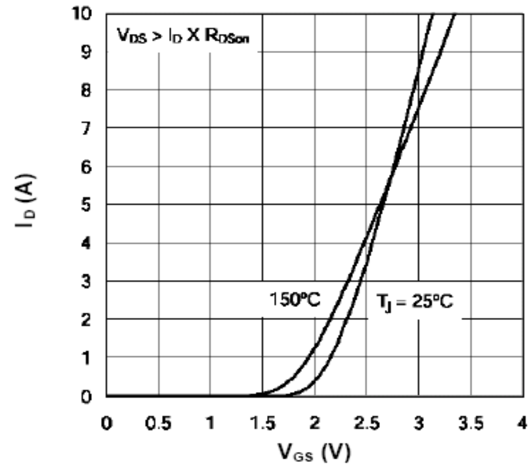


Fig 2. Transfer Characteristics

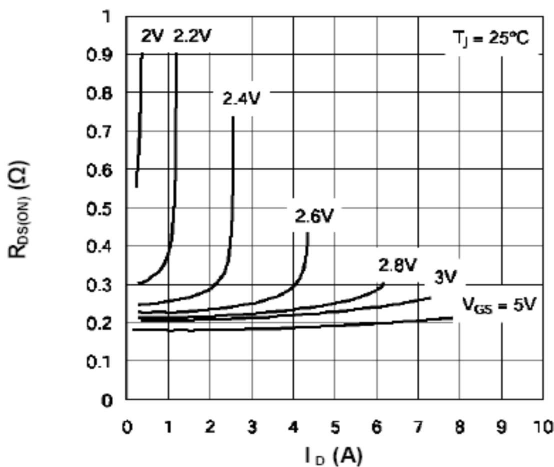


Fig 3. On-Resistance vs. Drain Current and Gate Voltage

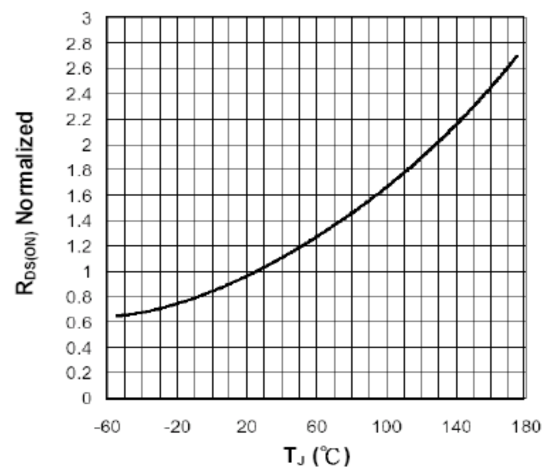


Fig 4. On-Resistance vs. Junction Temperature

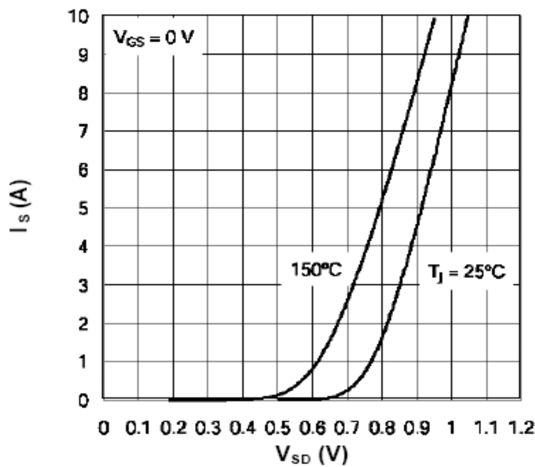


Fig 5. Body Diode Characteristics

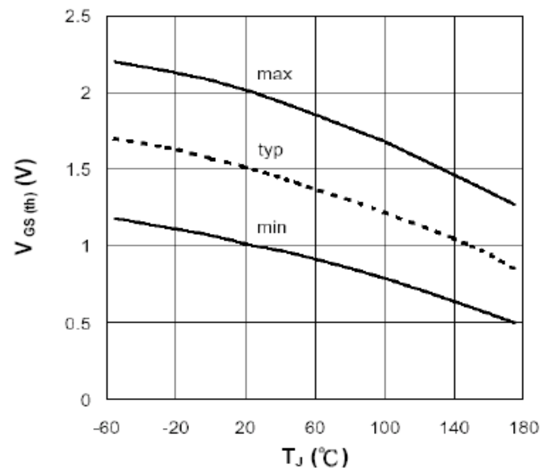


Fig 6. Gate-Source Threshold Voltage vs. Junction Temperature

Typical Characteristics(Cont.)

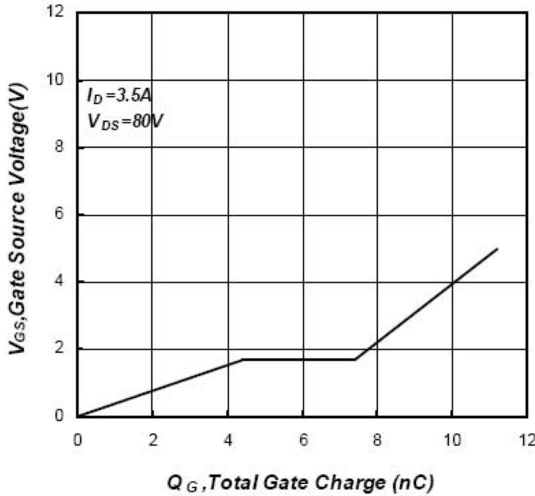


Fig 7. Gate Charge Characteristics

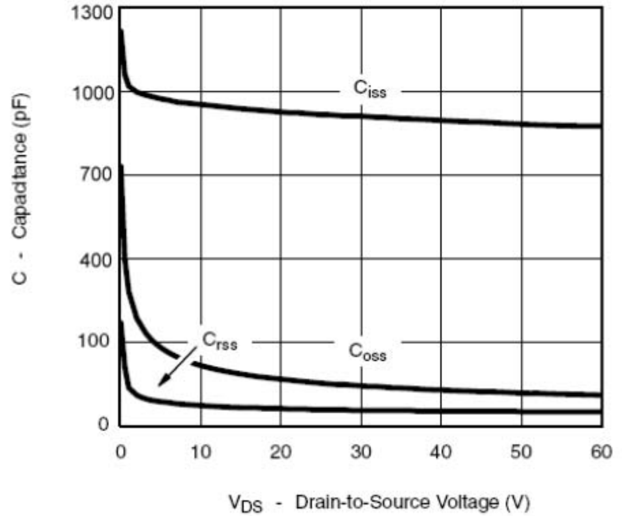


Fig 8. Typical Capacitance Characteristics

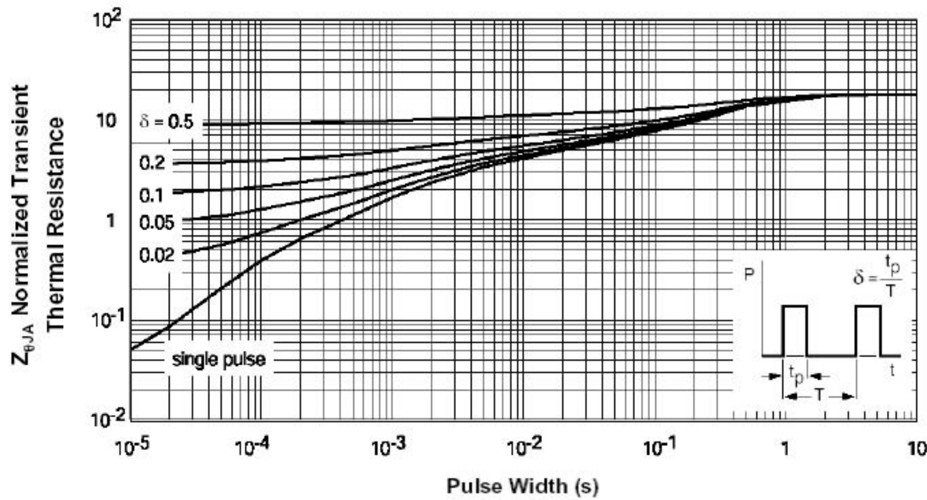
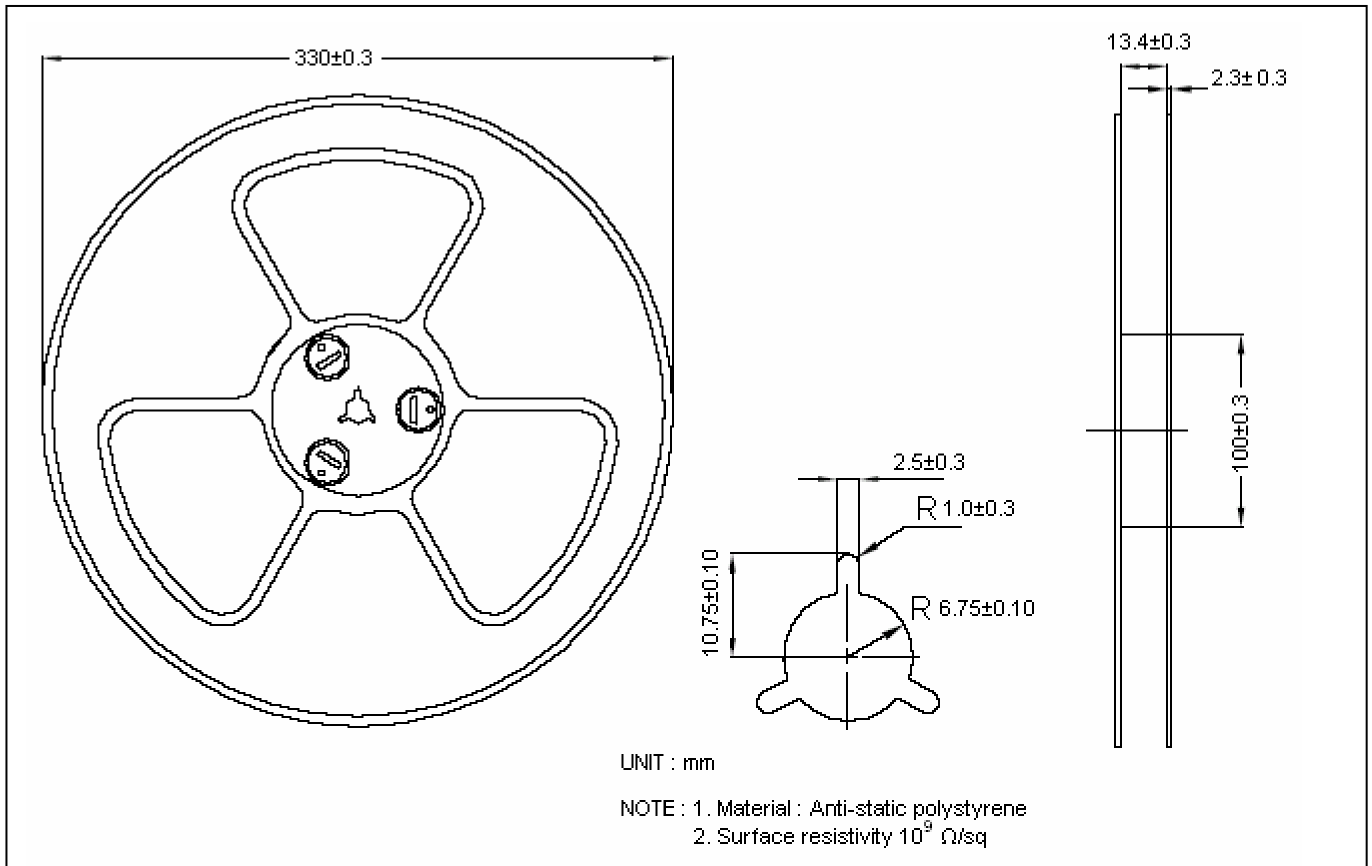
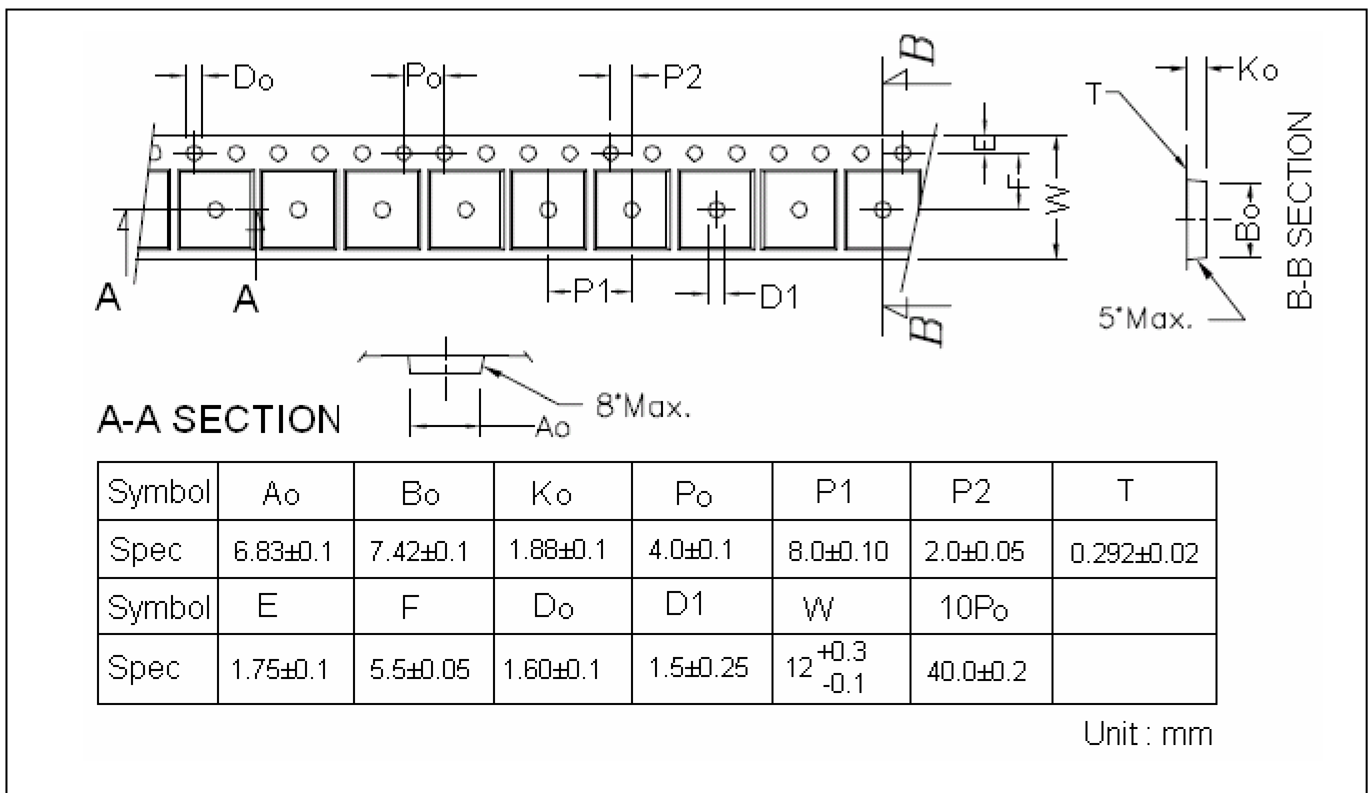


Fig 9. Normalized Maximum Transient Thermal Impedance

Reel Dimension



Carrier Tape Dimension



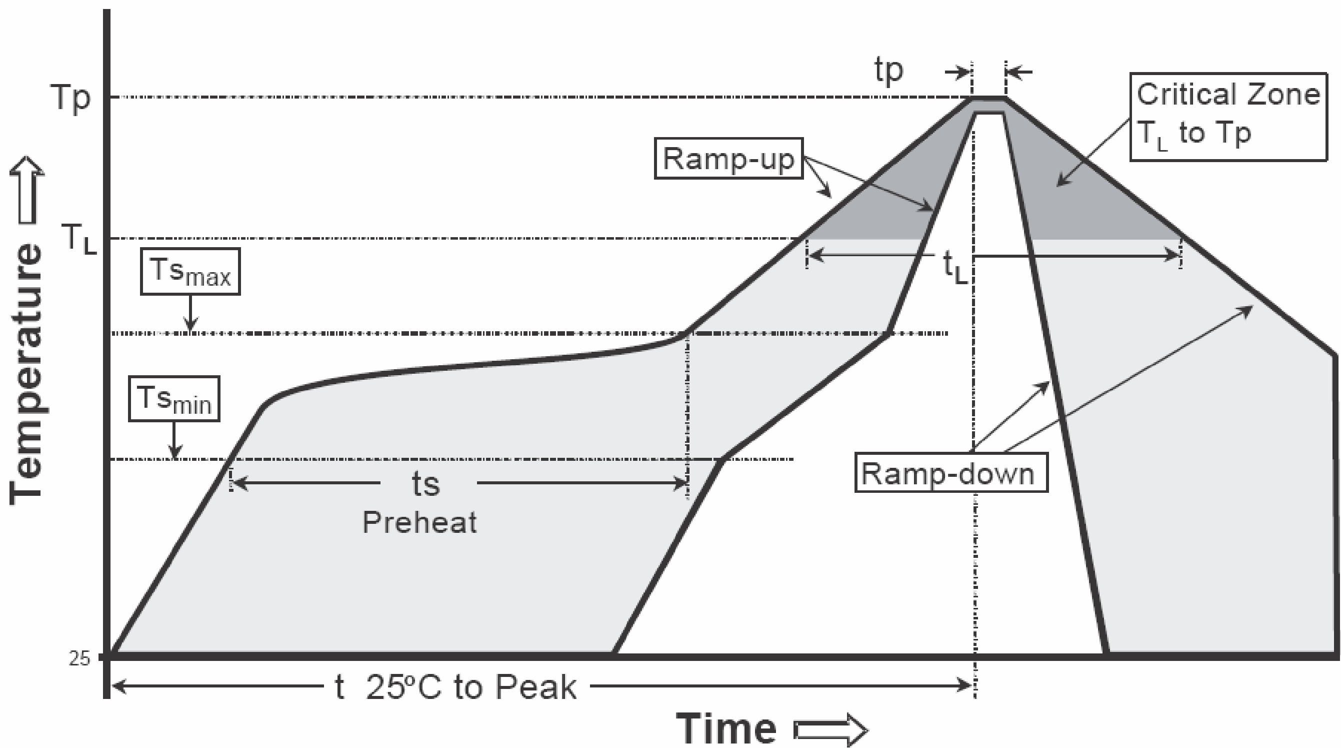
Symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.83±0.1	7.42±0.1	1.88±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.292±0.02
Symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.60±0.1	1.5±0.25	$12^{+0.3}_{-0.1}$	40.0±0.2	

Unit : mm

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

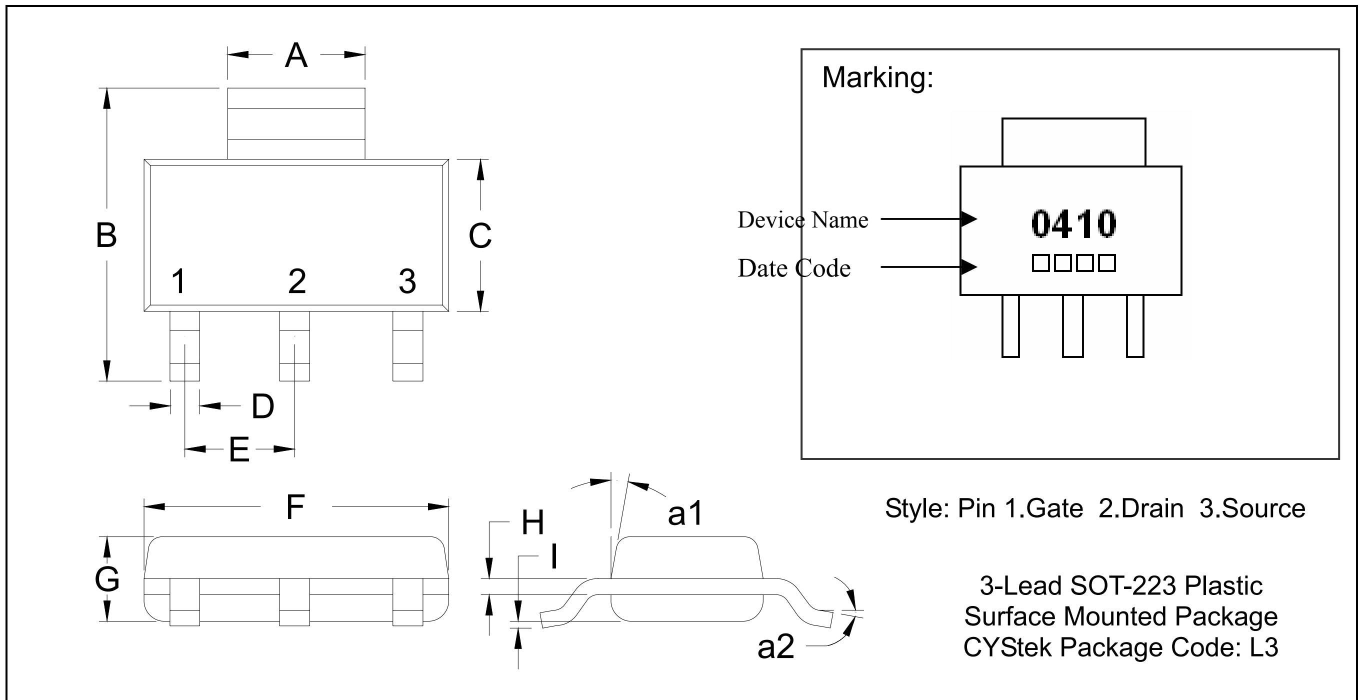
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts_{min} to ts_{max})	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T_P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-223 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1142	0.1220	2.90	3.10	G	0.0551	0.0709	1.40	1.80
B	0.2638	0.2874	6.70	7.30	H	0.0098	0.0138	0.25	0.35
C	0.1299	0.1457	3.30	3.70	I	0.0008	0.0039	0.02	0.10
D	0.0236	0.0315	0.60	0.80	a1	*13°	-	*13°	-
E	*0.0906	-	*2.30	-	a2	0°	10°	0°	10°
F	0.2480	0.2638	6.30	6.70					

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

- Lead: Pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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