

# Dual N-CHANNEL ENHANCEMENT MODE MOSFET

# MTDNK2N6

$BV_{DSS}$	60V
$I_D$	0.51A
$R_{DS(on)(MAX)}$	1.6 $\Omega$

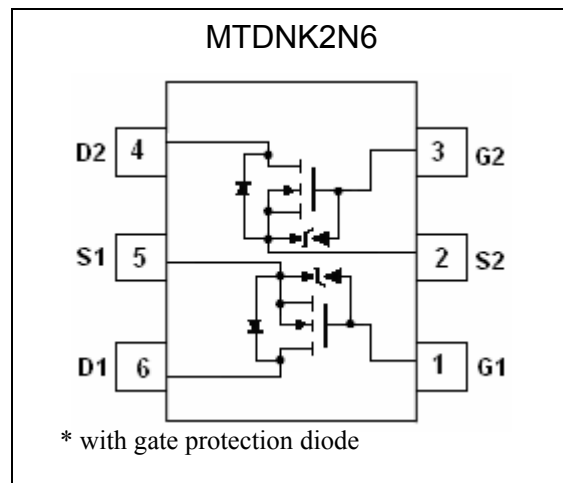
## Description

The MTDNK2N6 is a dual N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The SOT-26 package is universally preferred for all commercial-industrial surface mount applications.

## Features

- Simple drive requirement
- Low on-resistance
- Small package outline
- Pb-free package

## Equivalent Circuit



The following characteristics apply to both Tr1 and Tr2

## Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current @ $T_A=25^\circ\text{C}$ (Note 1)	$I_D$	0.51	A
Pulsed Drain Current (Note 2, 3)	$I_{DM}$	1.5	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	$P_d$	0.96	W
Linear Derating Factor		0.016	W / °C
Operating Junction Temperature and Storage Temperature Range	$T_j, T_{stg}$	-55~+150	°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{th(ja)}$	130	°C/W

Note : 1. Surface mounted on 0.125 in<sup>2</sup> copper pad of FR-4 board. 180°C/W when mounted on minimum copper pad.

2. Pulse width limited by maximum junction temperature.

3. Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

**Electrical Characteristics (Ta=25°C, unless otherwise noted)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>DSS</sub>	60	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	1	1.6	2.5	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	-	-	±5	μA	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V
I <sub>DSS</sub>	-	-	10	μA	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>j</sub> =125°C
*R <sub>DSON</sub>	-	1.4	2	Ω	I <sub>D</sub> =100mA, V <sub>GS</sub> =5V
	-	1.1	1.6		I <sub>D</sub> =500mA, V <sub>GS</sub> =10V
*G <sub>FS</sub>	200	-	-	mS	V <sub>DS</sub> =10V, I <sub>D</sub> =200mA
C <sub>iSS</sub>	-	62.7	-	pF	V <sub>DS</sub> =25V, V <sub>GS</sub> =0, f=1MHz
C <sub>oSS</sub>	-	17.6	-		
C <sub>rSS</sub>	-	9	-		
t <sub>d(ON)</sub>	-	8	20	ns	V <sub>DS</sub> =25V, I <sub>D</sub> =0.25A, V <sub>GS</sub> =10V, R <sub>G</sub> =25Ω
t <sub>r</sub>	-	7	20		
t <sub>d(OFF)</sub>	-	13	20		
t <sub>f</sub>	-	6	20		
Q <sub>g</sub>	-	1.1	-	nC	V <sub>DS</sub> =25V, I <sub>D</sub> =0.51A, V <sub>GS</sub> =10V,
Q <sub>gs</sub>	-	0.2	-		
Q <sub>gd</sub>	-	0.4	-		

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

**Source Drain Diode**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
*I <sub>S</sub>	-	-	0.51	A	
*I <sub>SM</sub>	-	-	1.5		
*V <sub>SD</sub>	-	0.87	1.2	V	I <sub>S</sub> =510mA, V <sub>GS</sub> =0V

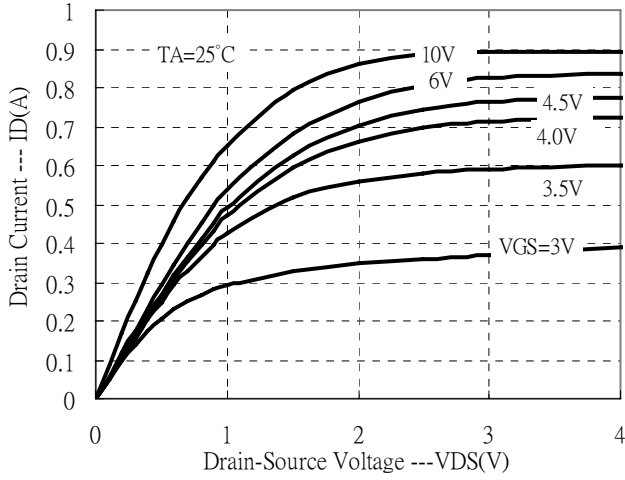
\*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

**Ordering Information**

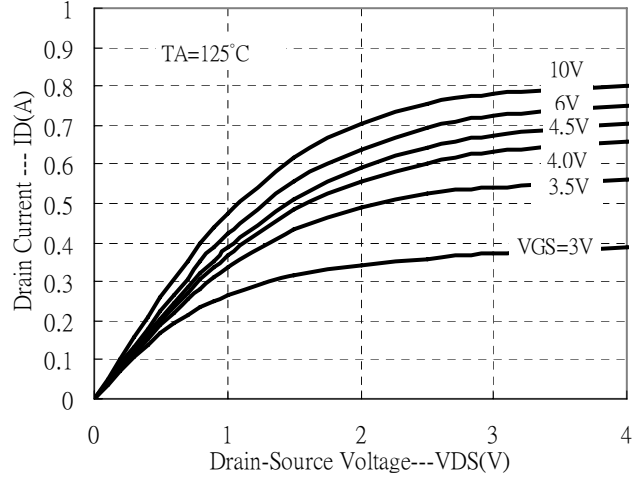
Device	Package	Shipping
MTDNK2N6-0-T1-G	SOT-26 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

## Characteristic Curves

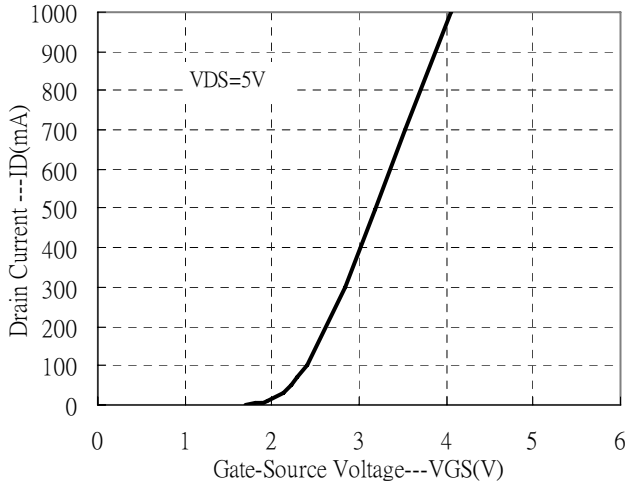
Typical Output Characteristics



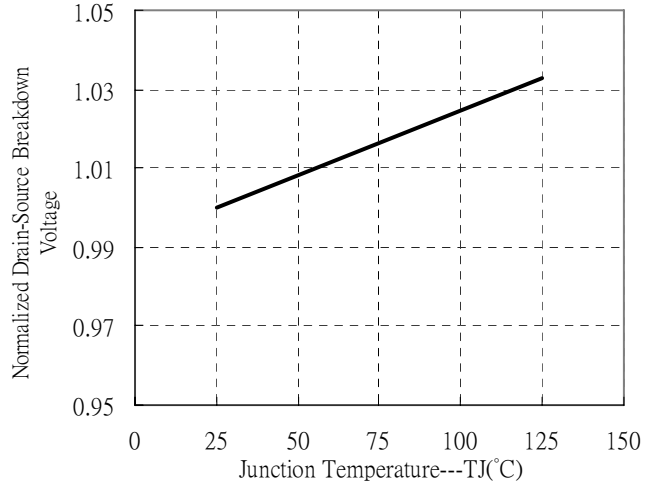
Typical Output Characteristics



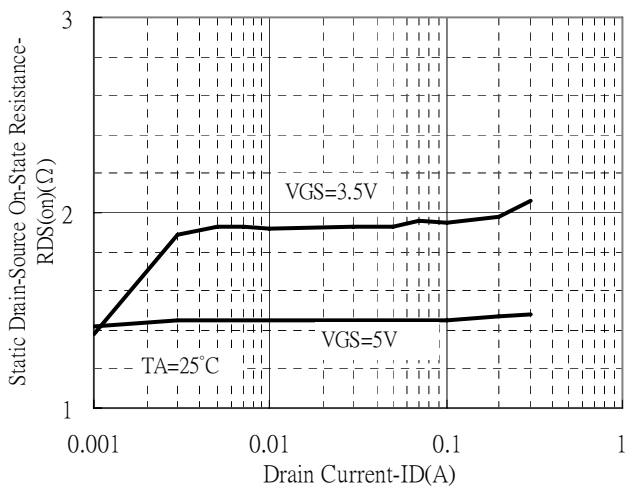
Typical Transfer Characteristics



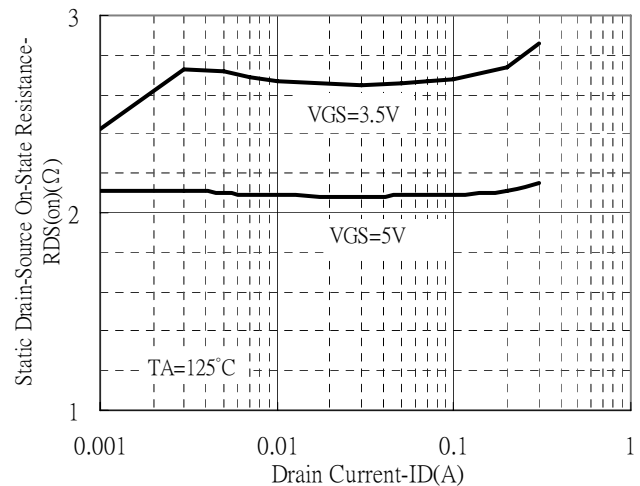
Breakdown Voltage Variation with Temperature



Static Drain-Source On-State resistance vs Drain Current

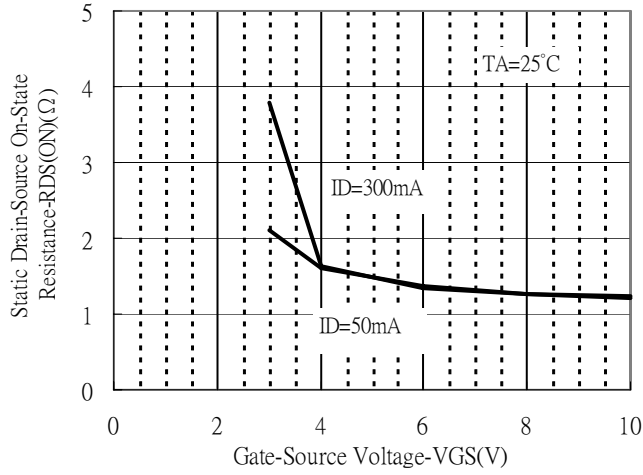


Static Drain-Source On-State resistance vs Drain Current

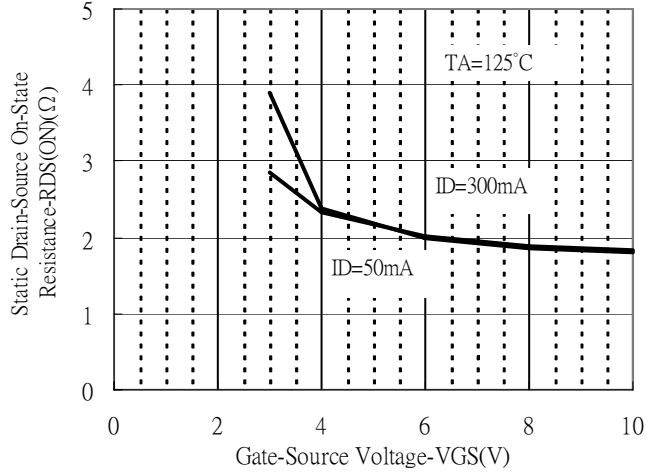


**Characteristic Curves(Cont.)**

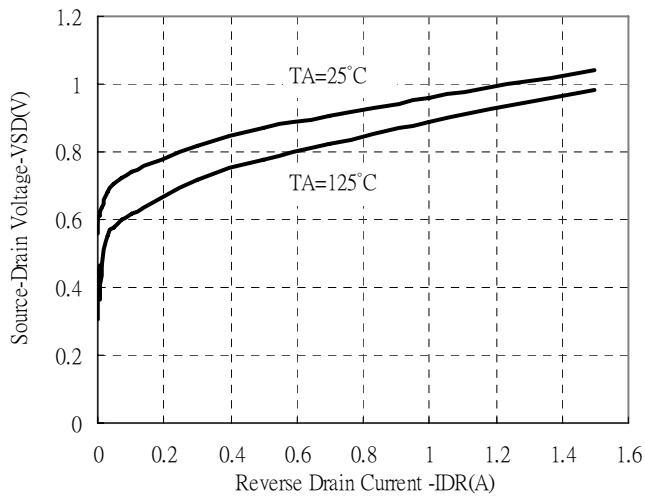
Static Drain-Source On-State Resistance vs Gate-Source Voltage



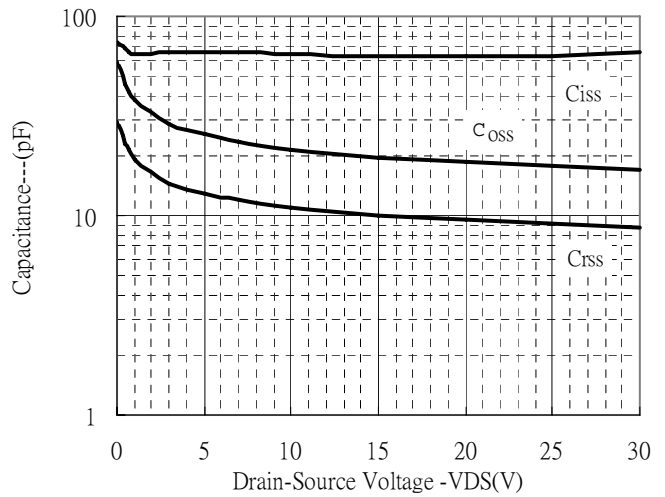
Static Drain-Source On-State Resistance vs Gate-Source Voltage



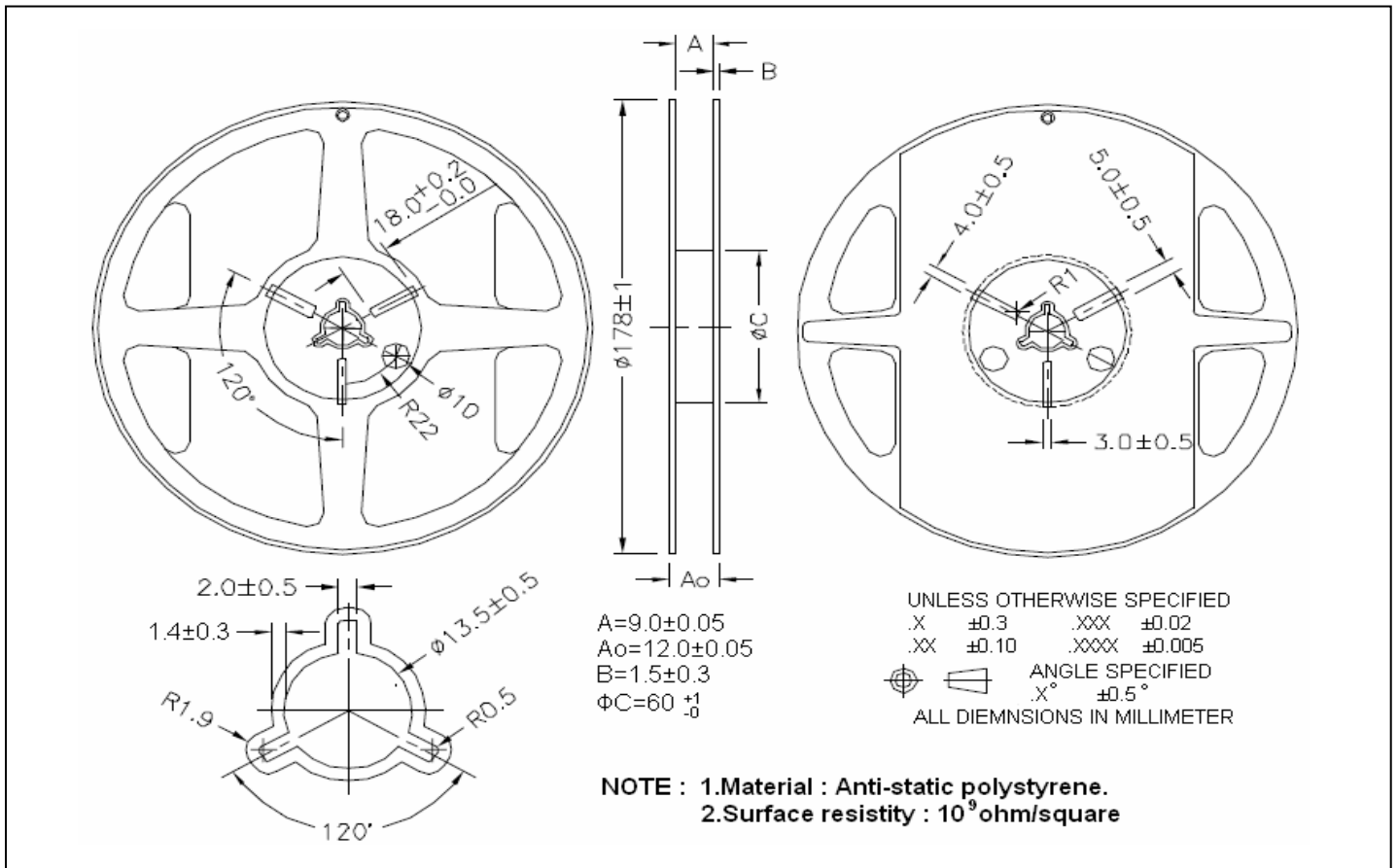
Reverse Drain Current vs Source-Drain Voltage



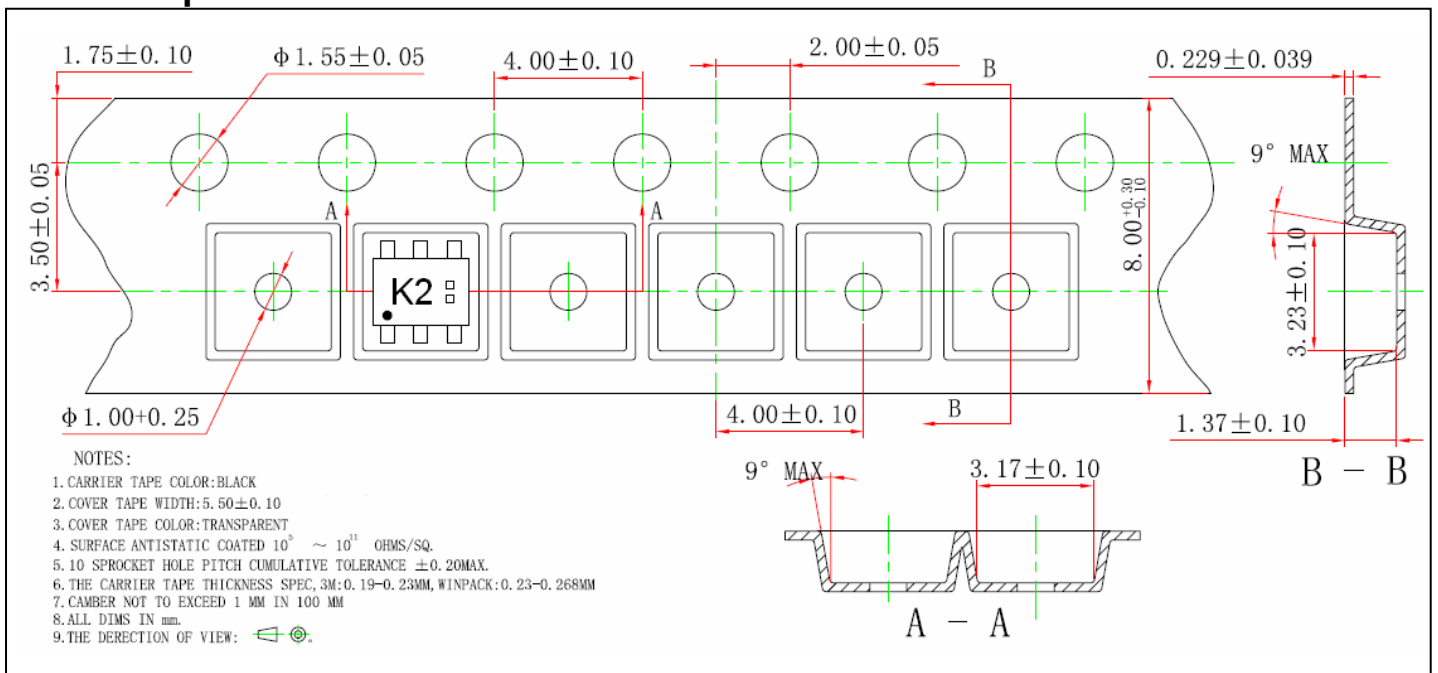
Capacitance vs Drain-to-Source Voltage



**Reel Dimension**

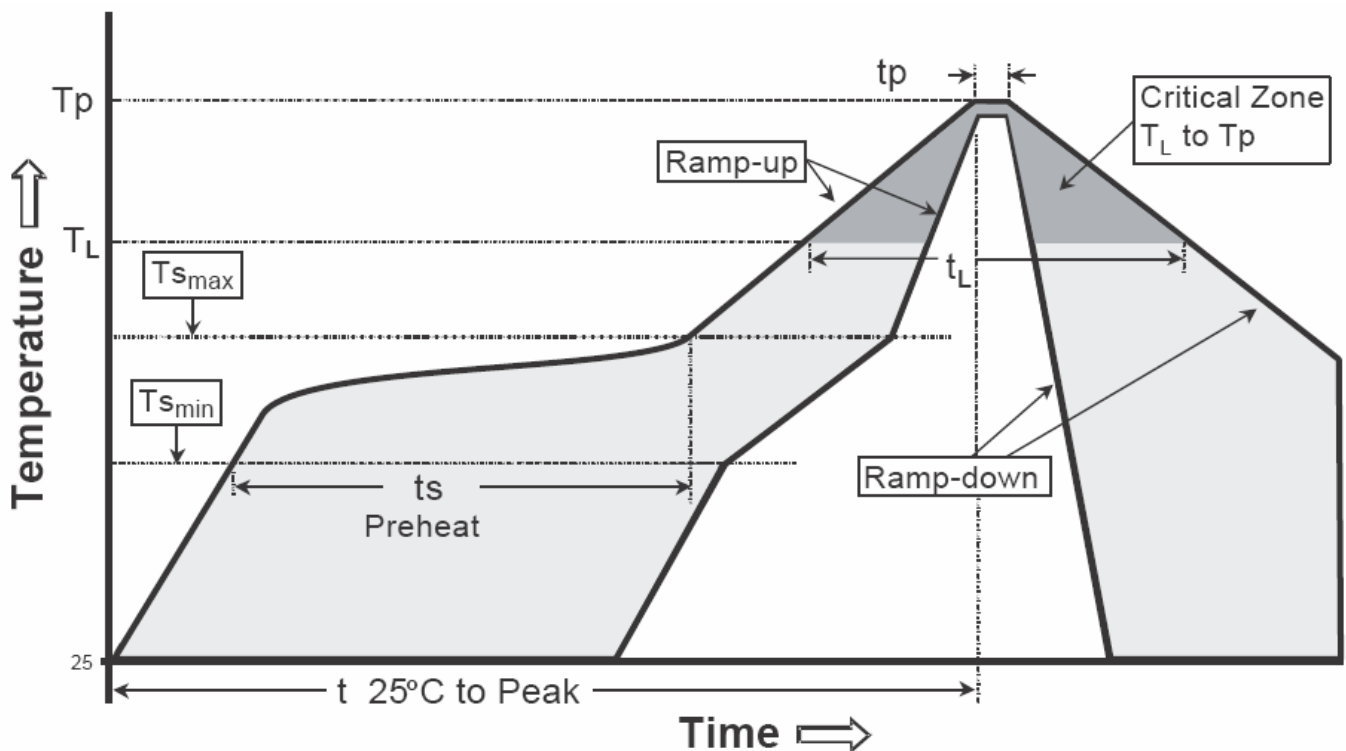


**Carrier Tape Dimension**



**Recommended wave soldering condition**

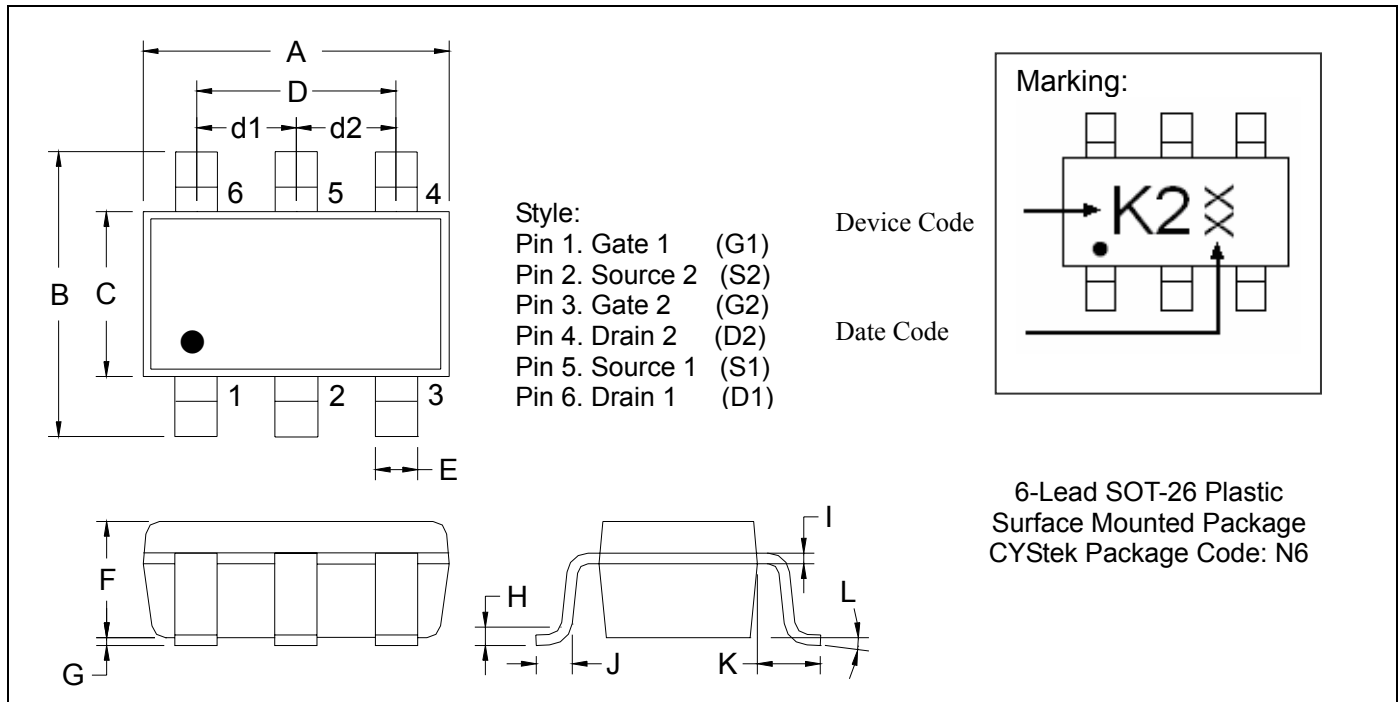
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	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(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-26 Dimension**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1063	0.1220	2.70	3.10	F	0.0472 REF		1.20 REF	
B	0.1024	0.1181	2.60	3.00	G	0	0.0039	0	0.10
C	0.0551	0.0709	1.40	1.80	H	-	0.0079	-	0.20
D	0.0748 REF		1.90 REF		I	0.0047 REF		0.12 REF	
d1	0.0374 REF		0.95 REF		J	0.0146 REF		0.37 REF	
d2	0.0374 REF		0.95 REF		K	0.0236 REF		0.60 REF	
E	0.0118	0.0217	0.30	0.55	L	0°	10°	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 :**

- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0

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