20V N-Channel Logic Level Enhancement Mode MOSFET

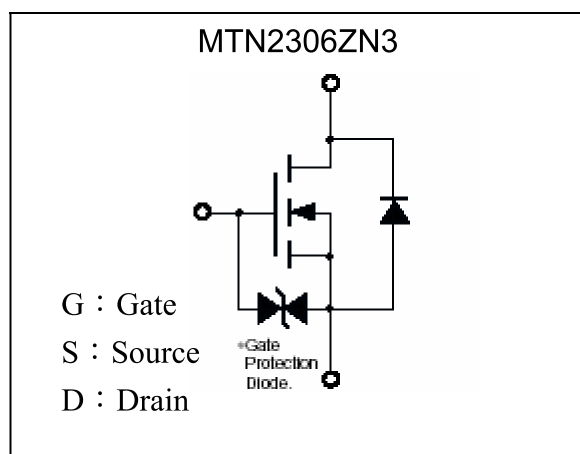
MTN2306ZN3

BV_{DSS}		20V
I_D		6A
$R_{DSON(MAX)}$	V_{GS}=10V, I_D=5A	28mΩ
	V_{GS}=4.5V, I_D=5A	30mΩ
	V_{GS}=2.5V, I_D=2.6A	40mΩ
	V_{GS}=1.8V, I_D=1A	60mΩ

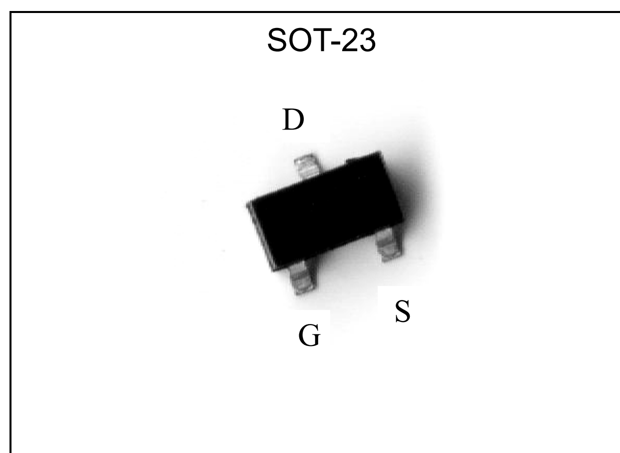
Features

- V_{DS}=20V
  $R_{DS(ON)}$=30mΩ@V_{GS}=4.5V, I_D=5A
  $R_{DS(ON)}$=40mΩ@V_{GS}=2.5V, I_D=2.6A
- Low on-resistance
- Low gate charge
- Excellent thermal and electrical capabilities
- Pb-free lead plating package

Equivalent Circuit



Outline



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±8	V
Continuous Drain Current @ T_A=25°C, V_{GS}=4.5V (Note 3)	I_D	6	A
Continuous Drain Current @ T_A=70°C, V_{GS}=4.5V (Note 3)	I_D	4	A
Pulsed Drain Current (Note 1, 2)	I_{DM}	24	A
Maximum Power Dissipation @ T_A=25℃	P_D	1.38	W
Linear Derating Factor		0.01	W/°C
ESD susceptibility (Note 4)		2600	V
Thermal Resistance, Junction-to-Ambient (Note 3)	$R_{th,ja}$	90	°C/W
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

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

3. Surface mounted on 1 in² copper pad of FR-4 board; 270°C/W when mounted on minimum copper pad.
4. Human body model, 1.5kΩ in series with 100pF

Electrical Characteristics (Tj=25°C, unless otherwise specified)

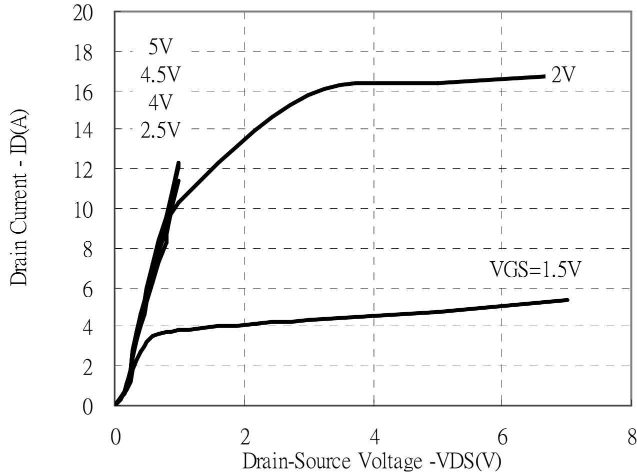
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	20	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	0.4	-	1.2	V	V_{DS}=V_{GS}, I_D=250μA
G_{FS}	-	13	-	S	V_{DS}=5V, I_D=5A
I_{GSS}	-	-	±10	μA	V_{GS}=±8V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=20V, V_{GS}=0
	-	-	25	μA	V_{DS}=20V, V_{GS}=0, Tj=70°C
*$R_{DS(ON)}$	-	19.5	28	mΩ	V_{GS}=10V, I_D=5A
	-	23	30		V_{GS}=4.5V, I_D=5A
	-	30	40		V_{GS}=2.5V, I_D=2.6A
	-	45	60		V_{GS}=1.8V, I_D=1A
Dynamic					
Ciss	-	474	800	pF	V_{DS}=20V, V_{GS}=0, f=1MHz
Coss	-	77.3	-		
Crss	-	59.3	-		
*$t_{d(ON)}$	-	6	-	ns	V_{DS}=15V, I_D=5A, V_{GS}=10V, R_G=3.3Ω, R_D=3Ω
*t_r	-	20	-		
*$t_{d(OFF)}$	-	20	-		
*t_f	-	3	-		
*Qg	-	8.5	15	nC	V_{DS}=16V, I_D=5A, V_{GS}=4.5V
*Qgs	-	1.5	-		
*Qgd	-	3.2	-		
Source-Drain Diode					
*V_{SD}	-	-	1.2	V	V_{GS}=0V, I_S=1.2A
*trr	-	14	-	ns	I_S=5A, V_{GS}=0V, dI/dt=100A/μs
*Qrr	-	7	-	nC	

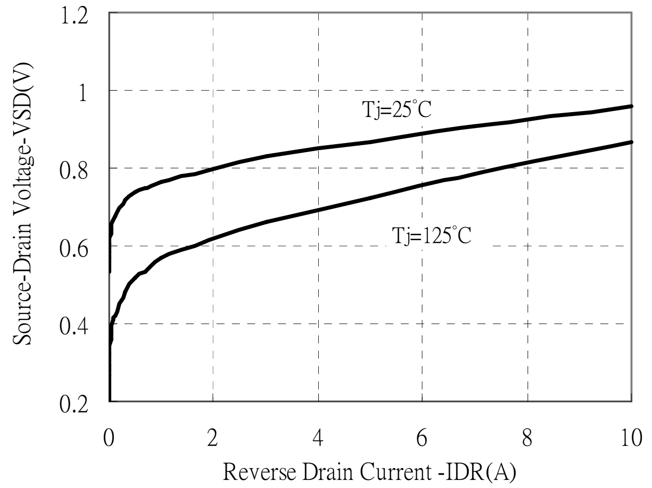
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

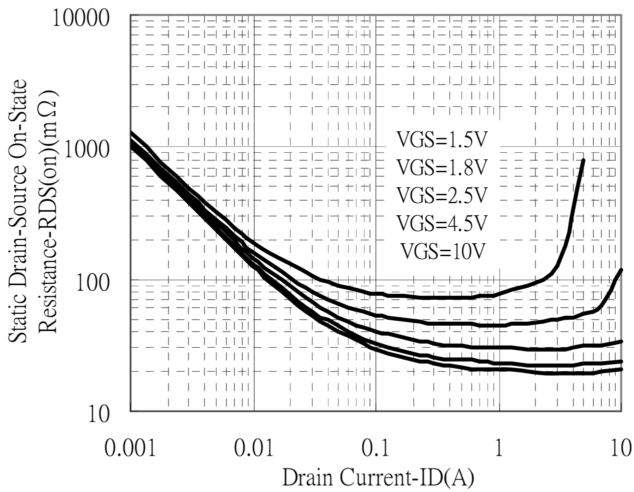
Ordering Information

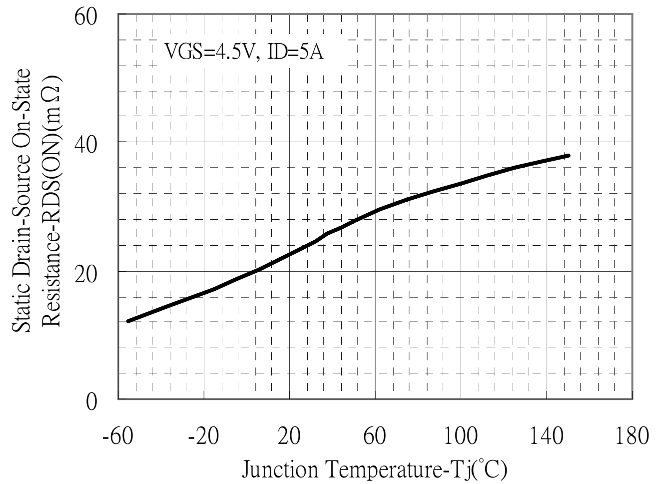
Device	Package	Shipping	Marking
MTN2306ZN3	SOT-23 (Pb-free lead plating package)	3000 pcs / Tape & Reel	2306•

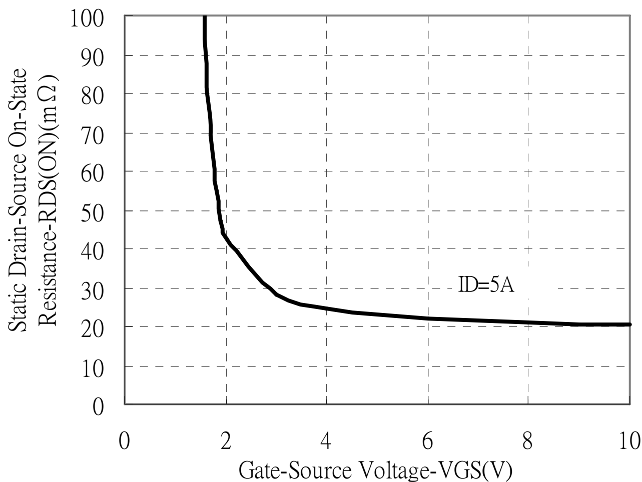
Typical Characteristics

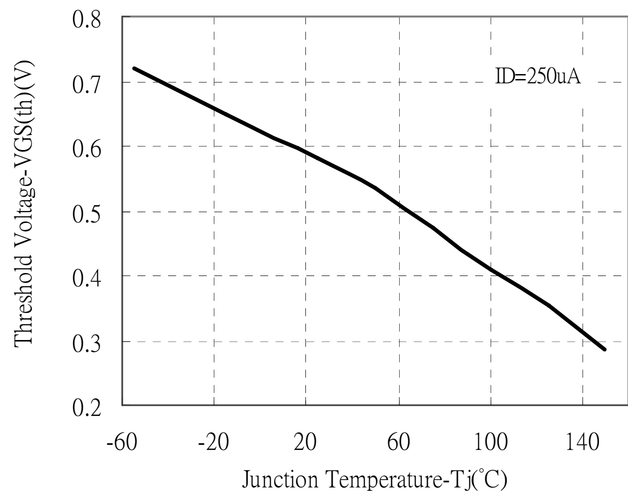




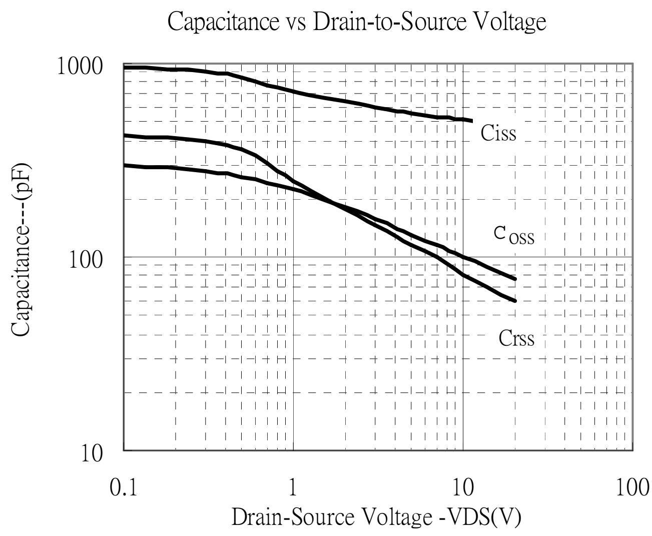




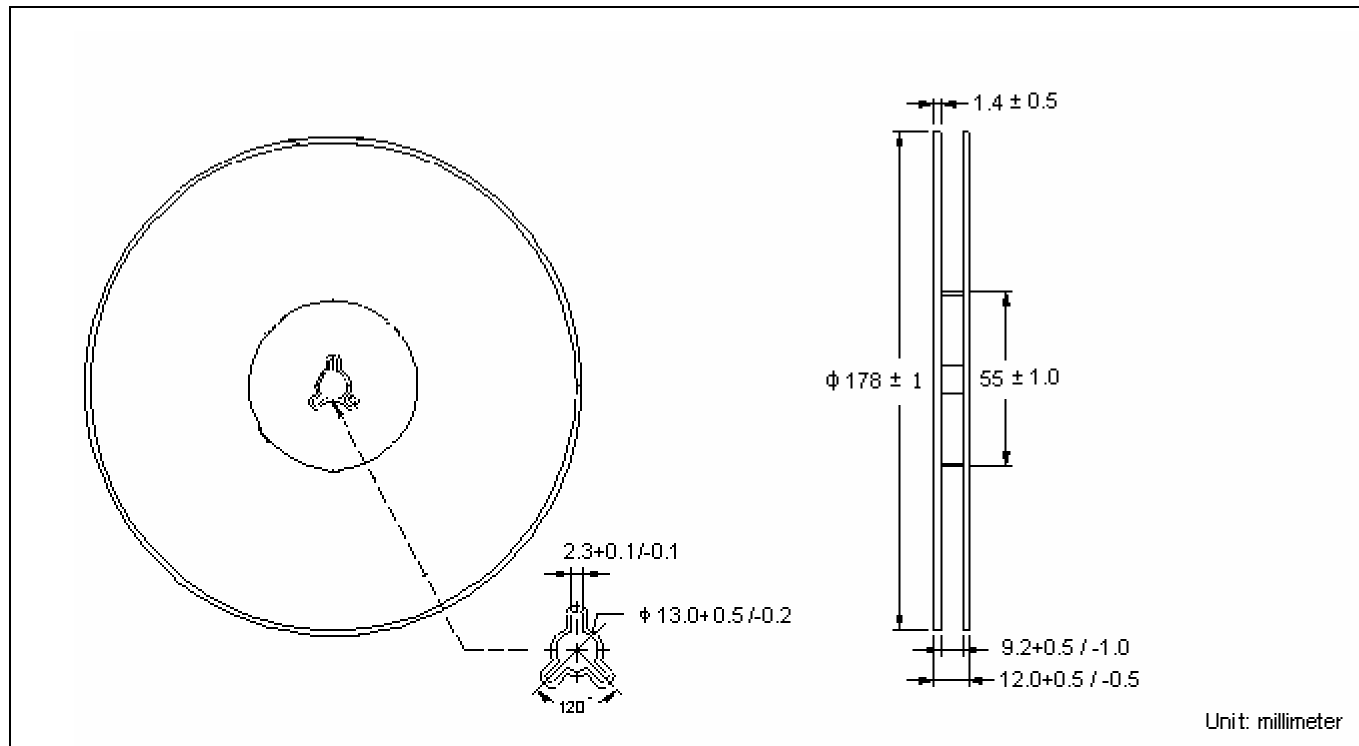




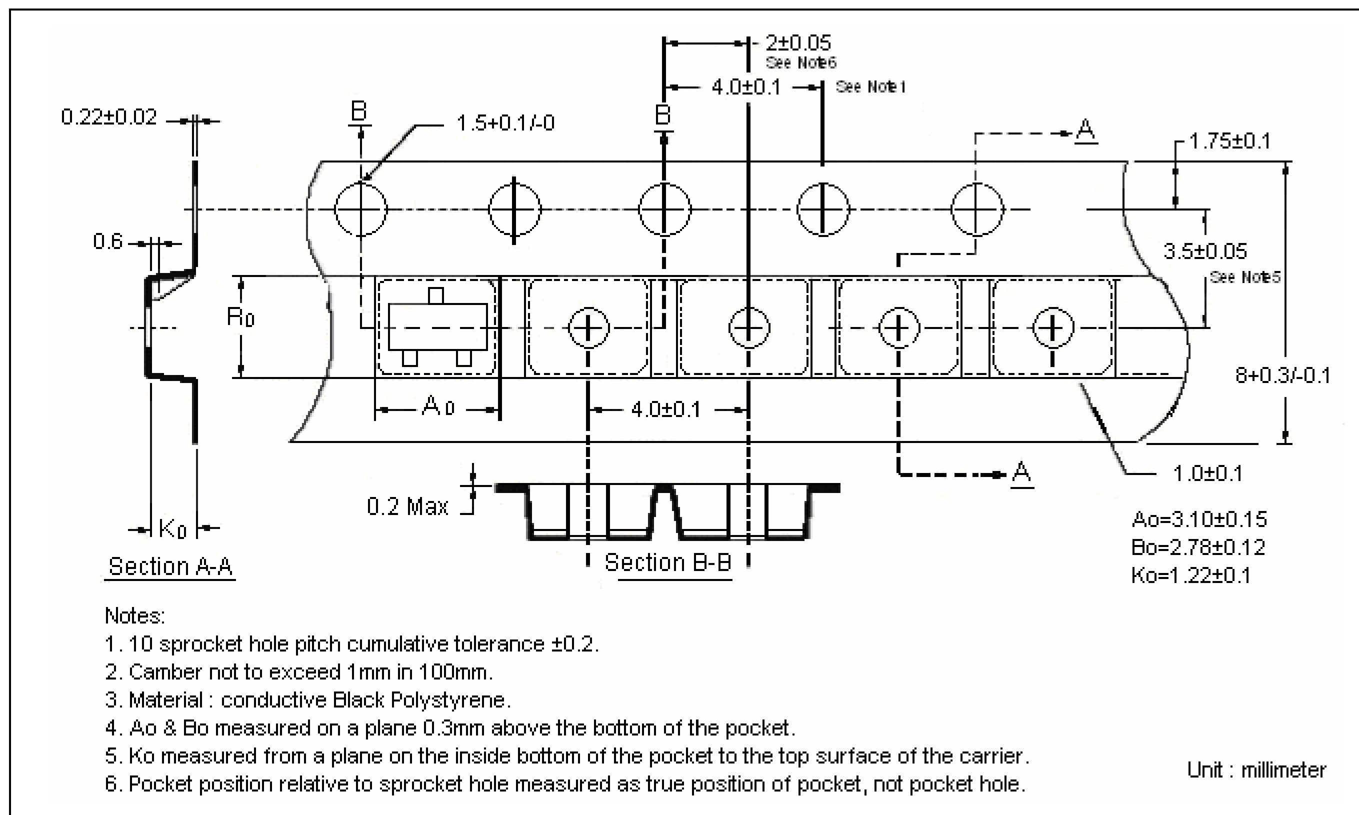
Typical Characteristics(Cont.)



Reel Dimension



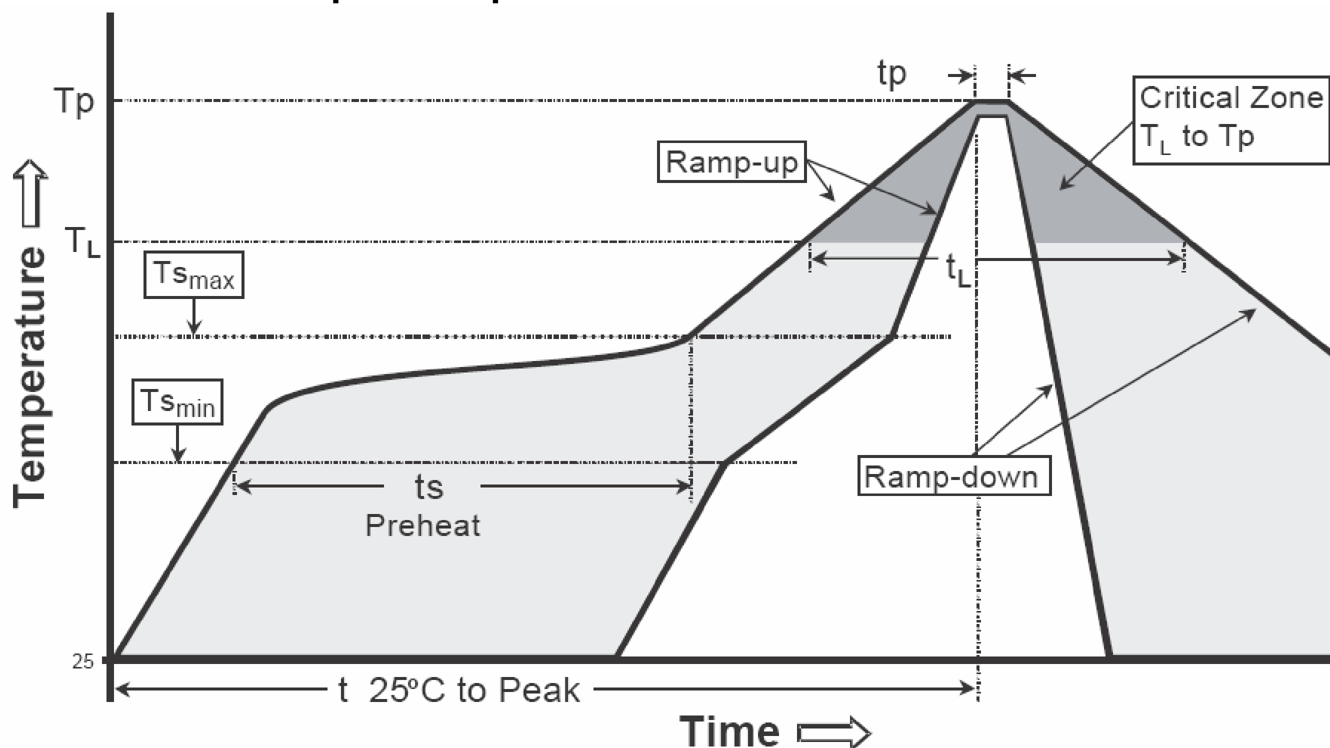
Carrier Tape Dimension



Recommended wave soldering condition

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

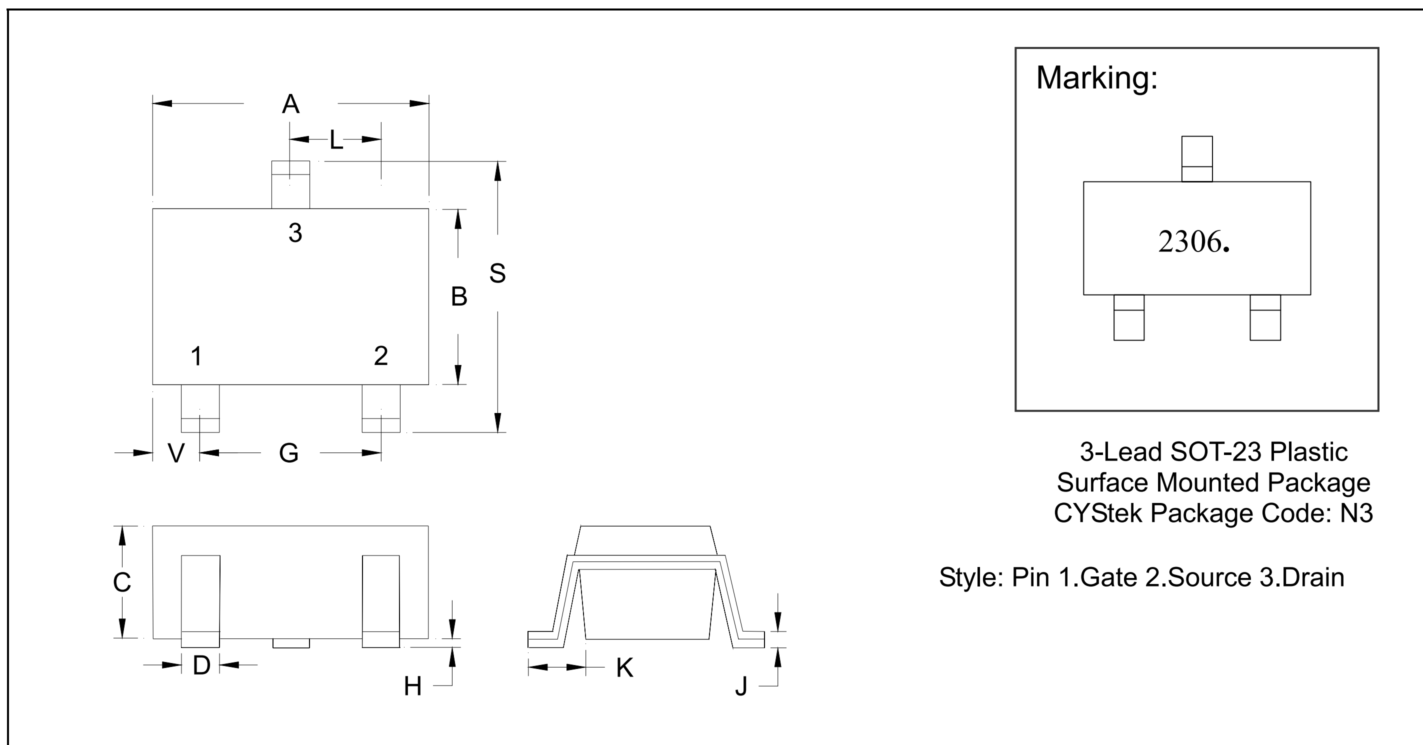
Recommended temperature profile for IR reflow



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(Ts min) −Temperature Max(Ts 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-23 Dimension



3-Lead SOT-23 Plastic
Surface Mounted Package
CYStek Package Code: N3

Style: Pin 1.Gate 2.Source 3.Drain

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0034	0.0070	0.085	0.177
B	0.0472	0.0630	1.20	1.60	K	0.0128	0.0266	0.32	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0005	0.0040	0.013	0.10					

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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