N-CHANNEL MOSFET

MTN138KS3

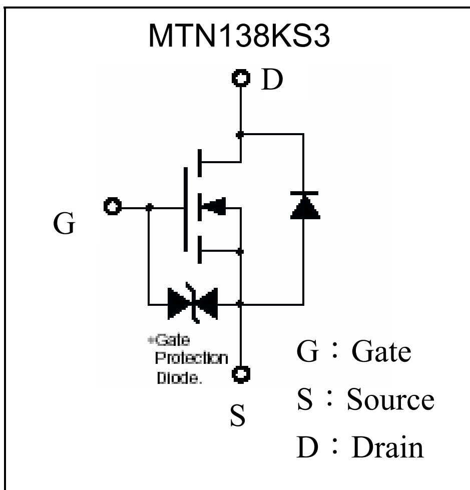
Description

The MTN138KS3 is a N-channel enhancement-mode MOSFET.

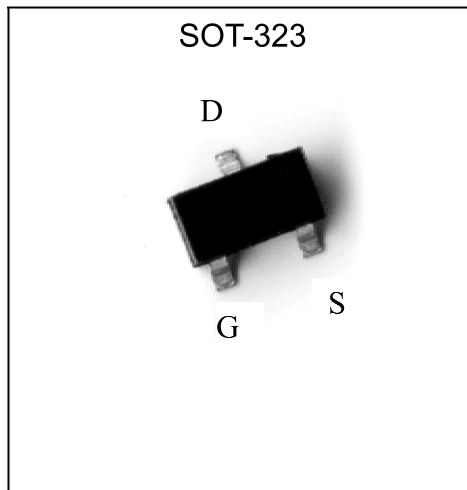
Features

• Low on-resistance
• High ESD
• High speed switching
• Low-voltage drive
• Easily designed drive circuits
• Easy to use in parallel
• Pb-free package

Symbol



Outline



Ordering Information

Device	Package	Shipping
MTN138KS3-0-T1-G	SOT-323 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	220	mA
	Pulsed	I_{DP}	800 *1	
Drain Reverse Current	Continuous	I_{DR}	220	
	Pulsed	I_{DRP}	800 *1	
Total Power Dissipation		P_D	200 *2	mW
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	625 *2	°C/W
ESD susceptibility			1500 *3	V
Operating Channel Temperature Range		T_{CH}	-55~+150	°C
Storage Temperature Range		Tstg	-55~+150	

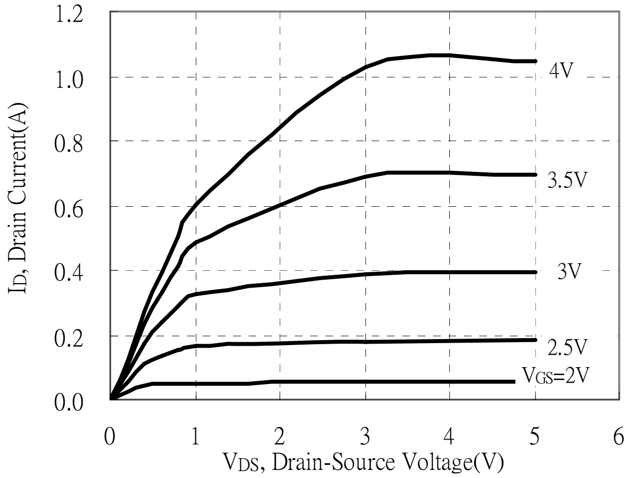
Note : *1. Pulse Width ≤ 300μs, Duty cycle ≤2%
*2. When the device is mounted on a minimum pad size
*3. Human body model, 1.5kΩ in series with 100pF

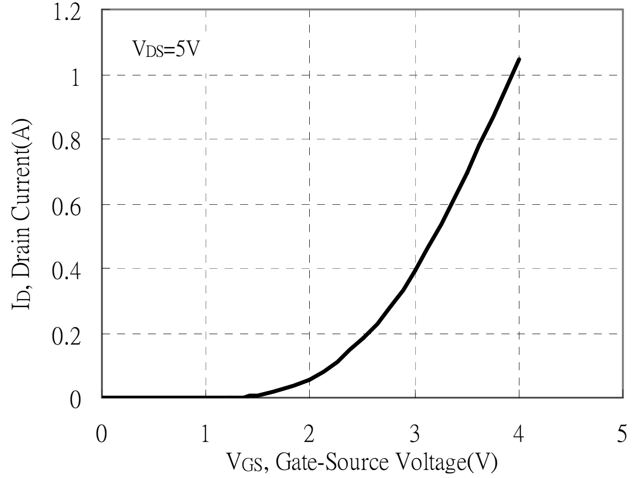
Electrical Characteristics (Ta=25°C)

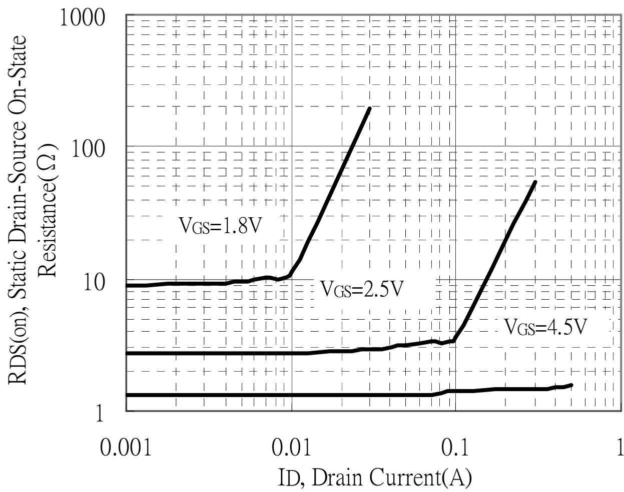
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}*	60	-	-	V	V_{GS}=0, I_D=10μA
$V_{GS(th)}$	0.5	1.2	1.5		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	1		V_{DS}=60V, V_{GS}=0
$R_{DS(ON)}$*	-	1.2	3	Ω	I_D=220mA, V_{GS}=10V
	-	1.4	3.2		I_D=220mA, V_{GS}=4.5V
G_{FS}	200	360	-	mS	V_{DS}=10V, I_D=220mA
Dynamic					
C_{iss}	-	29	-	pF	V_{DS}=25V, V_{GS}=0, f=1MHz
C_{oss}	-	4	-		
C_{rss}	-	2.8	-		
$t_{d(ON)}$	-	3	-	ns	V_{DS}=30V, I_D=200mA, V_{GS}=10V, R_G=6Ω
t_r	-	5	-		
$t_{d(OFF)}$	-	14	-		
t_f	-	9	-		
Qg	-	1.1	-	nC	V_{DS}=30V, I_D=200mA, V_{GS}=10V
Qgs	-	0.1	-		
Qgd	-	0.23	-		
Source-Drain Diode					
*V_{SD}	-	0.8	1.2	V	V_{GS}=0V, I_S=200mA

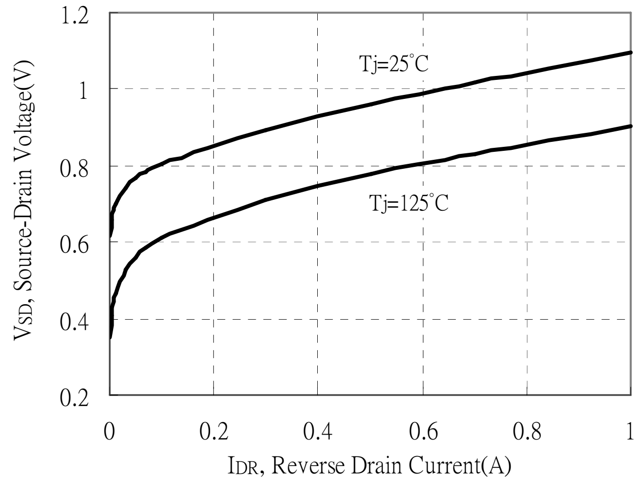
*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

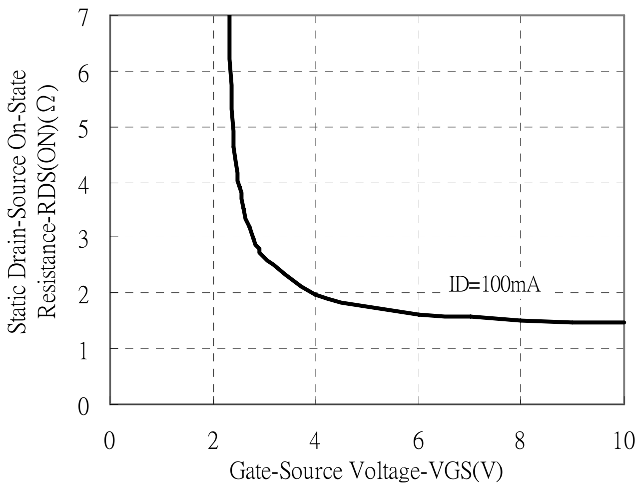
Typical Characteristics

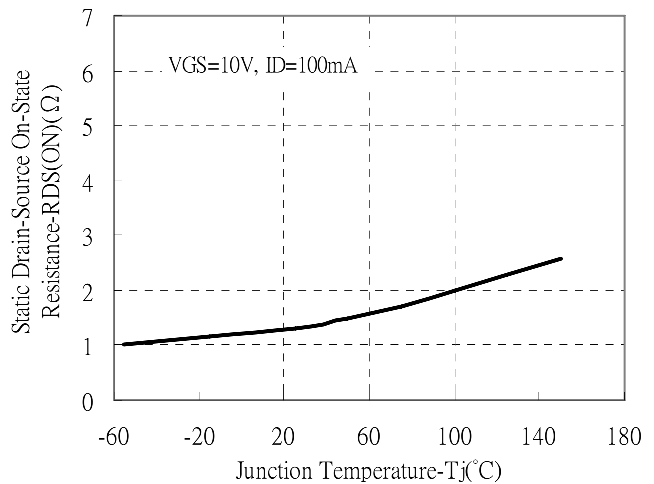




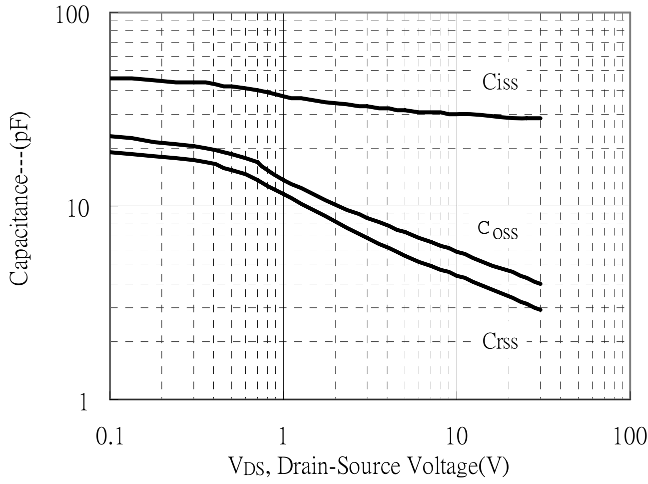


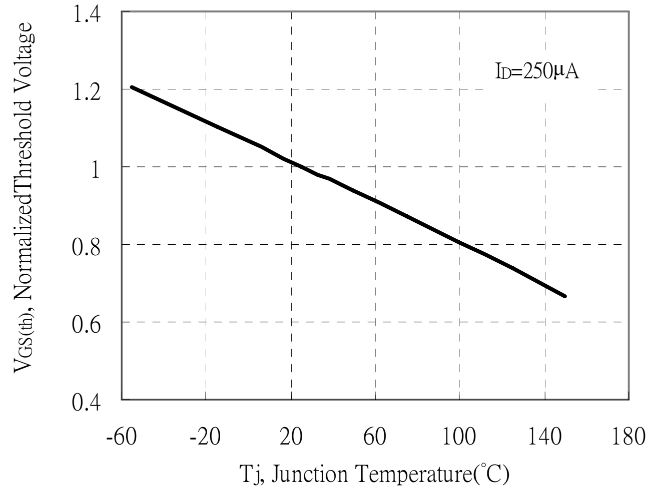


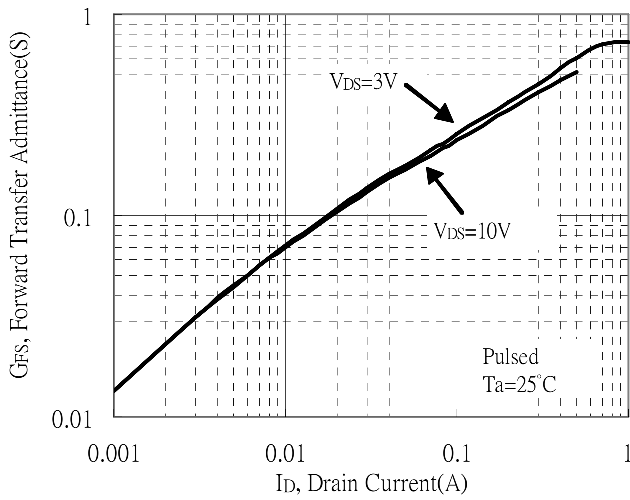


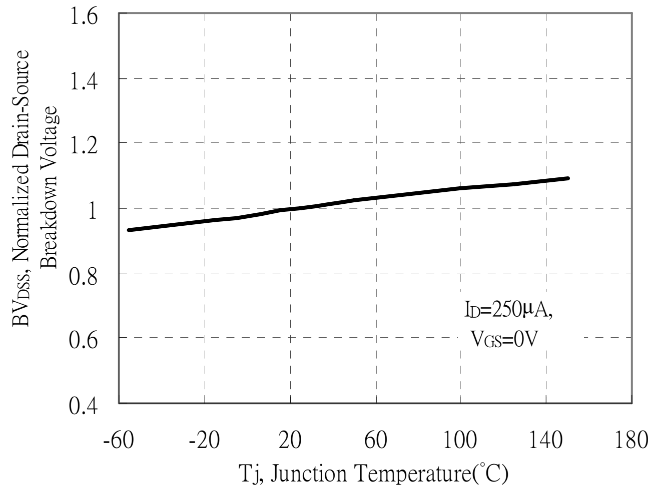


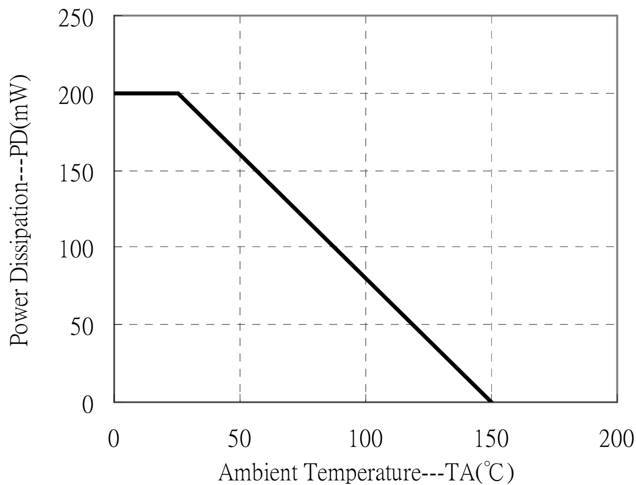
Characteristic Curves(Cont.)



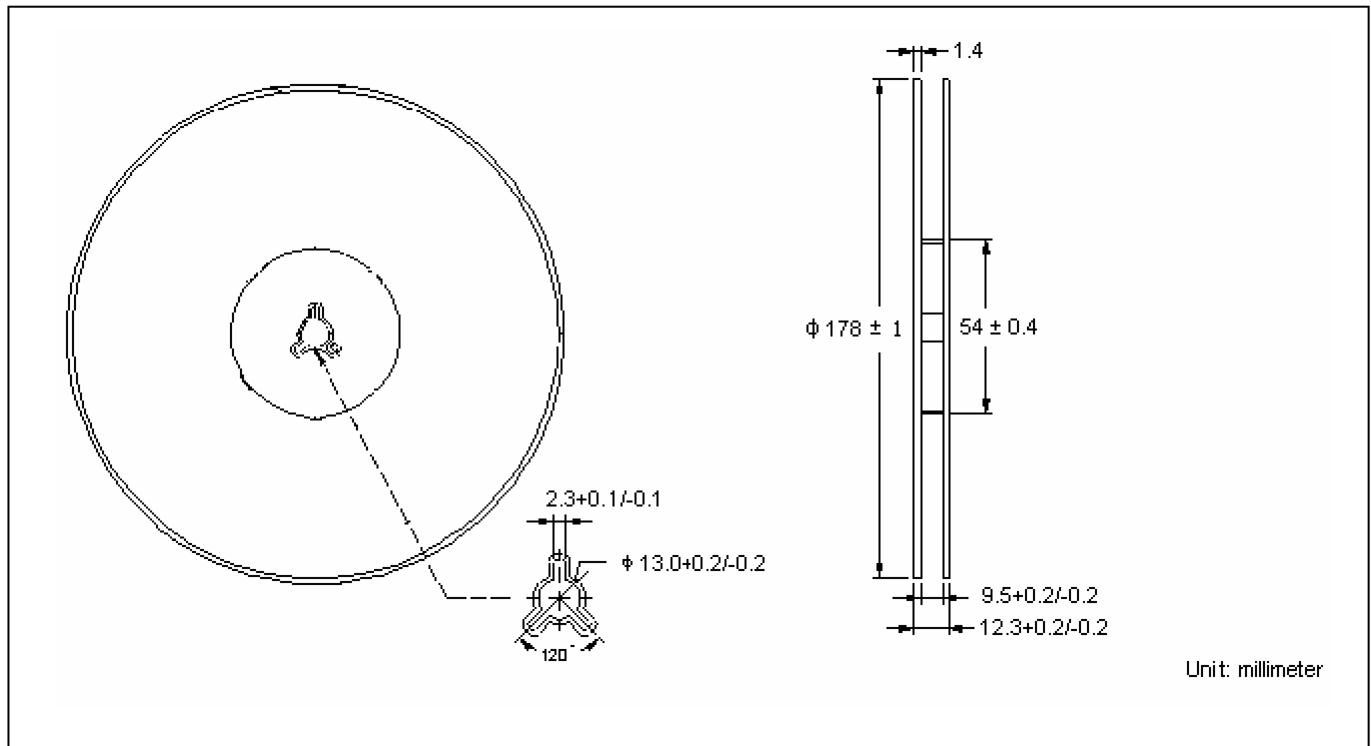




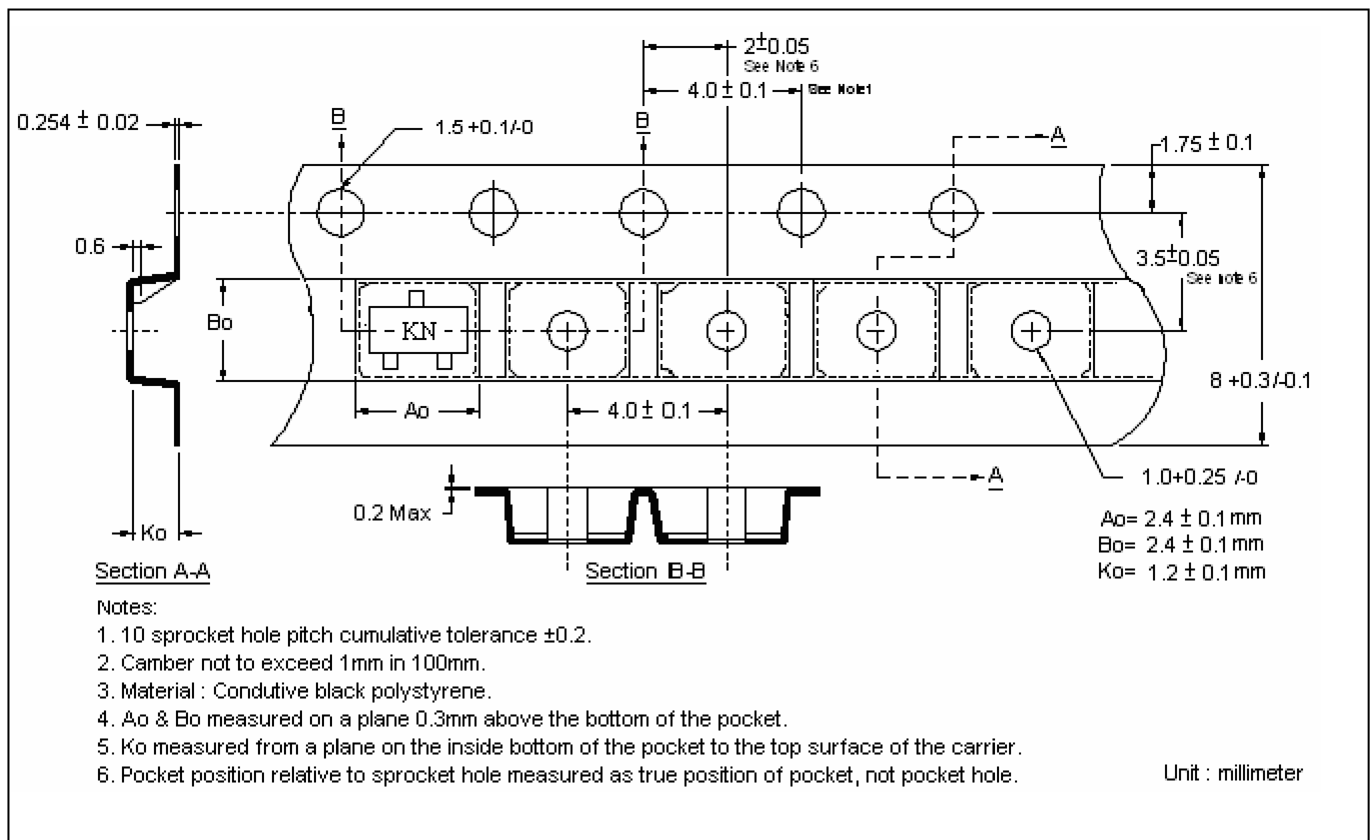




Reel Dimension



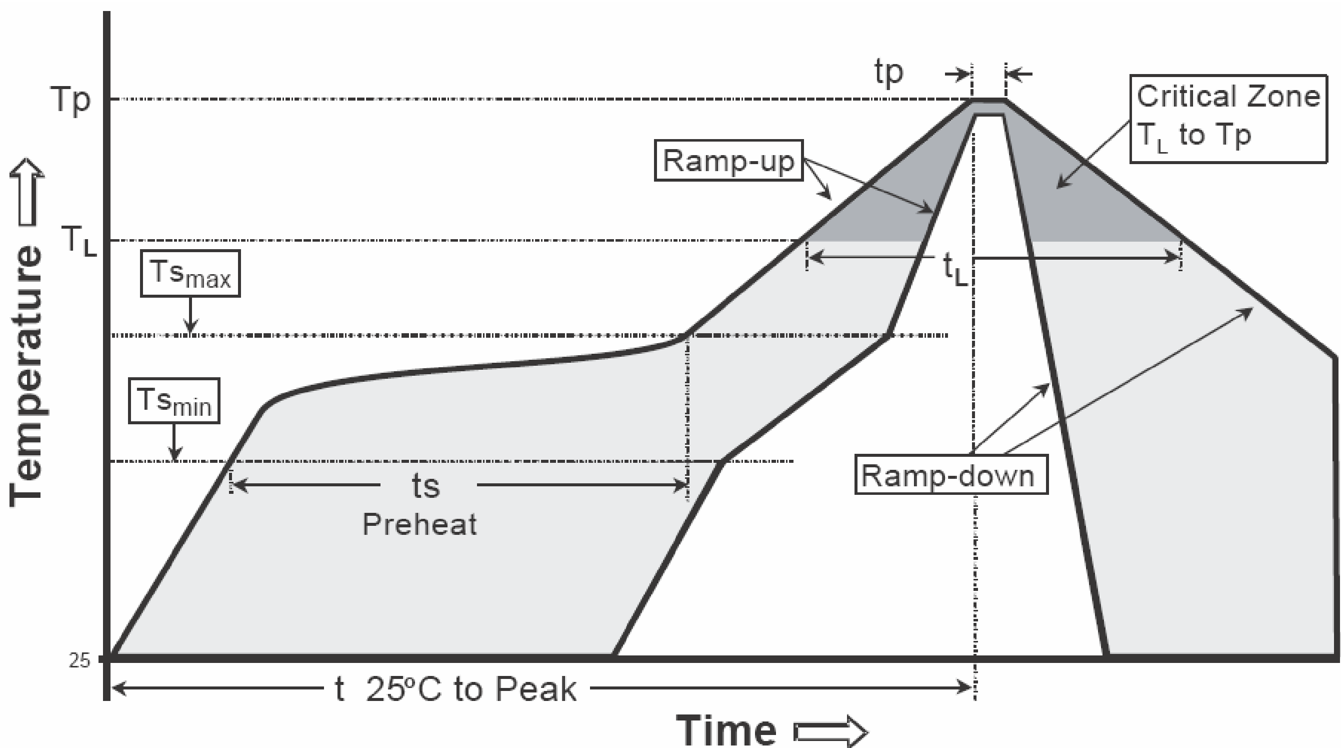
Carrier Tape Dimension



Recommended wave soldering condition

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

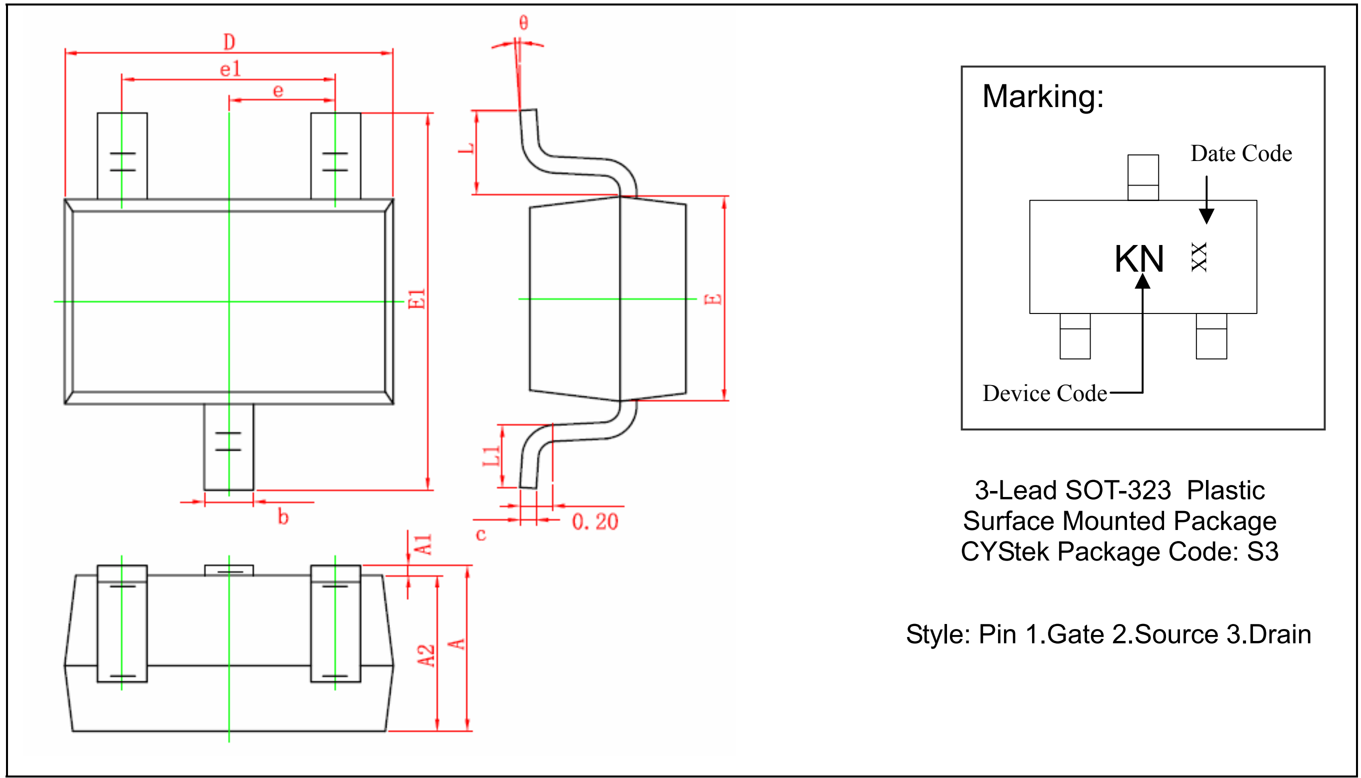
Recommended temperature profile for IR reflow



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-323 Dimension



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043	E1	2.150	2.450	0.085	0.096
A1	0.000	0.100	0.000	0.004	e	0.650	TYP	0.026	TYP
A2	0.900	1.000	0.035	0.039	e1	1.200	1.400	0.047	0.055
b	0.200	0.400	0.008	0.016	L	0.525	REF	0.021	REF
c	0.080	0.150	0.003	0.006	L1	0.260	0.460	0.010	0.018
D	2.000	2.200	0.079	0.087	θ	0°	8°	0°	8°
E	1.150	1.350	0.045	0.053					

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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