

N-Channel MOSFET

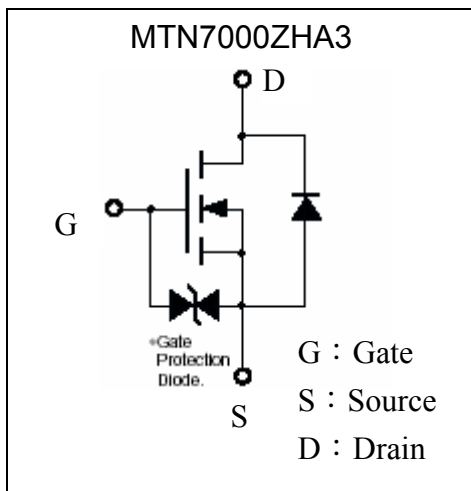
MTN7000ZHA3

BV_{DSS}	60V
I_D	115mA
$R_{DS(on)}$ (typ.)	3 Ω

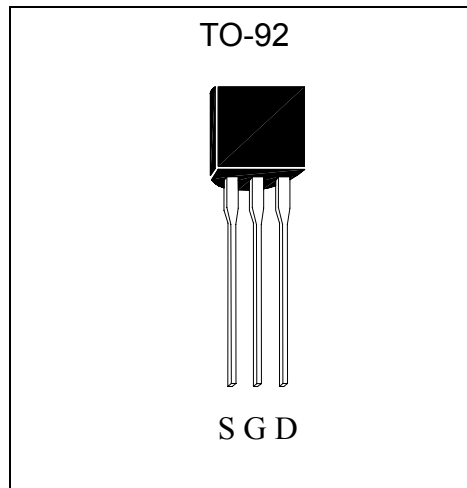
Features

- Low on-resistance
- High ESD capability
- High speed switching
- Low-voltage drive(4V)
- Easily designed drive circuits
- Easy to use in parallel
- Pb-free package

Symbol

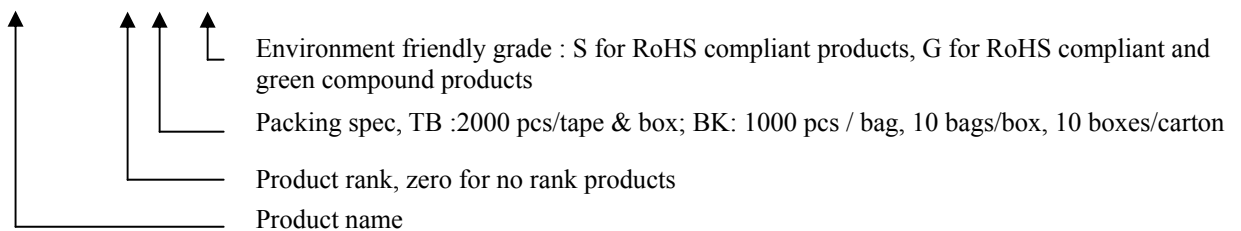


Outline



Ordering Information

Device	Package	Shipping
MTN7000ZHA3-0-TB-G	TO-92 (Pb-free lead plating and halogen-free package)	2000 pcs / Tape & Box
MTN7000ZHA3-0-BK-G		1000 pcs/ bag, 10 bags/box, 10boxes/carton





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	115	mA
	Pulsed	I _{DP}	700 *1	mA
Drain Reverse Current	Continuous	I _{DR}	115	mA
	Pulsed	I _{DRP}	700 *1	mA
Total Power Dissipation		P _D	400 *1	mW
ESD susceptibility			1250 *2	V
Channel Temperature		T _{CH}	+150	°C
Storage Temperature		T _{stg}	-55~+150	°C

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

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

Electrical Characteristics (Ta=25°C)

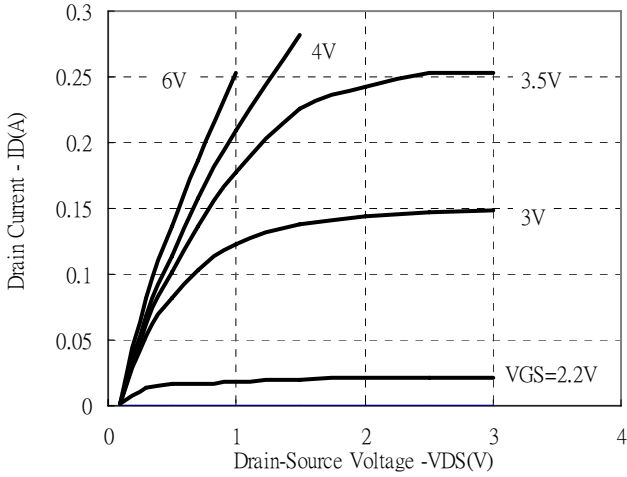
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS} *	60	-	-	V	V _{GS} =0, I _D =10μA
V _{GS(th)}	1	-	2.5		V _{DS} =V _{GS} , I _D =250μA
I _{GSS}	-	-	±10	μA	V _{GS} =±20V, V _{DS} =0
I _{DSS}	-	-	1		V _{DS} =60V, V _{GS} =0
R _{DS(ON)} *	-	3.6	5.5	Ω	I _D =100mA, V _{GS} =5V
	-	3	5		I _D =100mA, V _{GS} =10V
G _{FS}	100	-	-	mS	V _{DS} =10V, I _D =100mA
Dynamic					
C _{iss}	-	30.5	-	pF	V _{DS} =10V, V _{GS} =0, f=1MHz
C _{oss}	-	9.3	-		
C _{rss}	-	5.9	-		
Source-Drain Diode					
*I _S	-	-	115	mA	
*I _{SM}	-	-	700		
*V _{SD}	-	-	1.2	V	I _S =115mA, V _{GS} =0V

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

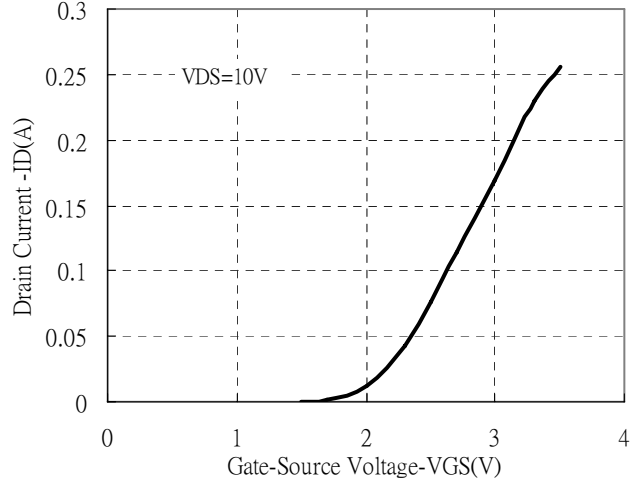


Typical Characteristics

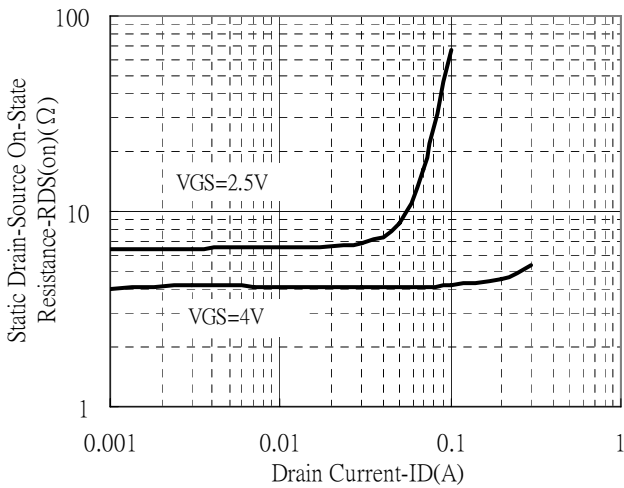
Typical Output Characteristics



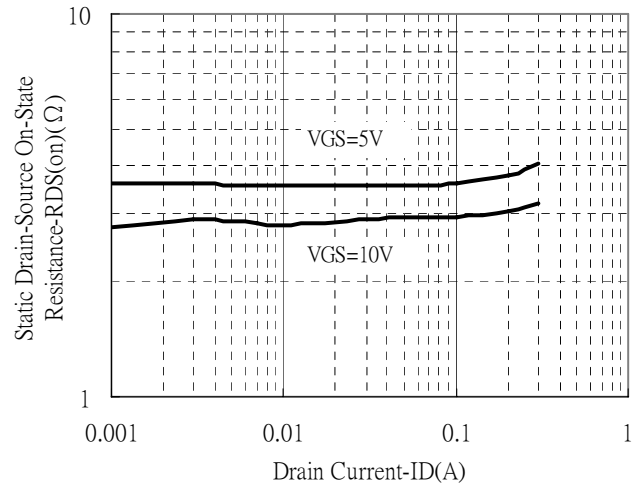
Typical Transfer Characteristics



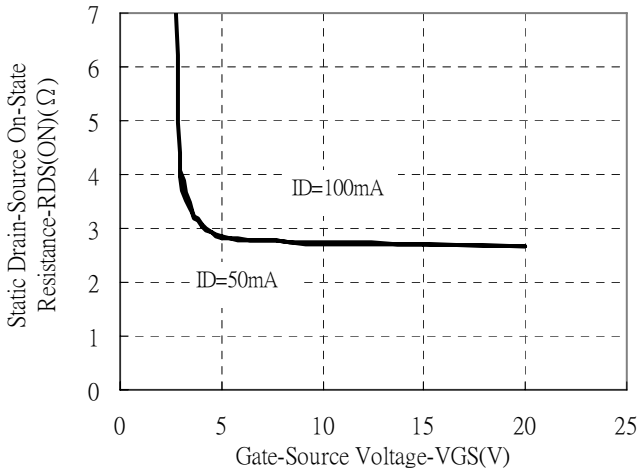
Static Drain-Source On-State resistance vs Drain Current



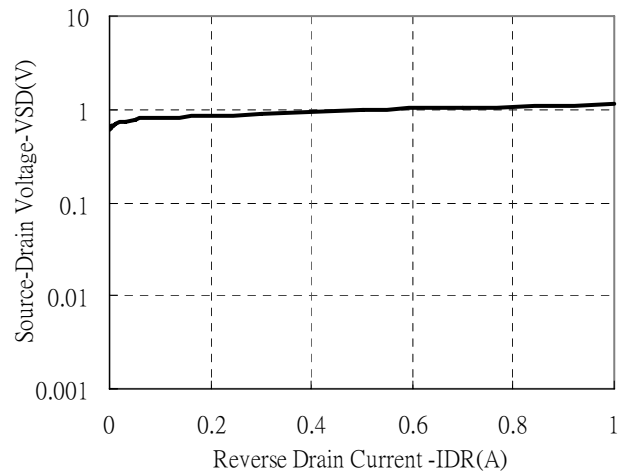
Static Drain-Source On-State resistance vs Drain Current



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



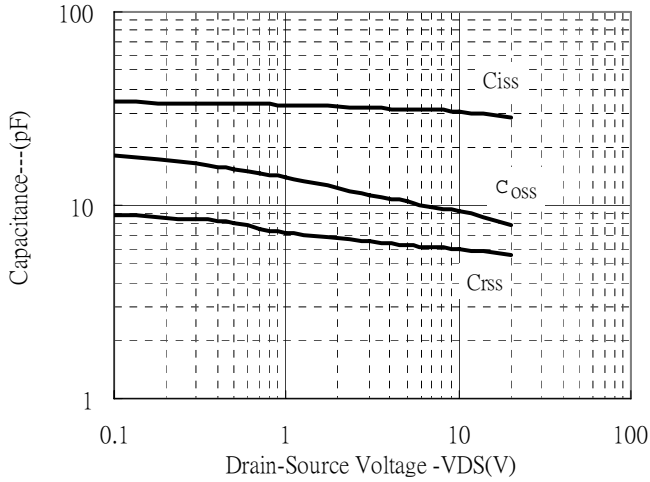
Reverse Drain Current vs Source-Drain Voltage



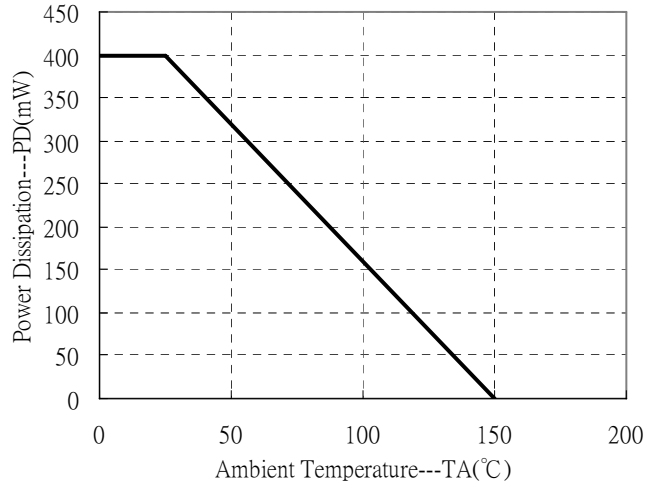


Typical Characteristics(Cont.)

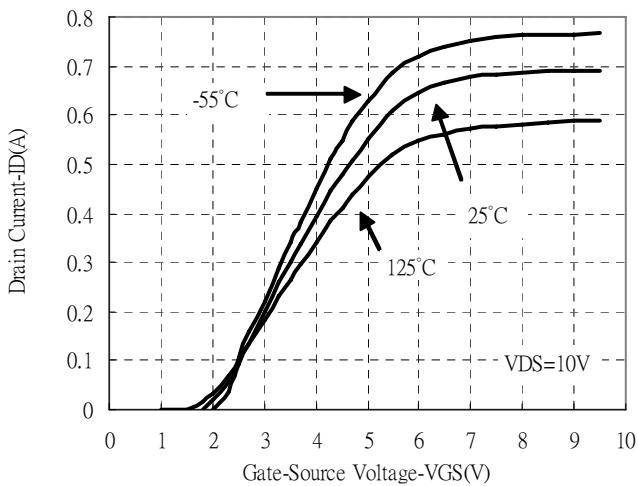
Capacitance vs Drain-to-Source Voltage



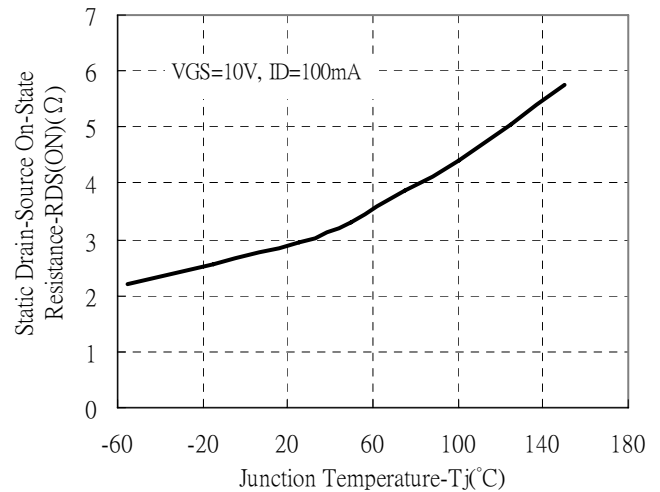
Power Derating Curve



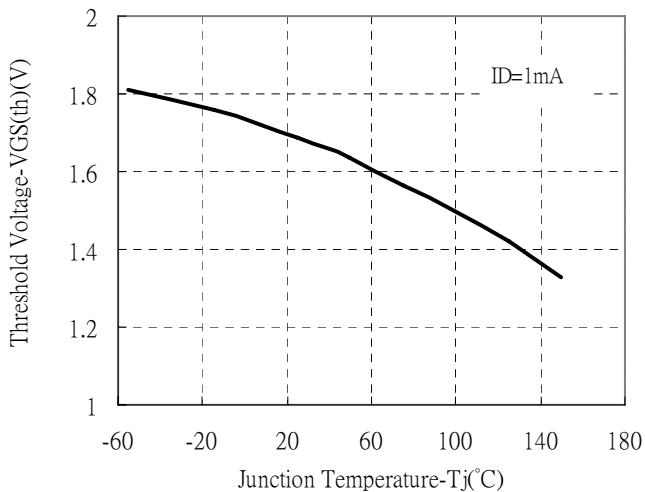
Drain Current vs Gate-Source Voltage



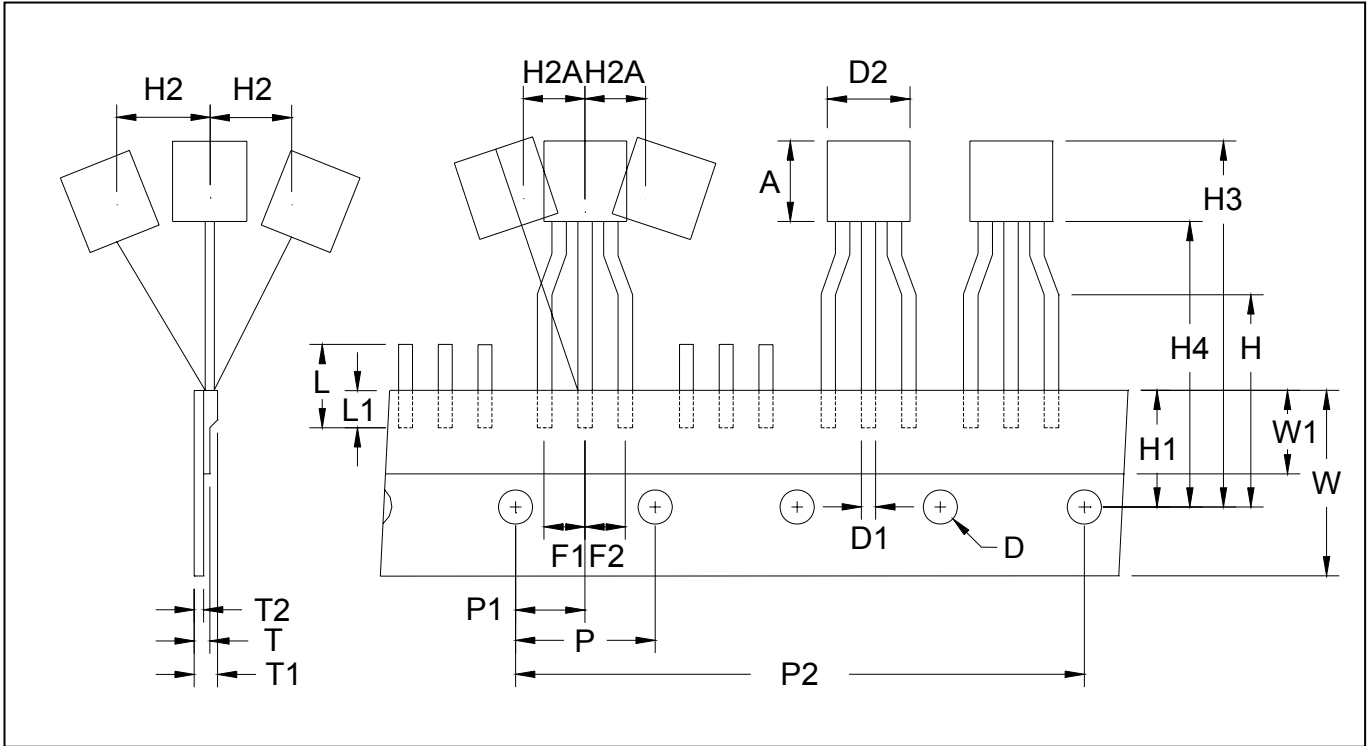
Drain-Source On-State Resistance vs Junction Temperature



Threshold Voltage vs Junction Temperature



TO-92 Taping Outline

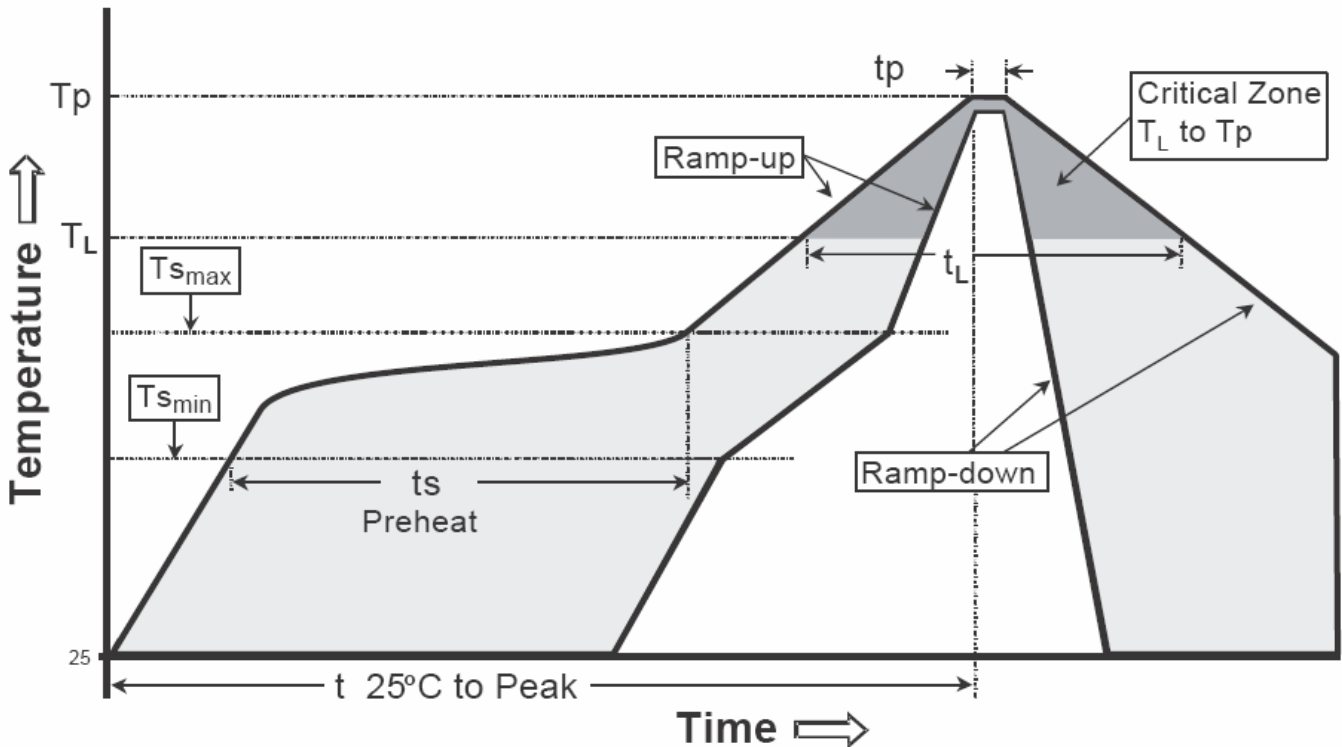


DIM	Item	Millimeters	
		Min.	Max.
A	Component body height	4.33	4.83
D	Tape Feed Diameter	3.80	4.20
D1	Lead Diameter	0.36	0.53
D2	Component Body Diameter	4.33	4.83
F1,F2	Component Lead Pitch	2.40	2.90
F1,F2	F1-F2	-	±0.3
H	Height Of Seating Plane	15.50	16.50
H1	Feed Hole Location	8.50	9.50
H2	Front To Rear Deflection	-	1
H2A	Deflection Left Or Right	-	1
H3	Component Height	-	27
H4	Feed Hole To Bottom Of Component	-	21
L	Lead Length After Component Removal	-	11
L1	Lead Wire Enclosure	2.50	-
P	Feed Hole Pitch	12.50	12.90
P1	Center Of Seating Plane Location	5.95	6.75
P2	4 Feed Hole Pitch	50.30	51.30
T	Over All Tape Thickness	-	0.55
T1	Total Taped Package Thickness	-	1.42
T2	Carrier Tape Thickness	0.36	0.68
W	Tape Width	17.50	19.00
W1	Adhesive Tape Width	5.00	7.00
-	20 pcs Pitch	253	255

Recommended wave soldering condition

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

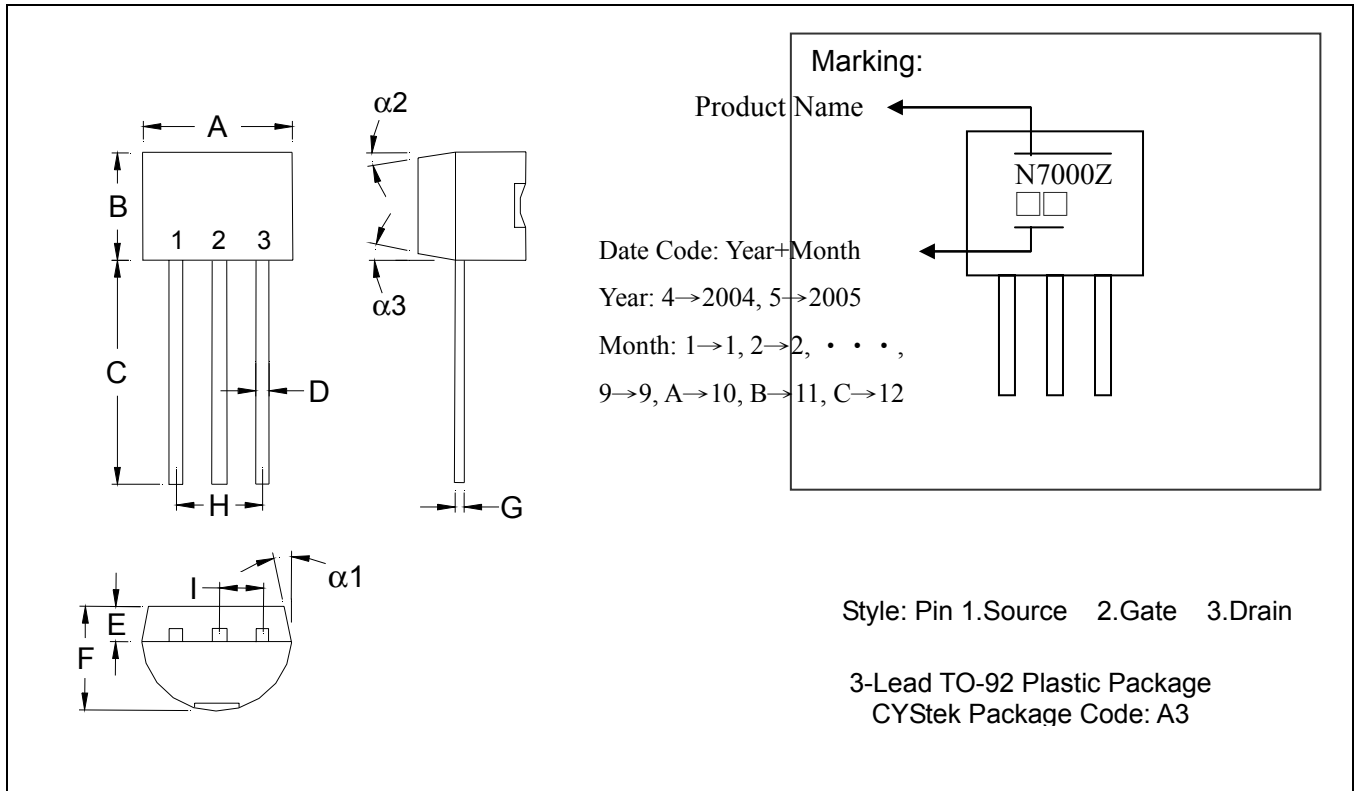
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	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.

TO-92 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1704	0.1902	4.33	4.83	G	0.0142	0.0220	0.36	0.56
B	0.1704	0.1902	4.33	4.83	H	-	*0.1000	-	*2.54
C	0.5000	-	12.70	-	I	-	*0.0500	-	*1.27
D	0.0142	0.0220	0.36	0.56	$\alpha 1$	-	*5°	-	*5°
E	-	*0.0500	-	*1.27	$\alpha 2$	-	*2°	-	*2°
F	0.1323	0.1480	3.36	3.76	$\alpha 3$	-	*2°	-	*2°

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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