30V N-Channel Enhancement Mode MOSFET

MTA90N03ZN3

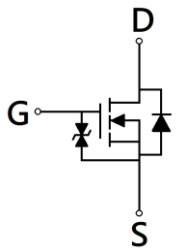
BV_{DSS}	30V
I_D	3.2A
R_{DSON}@V_{GS}=4.5V, I_D=2.5A	130mΩ(typ)
R_{DSON}@V_{GS}=3V,I_D=2.5A	144mΩ(typ)

Features

- Simple drive requirement.
- Small package outline.
- ESD protected.
- Pb-free lead plating and halogen-free package.

Symbol

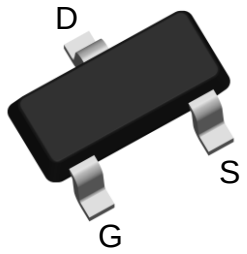
MTA90N03ZN3



G : Gate S : Source D : Drain

Outline

SOT-23



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±12	
Continuous Drain Current @ T_A=25°C , V_{GS}=4.5V	I_D	3.2	A
Continuous Drain Current @ T_A=70°C, V_{GS}=4.5V		2.6	
Pulsed Drain Current (Notes 1, 2)	I_{DM}	10	
Maximum Power Dissipation@ T_A=25℃	P_D	1.38 (Note 3)	W
Linear Derating Factor		0.01	W/°C
ESD susceptibility		1000 (Note 4)	V
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, t≤10s.
4. Human body model, 1.5kΩ in series with 100pF.

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient(PCB mounted)	Rth,ja	90	°C/W

Note : Surface mounted on 1 in² copper pad of FR-4 board, 270°C/W when mounted on minimum copper pad.

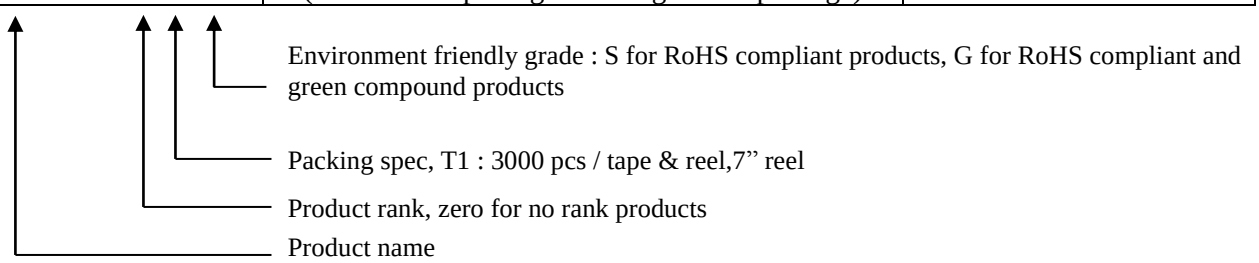
Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	0.5	0.9	1.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±12V, V_{DS}=0
I_{DSS}	-	-	1		V_{DS}=24V, V_{GS}=0
*$R_{DS(ON)}$	-	130	160	mΩ	V_{GS}=4.5V, I_D=2.5A
	-	145	180		V_{GS}=3V, I_D=2.5A
*G_{FS}	-	5.4	-	S	V_{DS}=3V, I_D=1.6A
Dynamic					
Ciss	-	309	-	pF	V_{DS}=10V, V_{GS}=0, f=1MHz
Coss	-	50	-		
Crss	-	38	-		
$t_{d(ON)}$	-	15	-	ns	V_{DS}=15V, I_D=500mA, V_{GS}=2.5V, R_G=6Ω
t_r	-	35	-		
$t_{d(OFF)}$	-	51	-		
t_f	-	27	-		
Qg	-	8	-	nC	V_{DS}=15V, I_D=3.2A, V_{GS}=4.5V
Qgs	-	0.8	-		
Qgd	-	2.8	-		
Source-Drain Diode					
*V_{SD}	-	0.8	1.2	V	V_{GS}=0V, I_S=1A

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

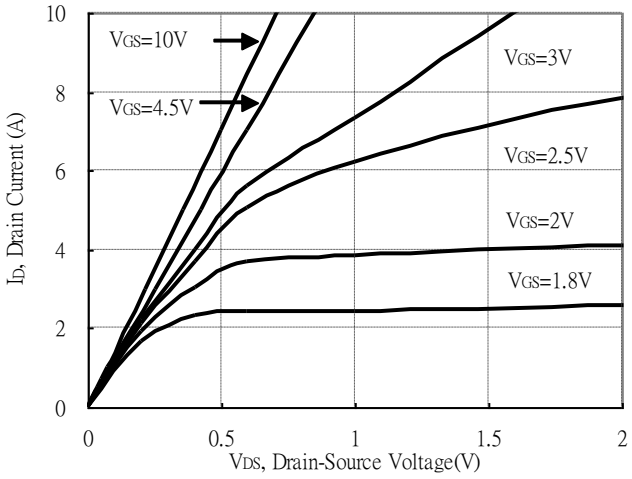
Ordering Information

Device	Package	Shipping
MTA90N03ZN3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

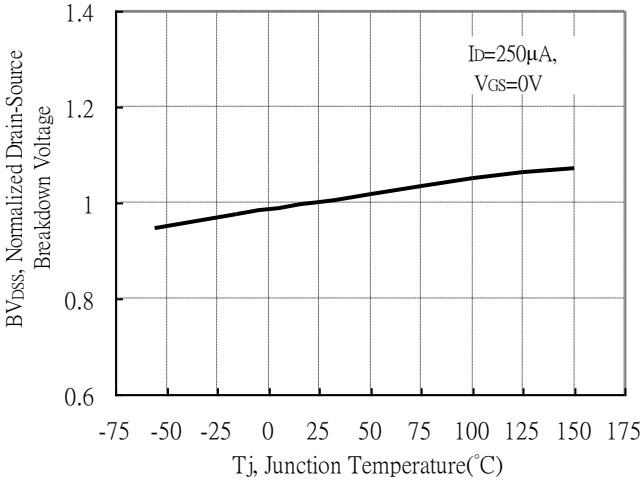


Typical Characteristics

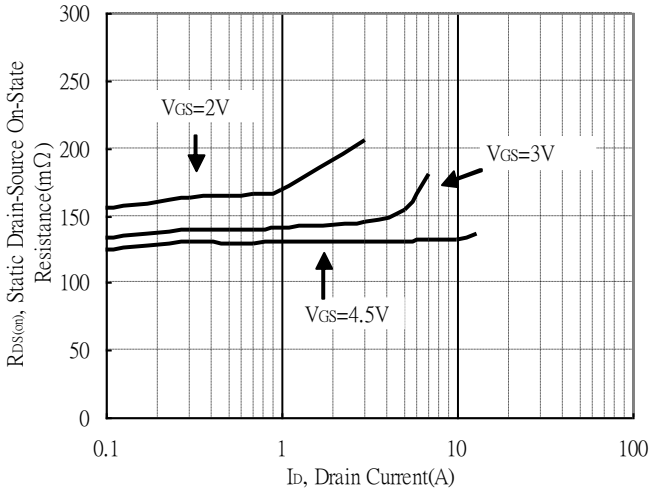
Typical Output Characteristics



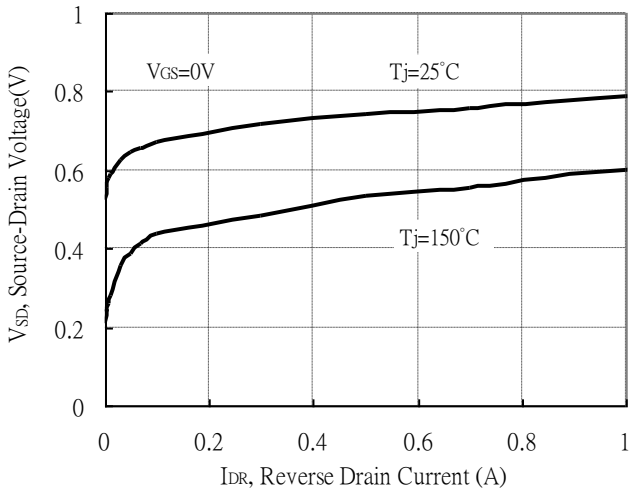
Brekdown Voltage vs Ambient Temperature



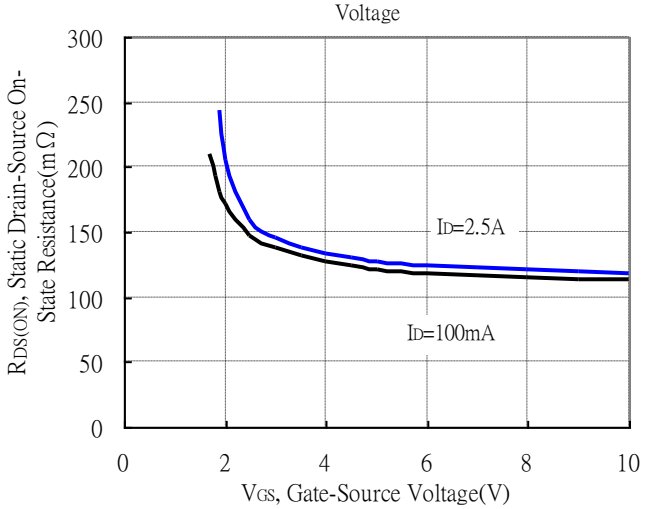
Static Drain-Source On-State resistance vs Drain Current



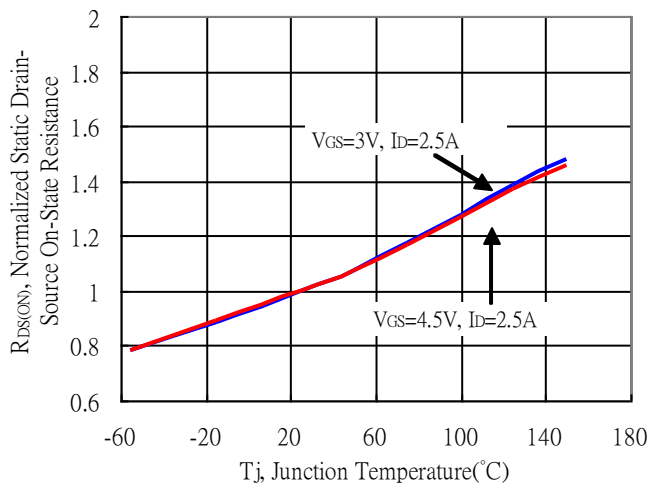
Reverse Drain Current vs Source-Drain Voltage



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

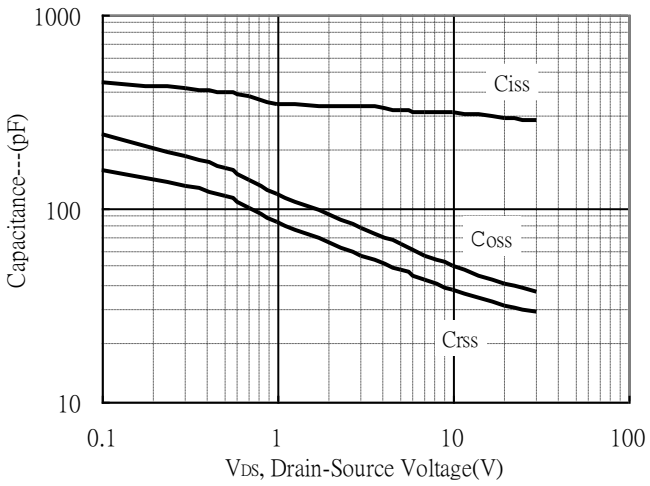


Drain-Source On-State Resistance vs Junction Tempearture

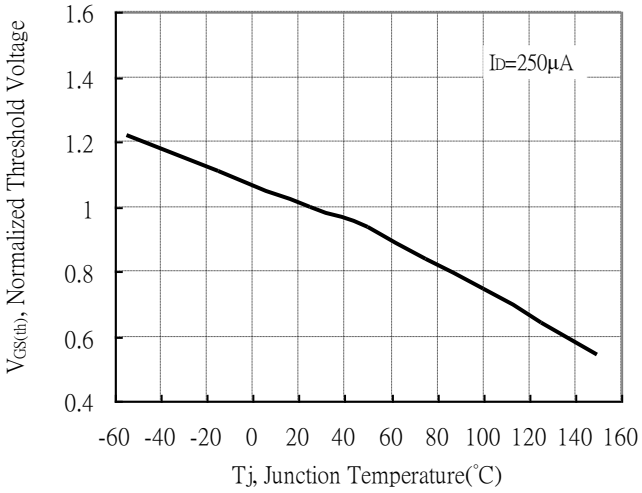


Typical Characteristics(Cont.)

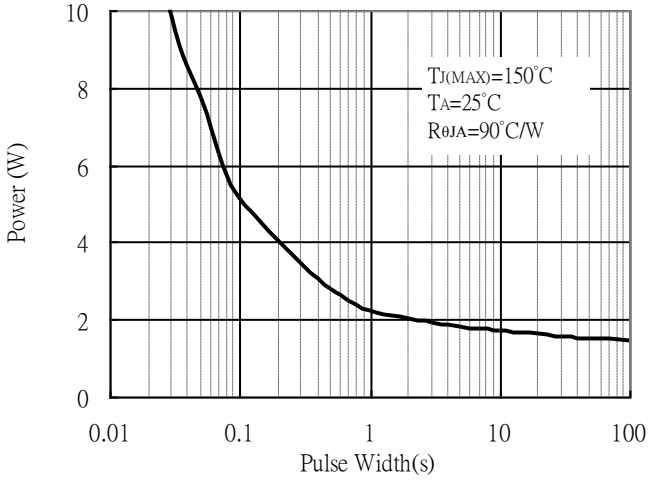
Capacitance vs Drain-to-Source Voltage



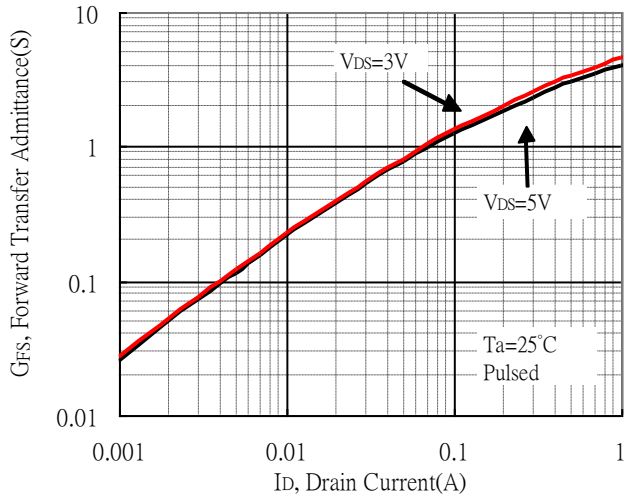
Threshold Voltage vs Junction Tempearture



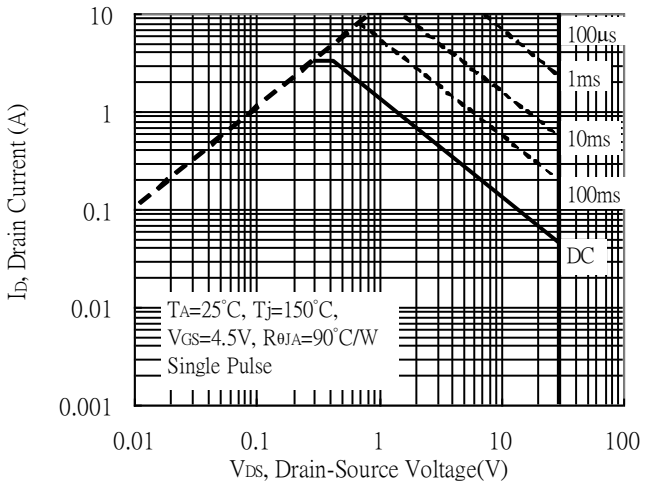
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



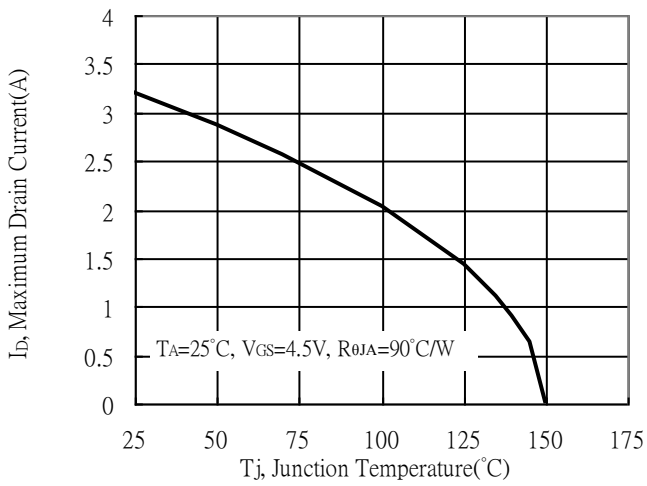
Forward Transfer Admittance vs Drain Current



Maximum Safe Operating Area

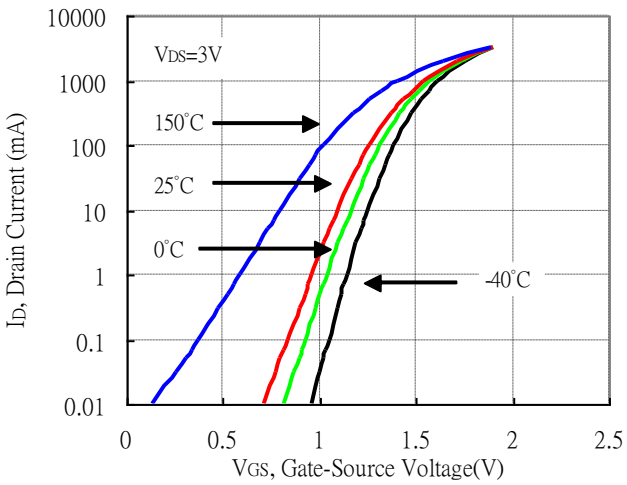


Maximum Drain Current vs JunctionTemperature

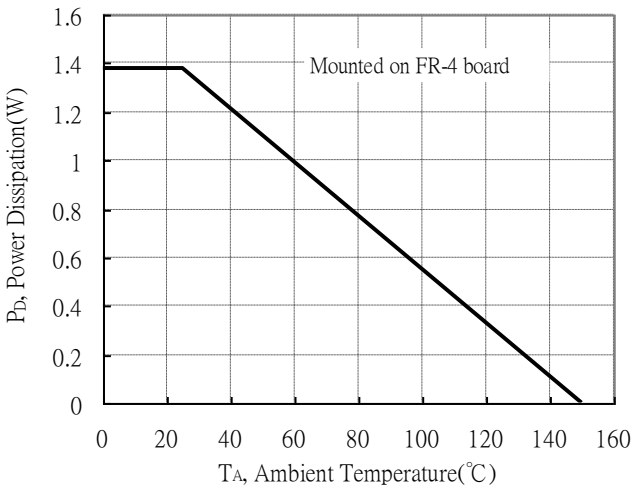


Typical Characteristics(Cont.)

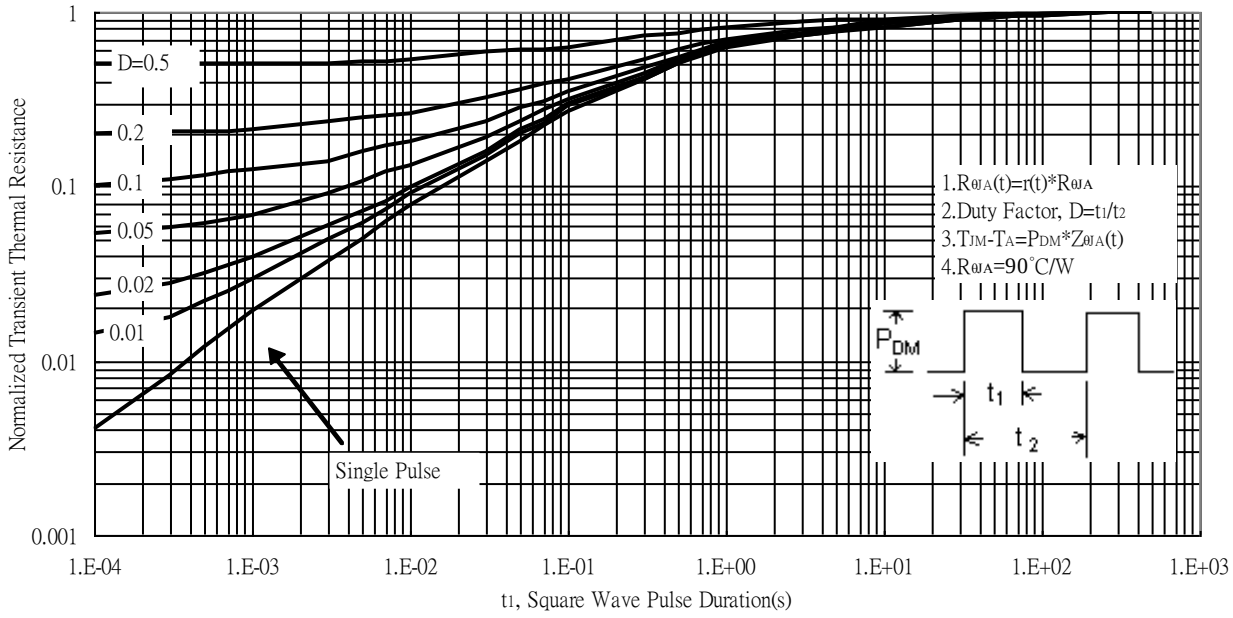
Typical Transfer Characteristics



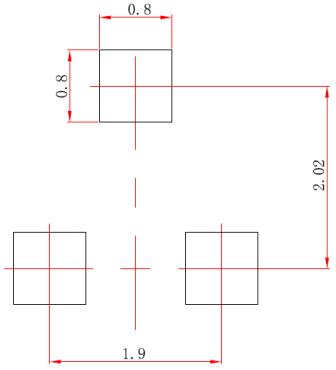
Power Derating Curve



Transient Thermal Response Curves

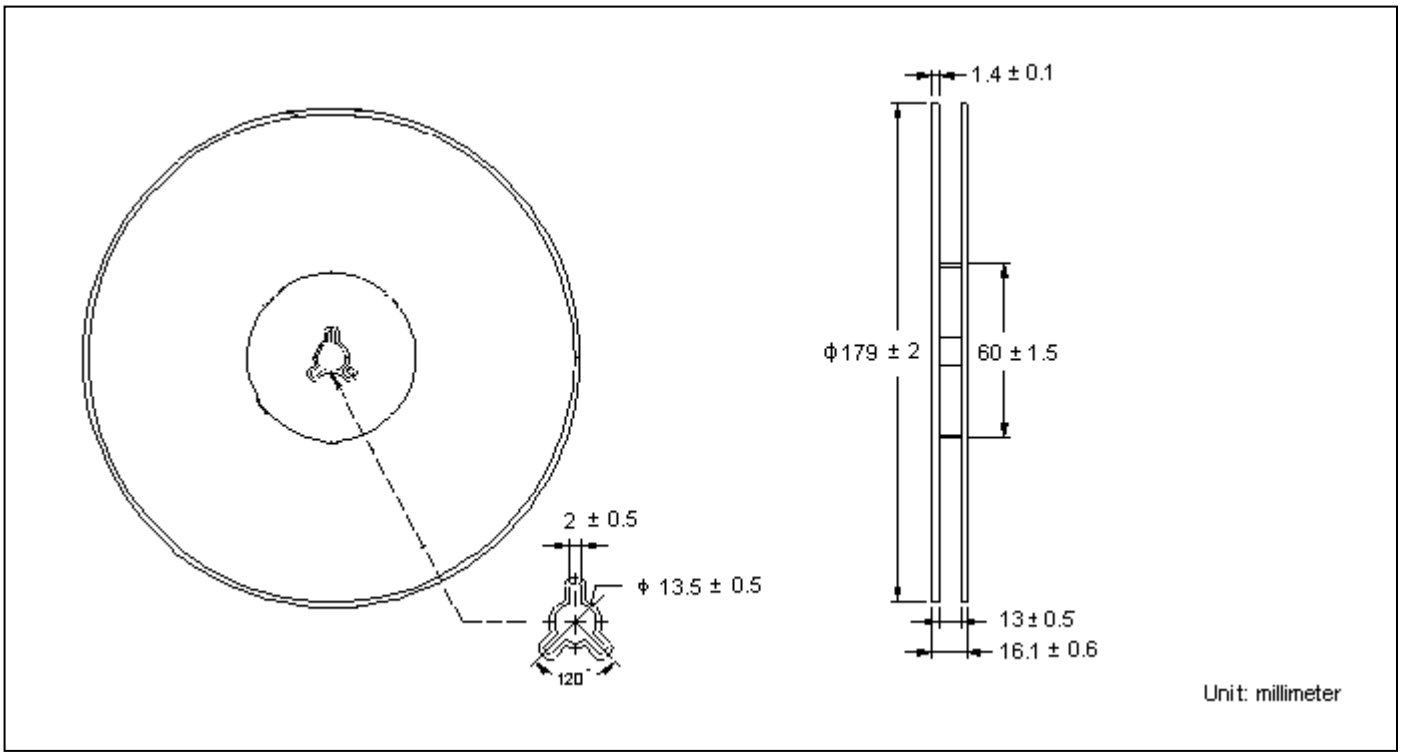


Recommended Soldering Footprint

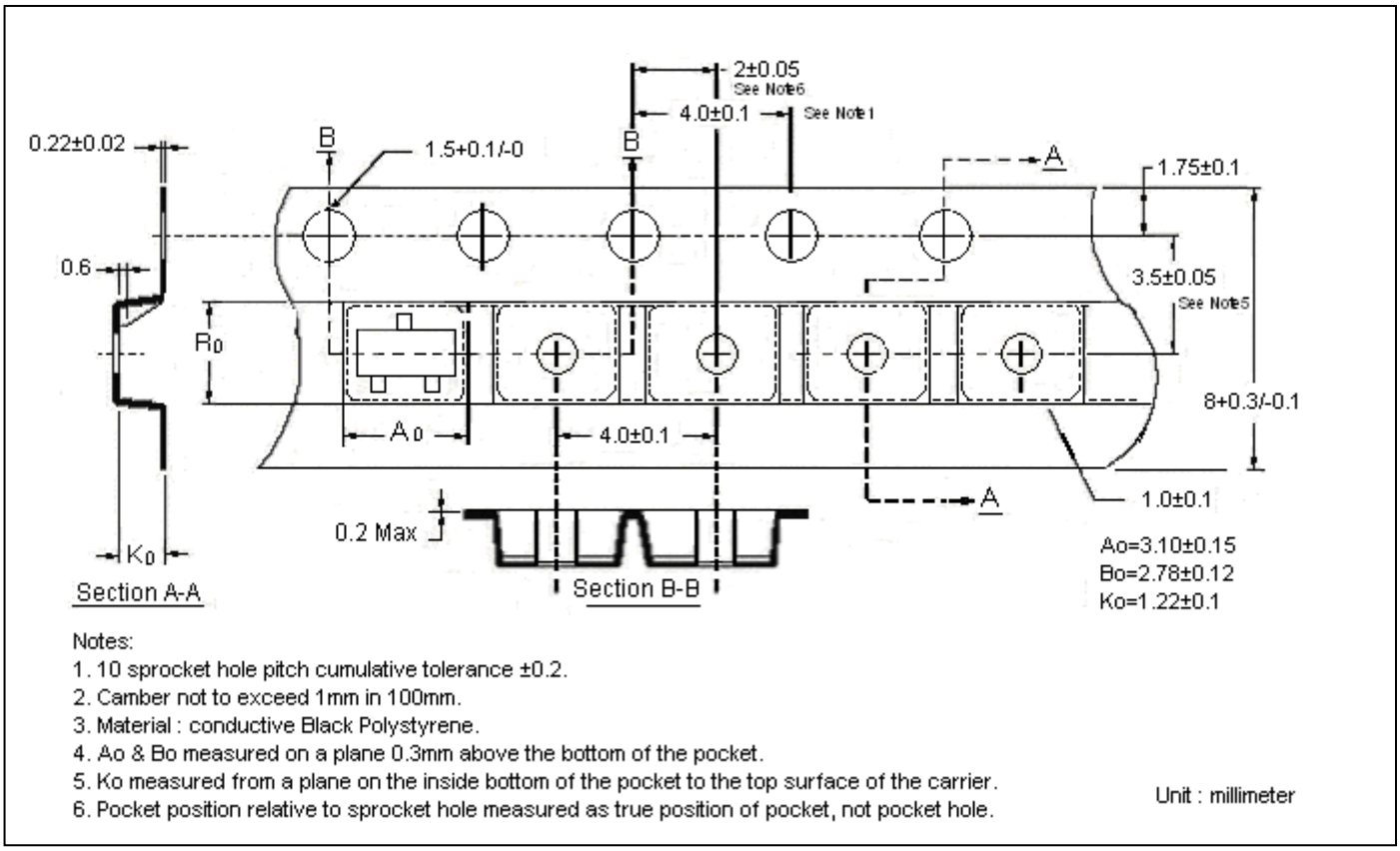


Unit : mm

Reel Dimension



Carrier Tape Dimension



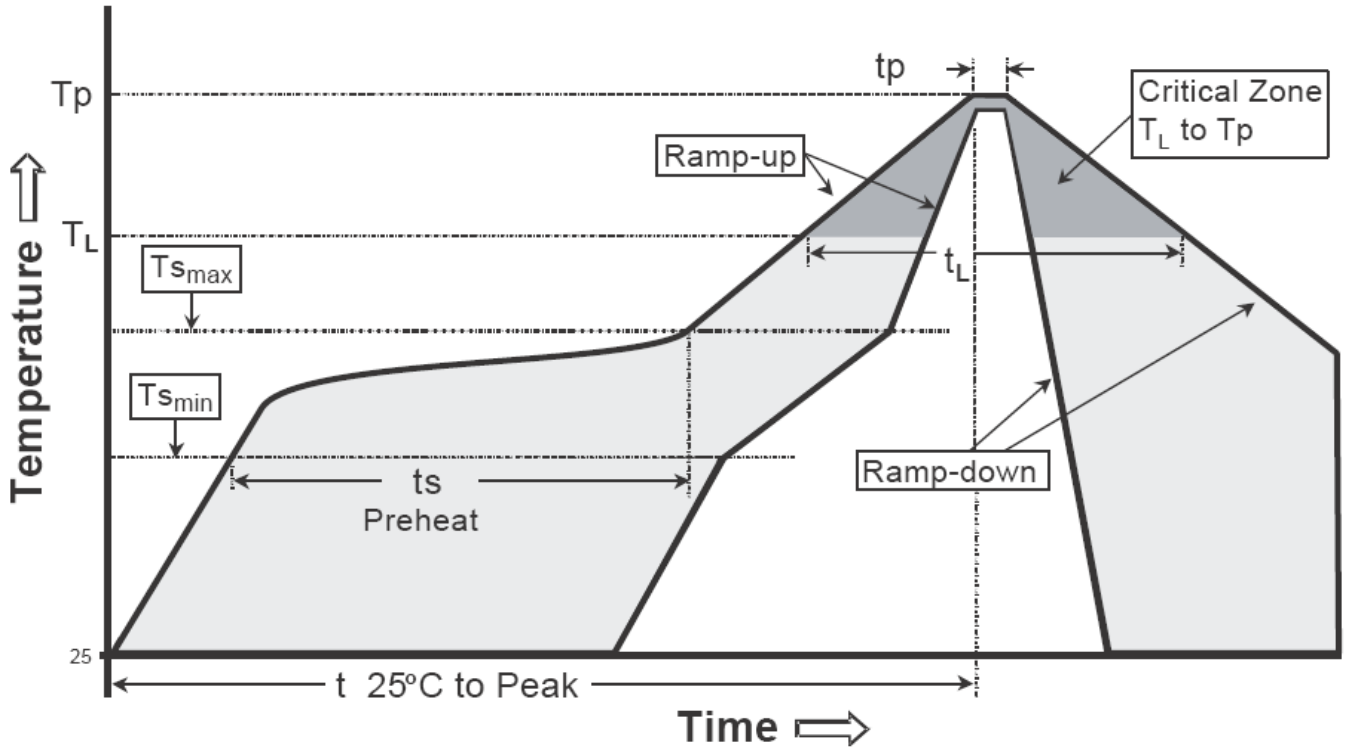
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

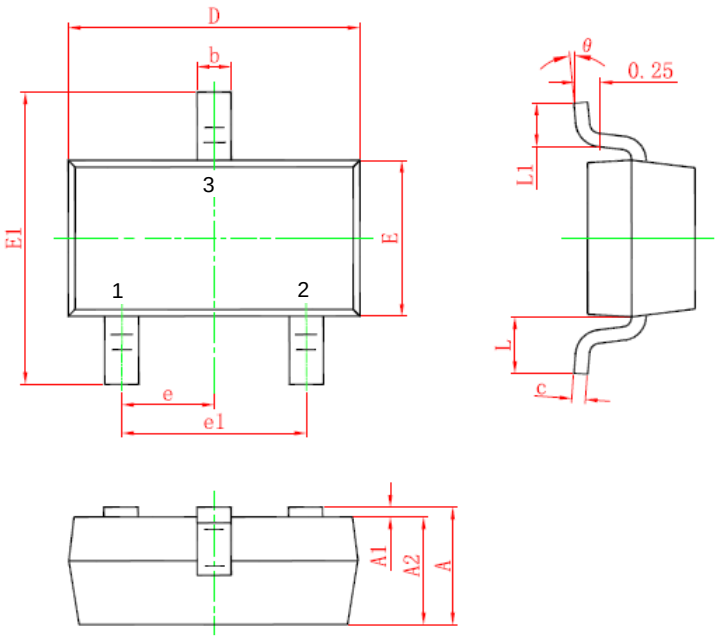
Recommended temperature profile for IR reflow

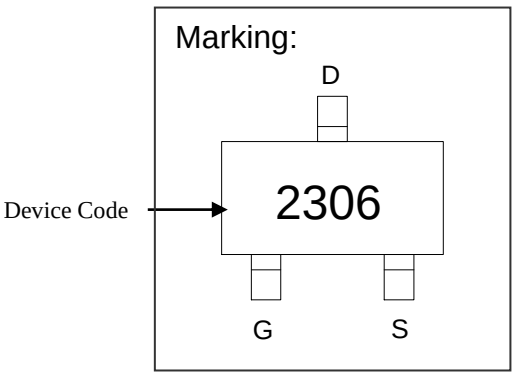


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(TP)	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





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

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.035	0.045	0.900	1.150	E1	0.089	0.100	2.250	2.550
A1	0.000	0.004	0.000	0.100	e	0.037 TYP.		0.950 TYP.	
A2	0.035	0.041	0.900	1.050	e1	0.071	0.079	1.800	2.000
b	0.012	0.020	0.300	0.500	L	0.022 REF.		0.550 REF.	
c	0.003	0.006	0.080	0.150	L1	0.012	0.020	0.300	0.500
D	0.110	0.118	2.800	3.000	θ	0°	8°	0°	8°
E	0.047	0.055	1.200	1.400					

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.