

**N-Channel Logic Level Enhancement Mode MOSFET**

# MTN7002KC3

BV <sub>DSS</sub>	60V
I <sub>D</sub>	230mA
R <sub>DS(on)</sub> @V <sub>GS</sub> =10V	1.2Ω typ.
R <sub>DS(on)</sub> @V <sub>GS</sub> =4.5V	1.8Ω typ.

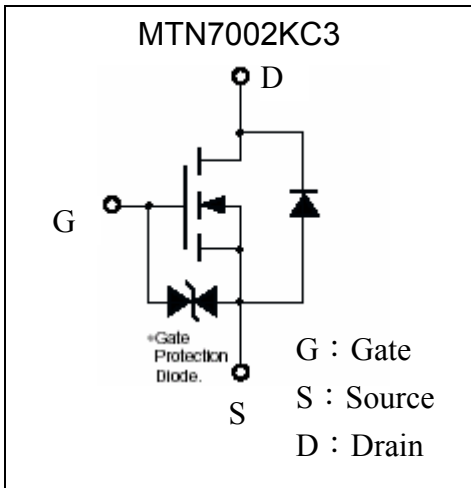
**Description**

The MTN7002KC3 is a N-channel enhancement-mode MOSFET.

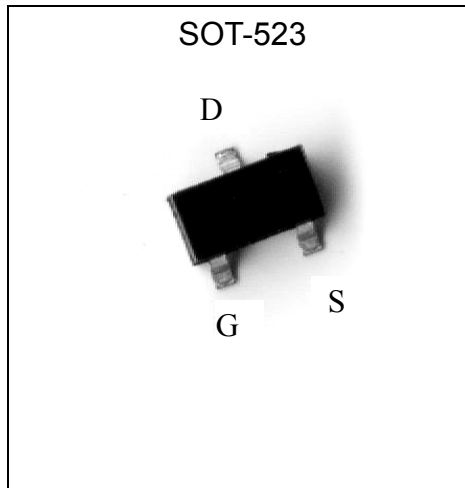
**Features**

- 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	Marking
MTN7002KC3	SOT-523 (Pb-free)	3000 pcs / Tape & Reel	72



**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V <sub>DSS</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Drain Current	Continuous	I <sub>D</sub>	230 mA
	Pulsed	I <sub>DP</sub>	800 *1 mA
Drain Reverse Current	Continuous	I <sub>DR</sub>	230 mA
	Pulsed	I <sub>DRP</sub>	800 *1 mA
Total Power Dissipation	P <sub>D</sub>	150 *2	mW
ESD susceptibility		1550 *3	V
Channel Temperature	T <sub>CH</sub>	+150	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C

**Thermal Characteristics**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	833 *2	°C/W

Note : \*1. Pulse Width ≤ 300μs, Duty cycle ≤ 2%

\*2. When the device is mounted on a glass epoxy board with area measuring 1×0.75×0.62 inch

\*3. Human body model, 1.5kΩ in series with 100pF

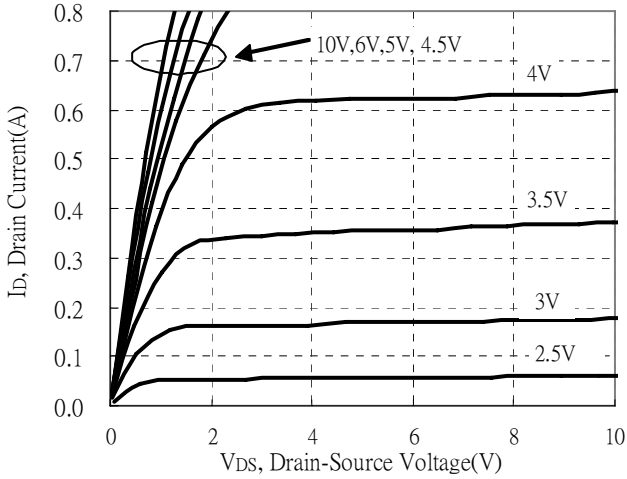
**Electrical Characteristics (Ta=25°C)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>DSS</sub> *	60	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =10μA
V <sub>GS(th)</sub>	1	1.6	2.5		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0
I <sub>DSS</sub>	-	-	1		V <sub>DS</sub> =60V, V <sub>GS</sub> =0
R <sub>DS(ON)</sub> *	-	1.2	2.5	Ω	I <sub>D</sub> =500mA, V <sub>GS</sub> =10V
	-	1.8	3		I <sub>D</sub> =100mA, V <sub>GS</sub> =4.5V
G <sub>FS</sub>	100	240	-	mS	V <sub>DS</sub> =10V, I <sub>D</sub> =100mA
C <sub>iss</sub>	-	30.6	-	pF	V <sub>DS</sub> =10V, V <sub>GS</sub> =0, f=1MHz
C <sub>oss</sub>	-	5.5	-		
C <sub>rss</sub>	-	4	-		
t <sub>d(ON)</sub>	-	3	-	ns	V <sub>DS</sub> =30V, I <sub>D</sub> =200mA, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω
t <sub>r</sub>	-	5	-		
t <sub>d(OFF)</sub>	-	14	-		
t <sub>f</sub>	-	9	-		
Q <sub>g</sub>	-	1.1	-	nC	V <sub>DS</sub> =30V, I <sub>D</sub> =200mA, V <sub>GS</sub> =10V
Q <sub>gs</sub>	-	0.1	-		
Q <sub>gd</sub>	-	0.23	-		

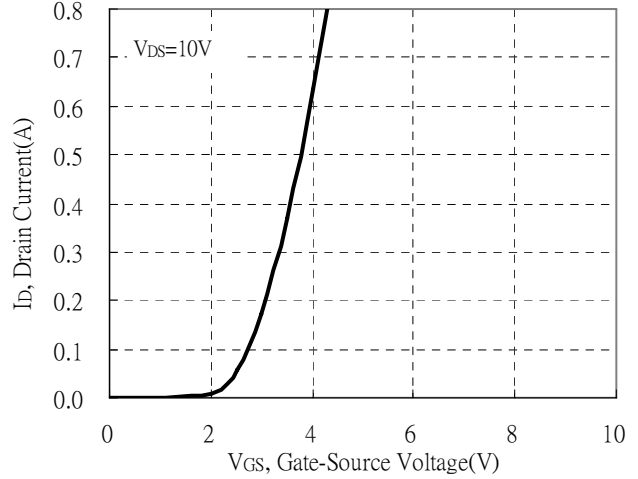
\*Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

## Typical Characteristics

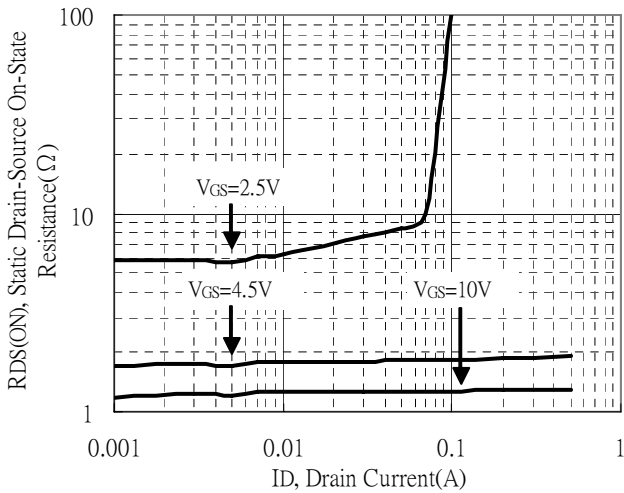
Typical Output Characteristics



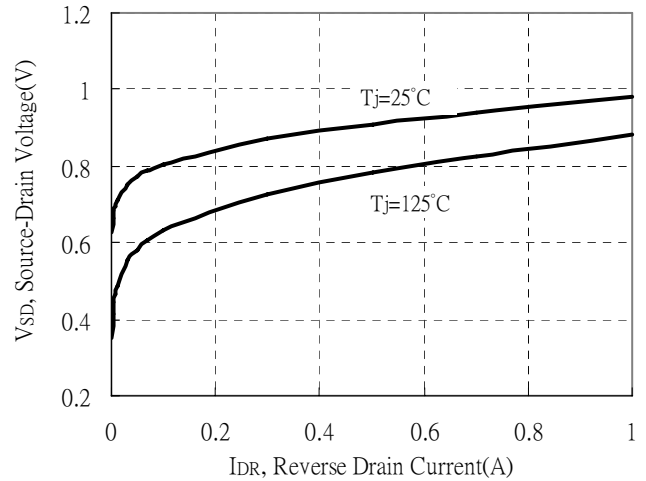
Typical Transfer Characteristics



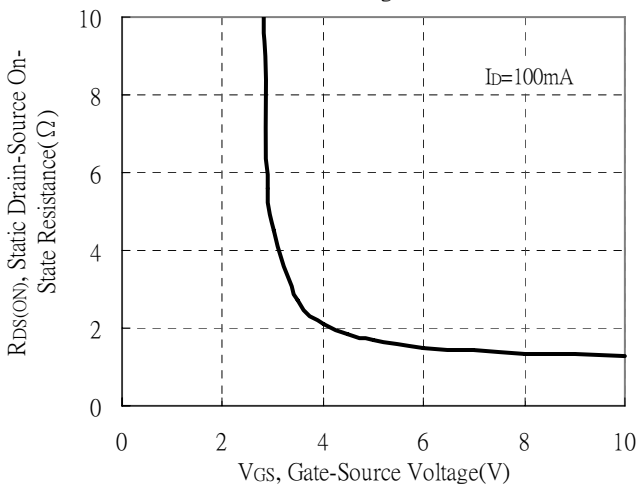
Static Drain-Source On-State resistance vs Drain Current



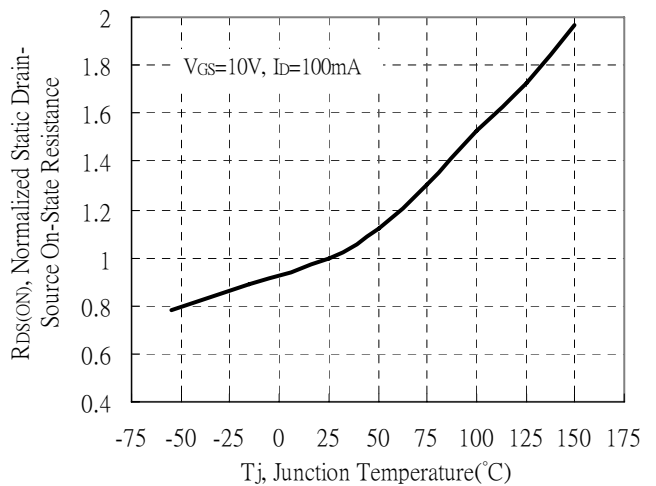
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

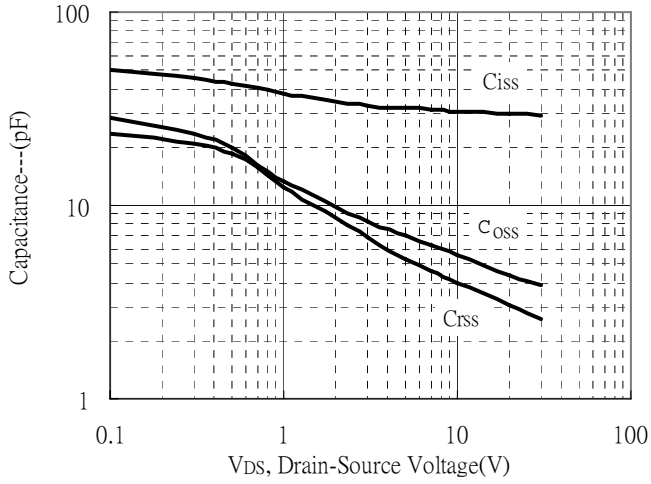


Drain-Source On-State Resistance vs Junction Temperature

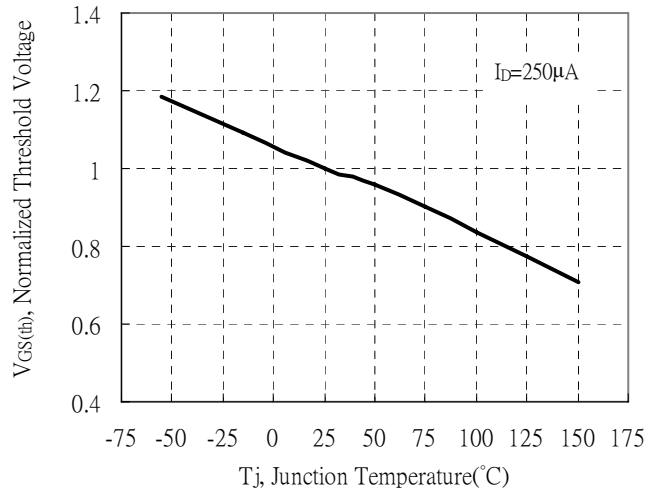


**Typical Characteristics(Cont.)**

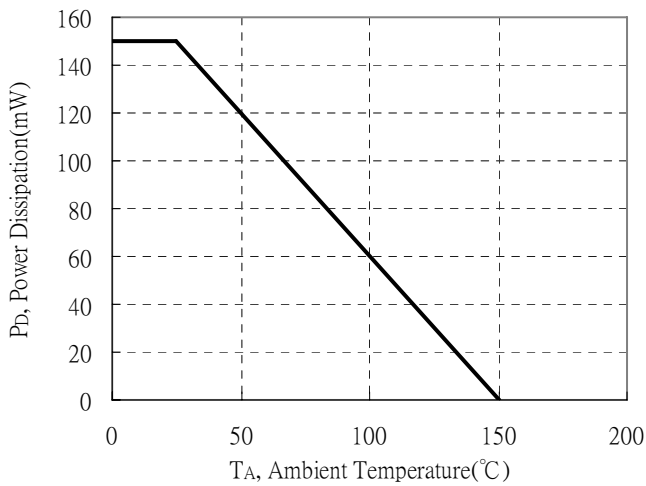
Capacitance vs Drain-to-Source Voltage



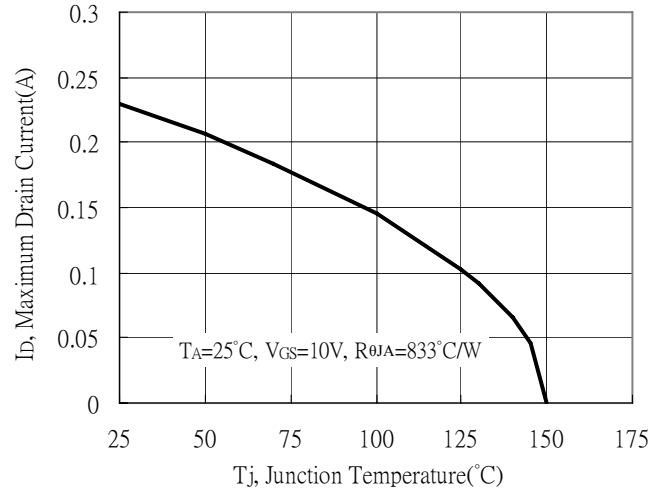
Threshold Voltage vs Junction Temperature



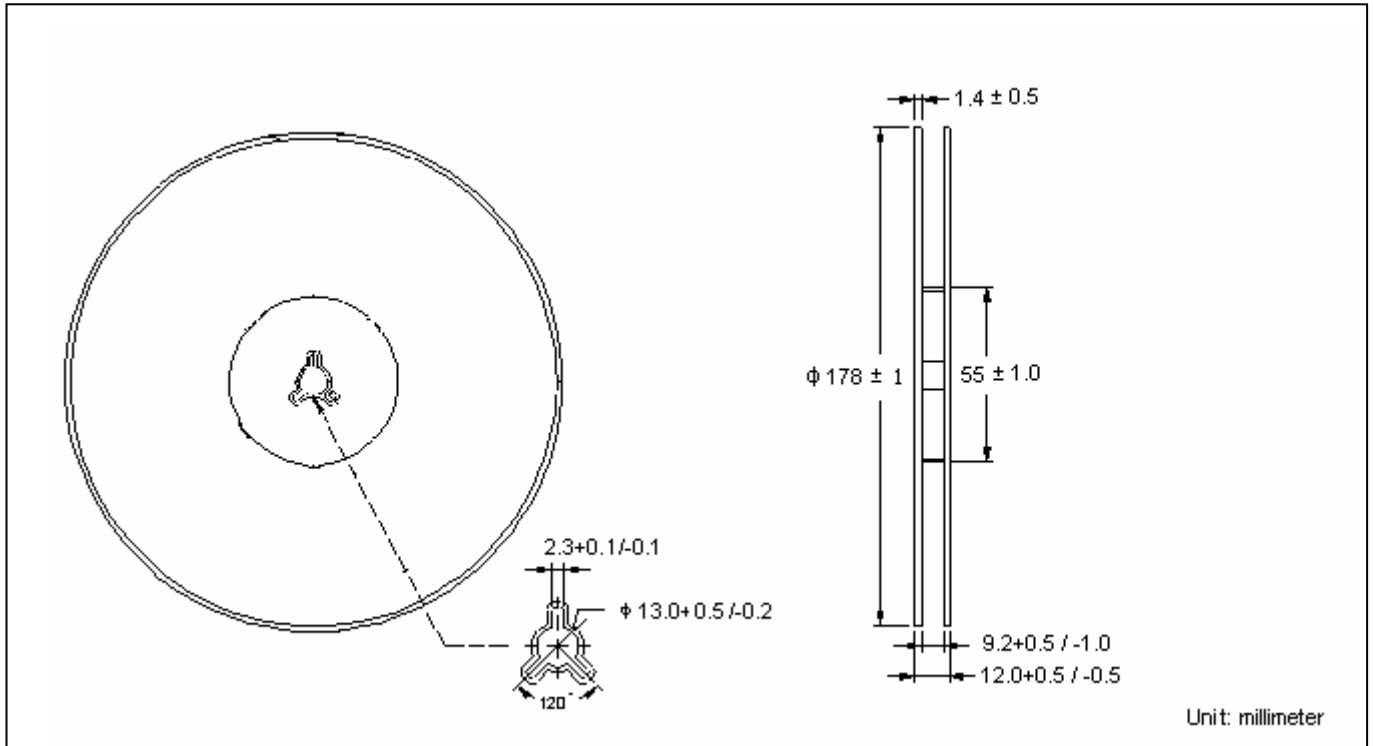
Power Derating Curve



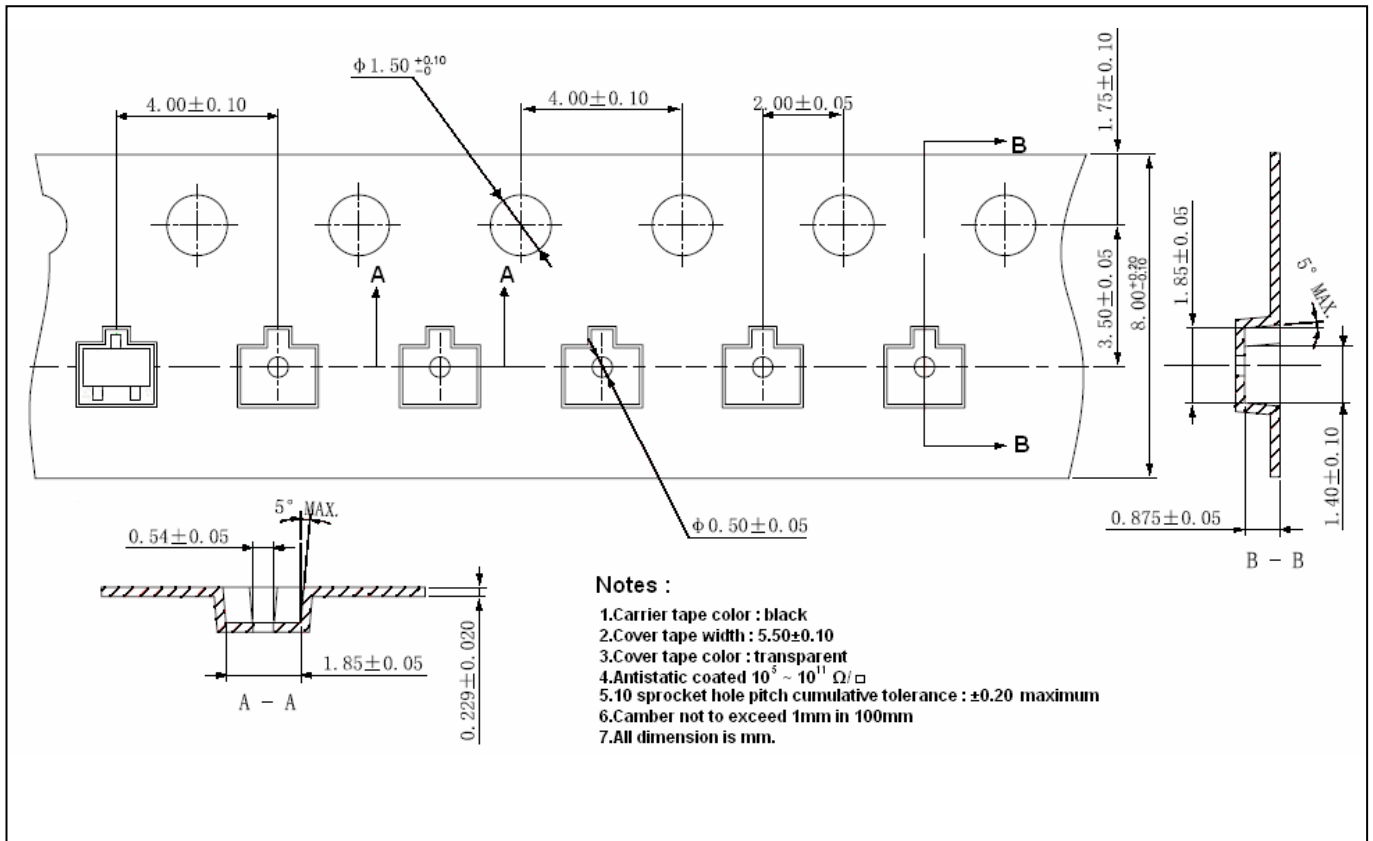
Maximum Drain Current vs Junction Temperature



**Reel Dimension**



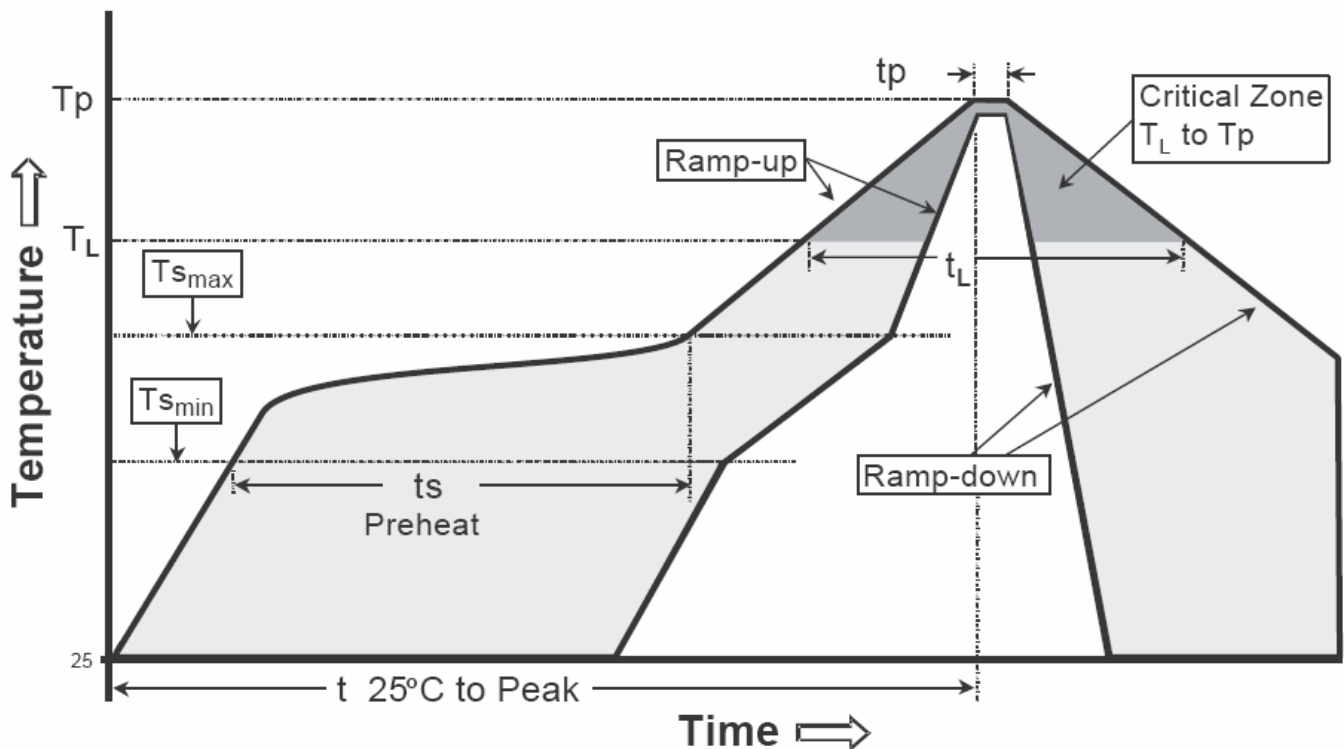
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

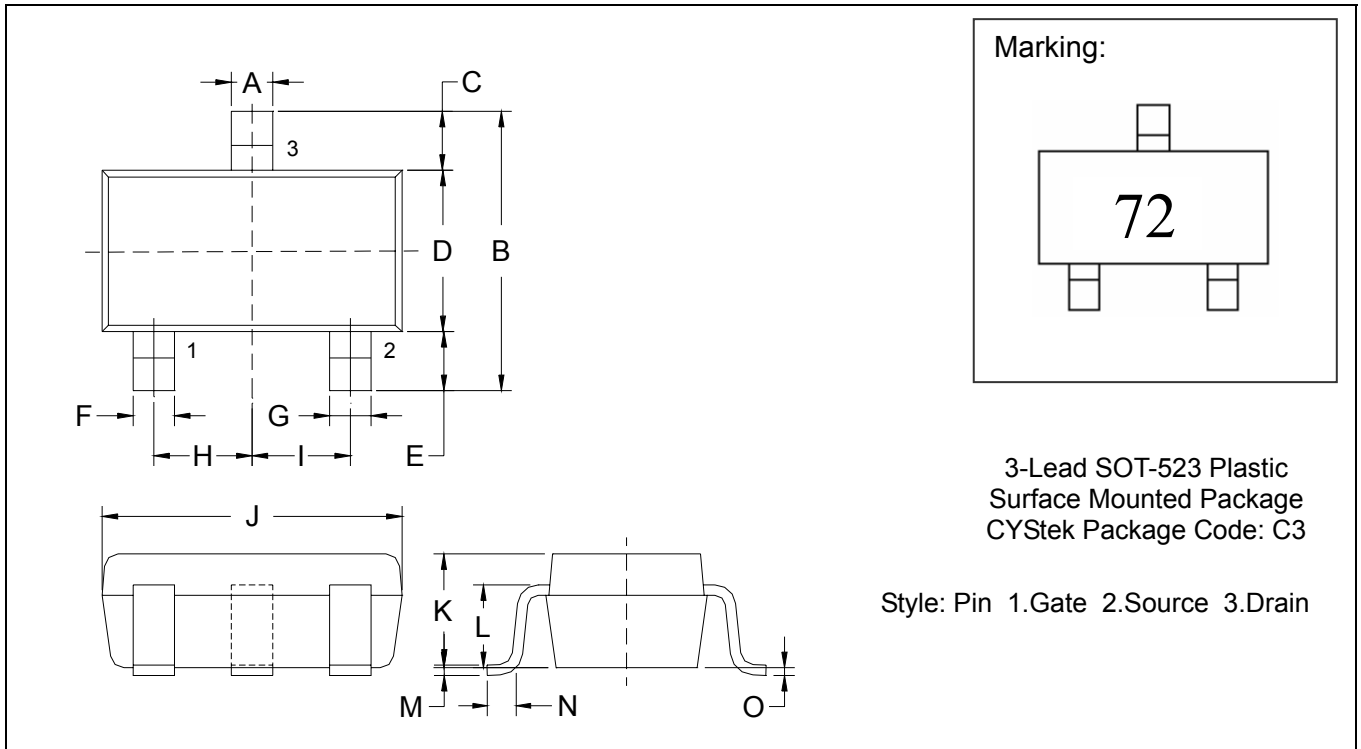
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Ts <sub>max</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s</sub> min)	100°C	150°C
-Temperature Max(T <sub>s</sub> max)	150°C	200°C
-Time(t <sub>s</sub> min to t <sub>s</sub> max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>p</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(t <sub>p</sub> )	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-523 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0079	0.0157	0.20	0.40	I	*0.0197	-	*0.50	-
B	0.0591	0.0669	1.50	1.70	J	0.0610	0.0650	1.55	1.65
C	0.0118	0.0197	0.30	0.50	K	0.0276	0.0315	0.70	0.80
D	0.0295	0.0335	0.75	0.85	L	0.0224	0.0248	0.57	0.63
E	0.0118	0.0197	0.30	0.50	M	0.0020	0.0059	0.05	0.15
F	0.0039	0.0118	0.10	0.30	N	0.0039	0.0118	0.10	0.30
G	0.0039	0.0118	0.10	0.30	O	0	0.0031	0	0.08
H	*0.0197	-	*0.50	-					

**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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