

N-Channel Enhancement Mode MOSFET

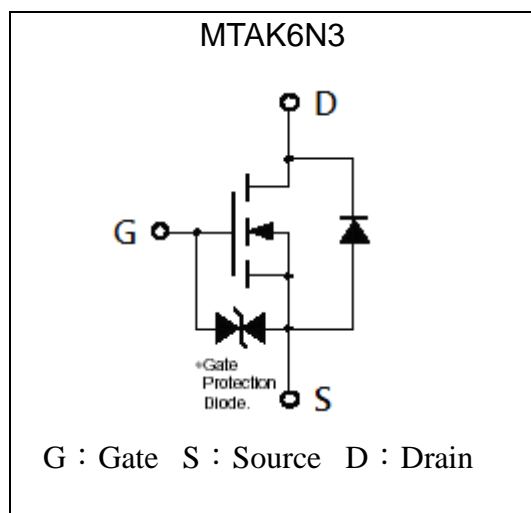
MTAK6N3

BV_{DSS}	60V	
$I_D @ V_{GS}=4.5V, T_A=25^\circ C$	330mA	
$R_{DS(on)(TYP)}$	$V_{GS}=4.5V, I_D=200mA$	1.3 Ω
	$V_{GS}=2.5V, I_D=100mA$	1.7 Ω

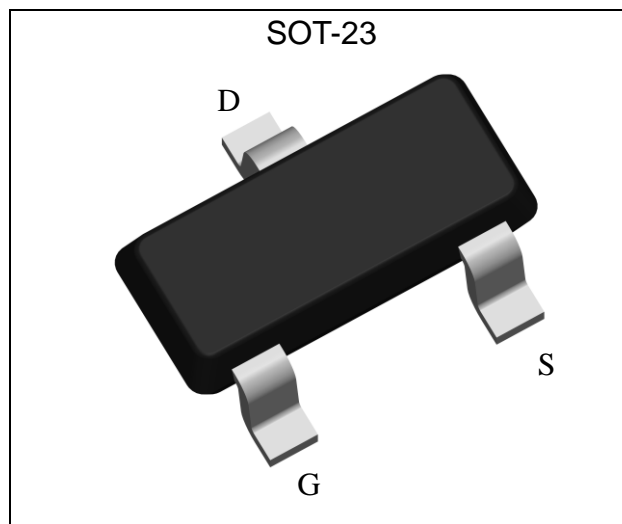
Description

- Low voltage drive(2.5V drive) makes this device ideal for portable equipment.
- The MOSFET elements are independent, eliminating mutual interference.
- Mounting cost and area can be cut in half.
- High speed switching
- ESD protected device, HBM $\geq 2kV$
- Pb-free lead plating & halogen-free package

Symbol

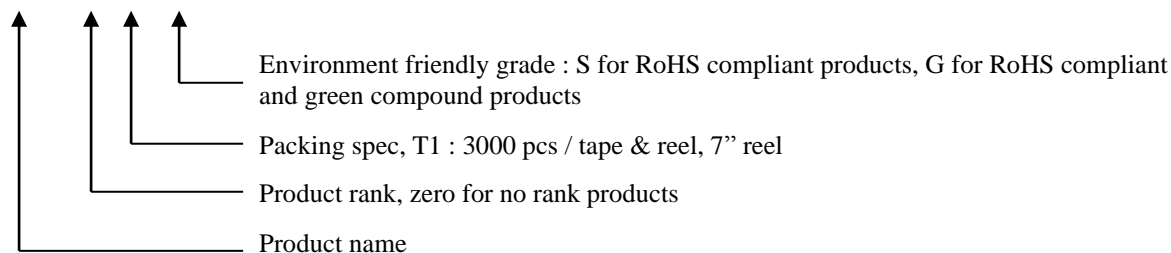


Outline



Ordering Information

Device	Package	Shipping
MTAK6N3-0-T1-G	SOT-23 (Pb-free lead plating & halogen-free package)	3000 pcs / Tape & Reel





Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	BV _{DSS}	60	V
Gate-Source Voltage	V _{GS}	±16	
Continuous Drain Current	I _D	330	mA
Pulsed Drain Current	I _{DM}	1320 *1	
Total Power Dissipation	P _D	350 *2	mW
ESD susceptibility	V _{ESD}	2000 *3	V
Operating Junction and Storage Temperature Range	T _j ; T _{stg}	-55~+150	°C

- Note : *1. Pulse Width ≤ 10μs, Duty cycle ≤ 1%
 *2. With each pin mounted on the recommended lands.
 *3. Human body model, 1.5kΩ in series with 100pF

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Channel-to-ambient, max	*R _{th,ch-a}	357	°C/W

Note : With each pin mounted on the recommended lands.

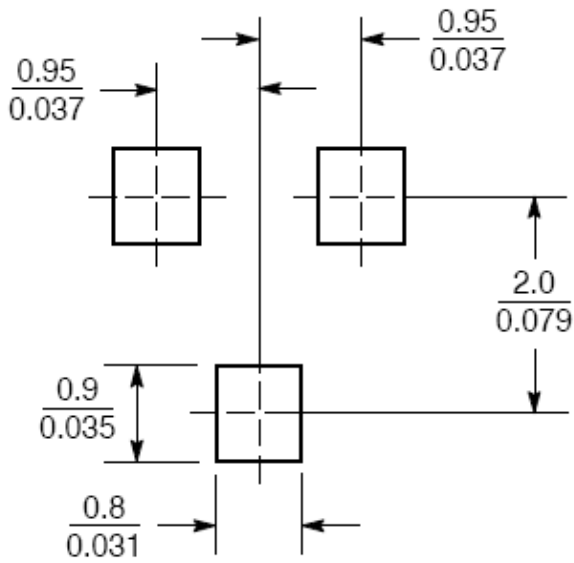
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	60	-	-	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	0.5	-	1.5		I _D =250μA, V _{DS} =V _{GS}
I _{GSS}	-	-	±10	μA	V _{GS} =±16V, V _{DS} =0V
I _{DSS}	-	-	1		V _{DS} =60V, V _{GS} =0V
R _{DS(ON)}	-	1.3	3	Ω	V _{GS} =4.5V, I _D =200mA
	-	1.7	5.1		V _{GS} =2.5V, I _D =100mA
G _{FS}	100	322	-	mS	V _{DS} =5V, I _D =100mA
Dynamic					
C _{iss}	-	25.8	-	pF	V _{DS} =25V, V _{GS} =0V, f=1MHz
C _{oss}	-	8.6	-		
C _{rss}	-	7	-		
t _{d(on)}	-	3.1	-	ns	V _{DD} =30V, I _D =200mA, V _{GS} =10V, R _G =25Ω
t _r	-	15.1	-		
t _{d(off)}	-	11.4	-		
t _f	-	18	-		
Q _g	-	1.6	-	nC	I _D =0.5A, V _{DS} =30V, V _{GS} =10V
Q _{gs}	-	0.4	-		
Q _{gd}	-	0.2	-		
R _g	-	3	-	Ω	f=1MHz

Source-Drain Diode					
*V _{SD}	-	0.79	1.2	V	V _{GS} =0V, I _S =100mA
*trr	-	8.3	-	ns	I _F =0.5A, dI _F /dt=100A/μs
*Q _{rr}	-	2.7	-	nC	

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

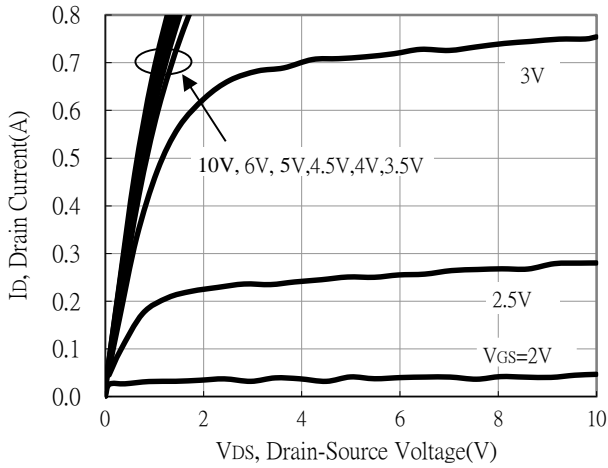
Recommended Soldering Footprint



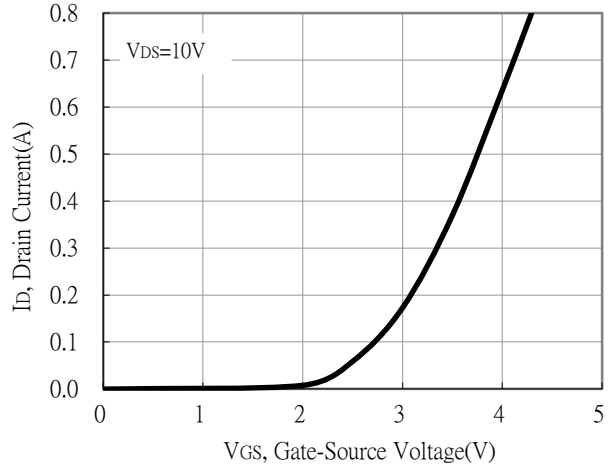
Unit : $\frac{\text{mm}}{\text{inches}}$

Typical Characteristics

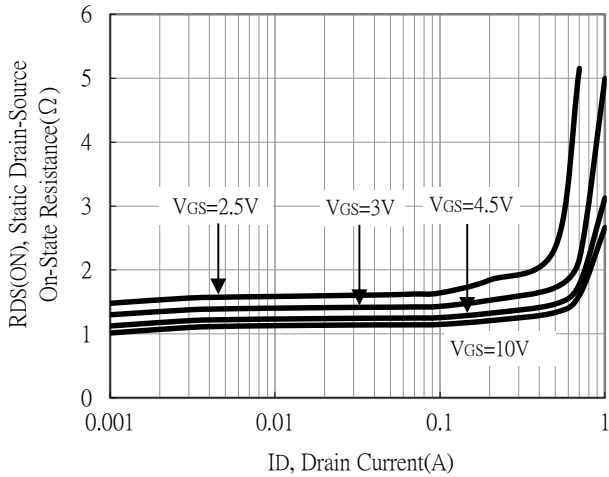
Typical Output Characteristics



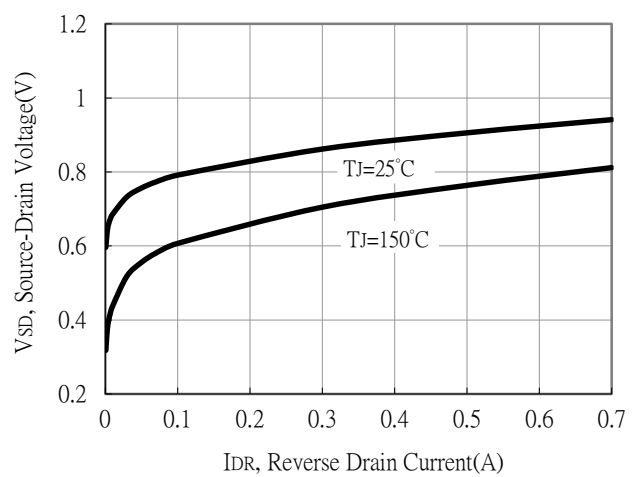
Typical Transfer Characteristics



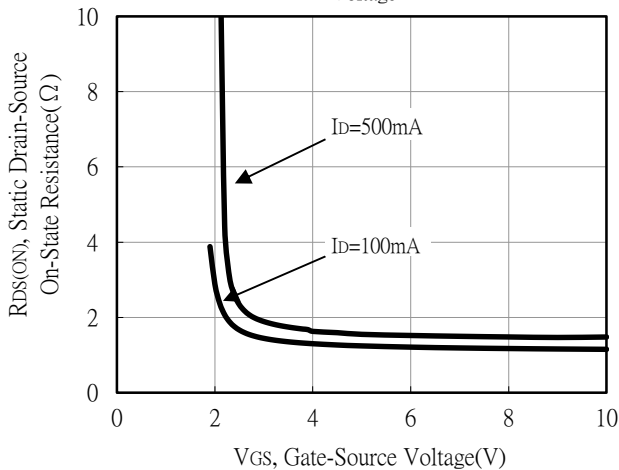
Static Drain-Source On-State resistance vs Drain Current



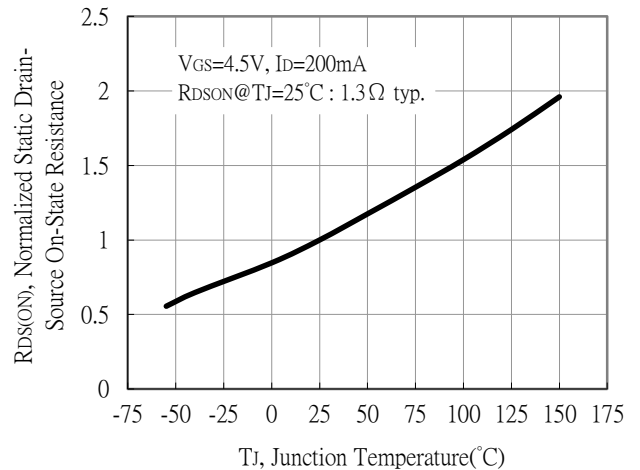
Reverse Drain Current vs Source-Drain Voltage



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

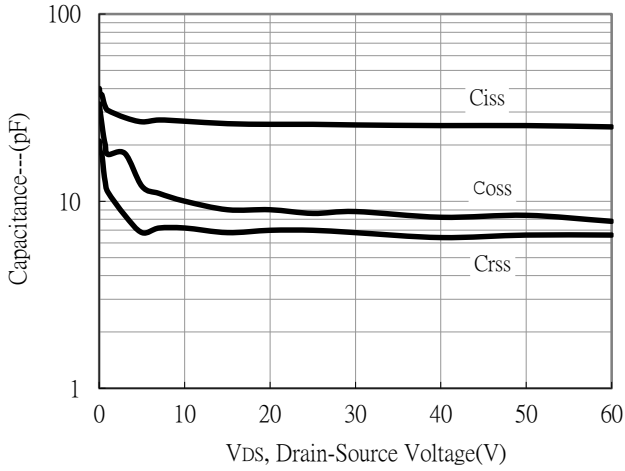


Drain-Source On-State Resistance vs Junction Temperature

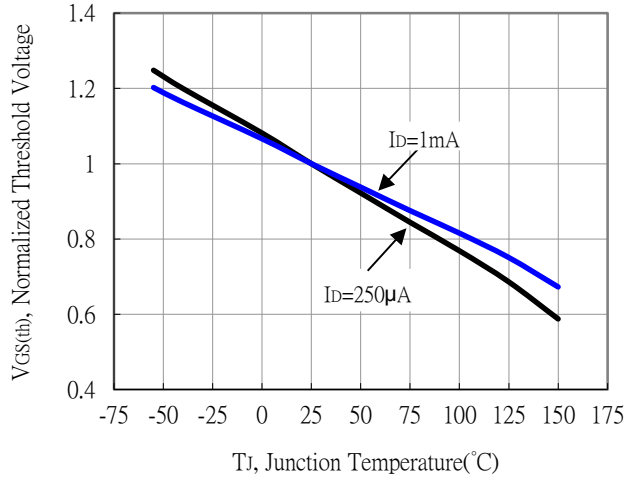


Typical Characteristics(Cont.)

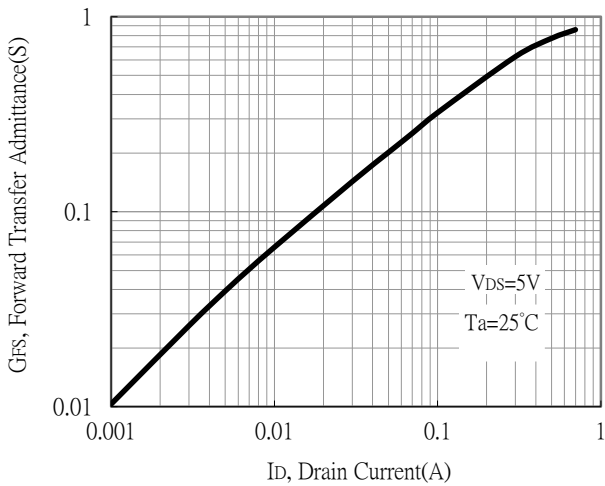
Capacitance vs Drain-to-Source Voltage



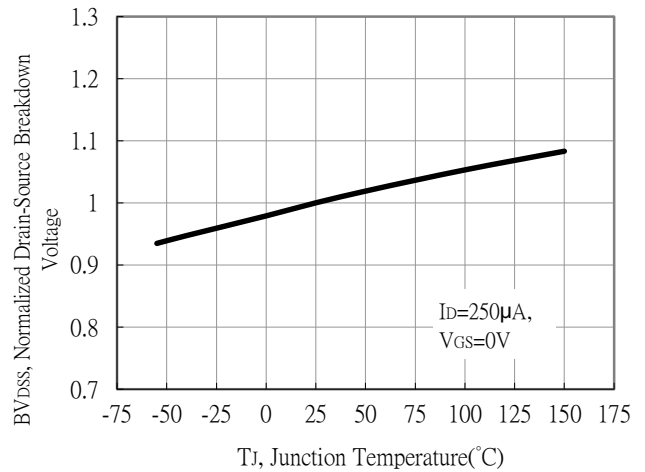
Threshold Voltage vs Junction Temperature



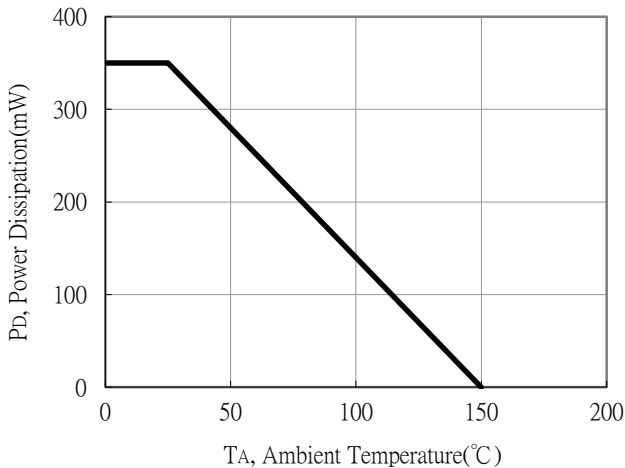
Forward Transfer Admittance vs Drain Current



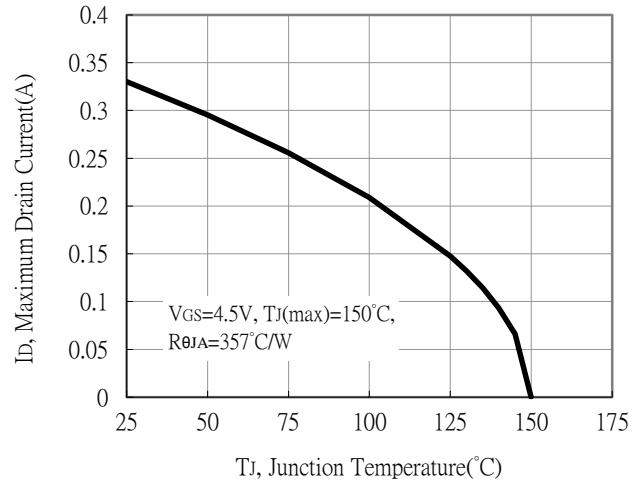
Brekdown Voltage vs Ambient Temperature



Power Derating Curve

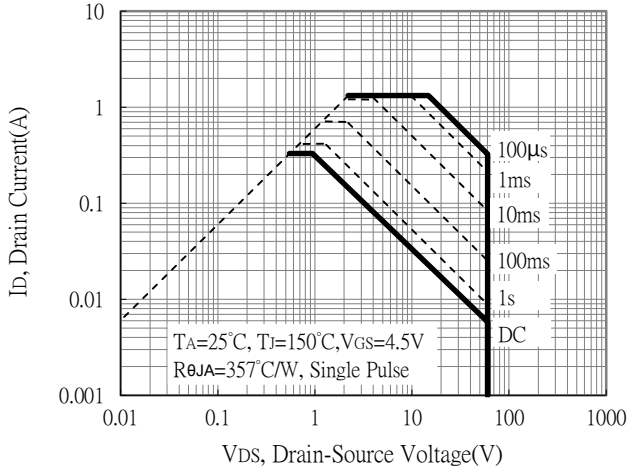


Maximum Drain Current vs Junction Temperature

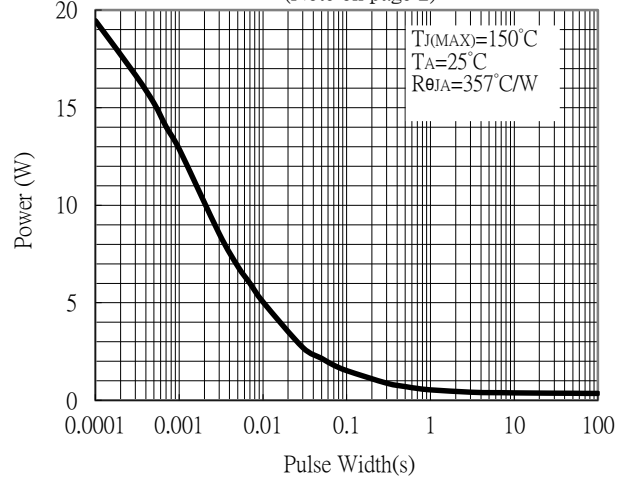


Typical Characteristics(Cont.)

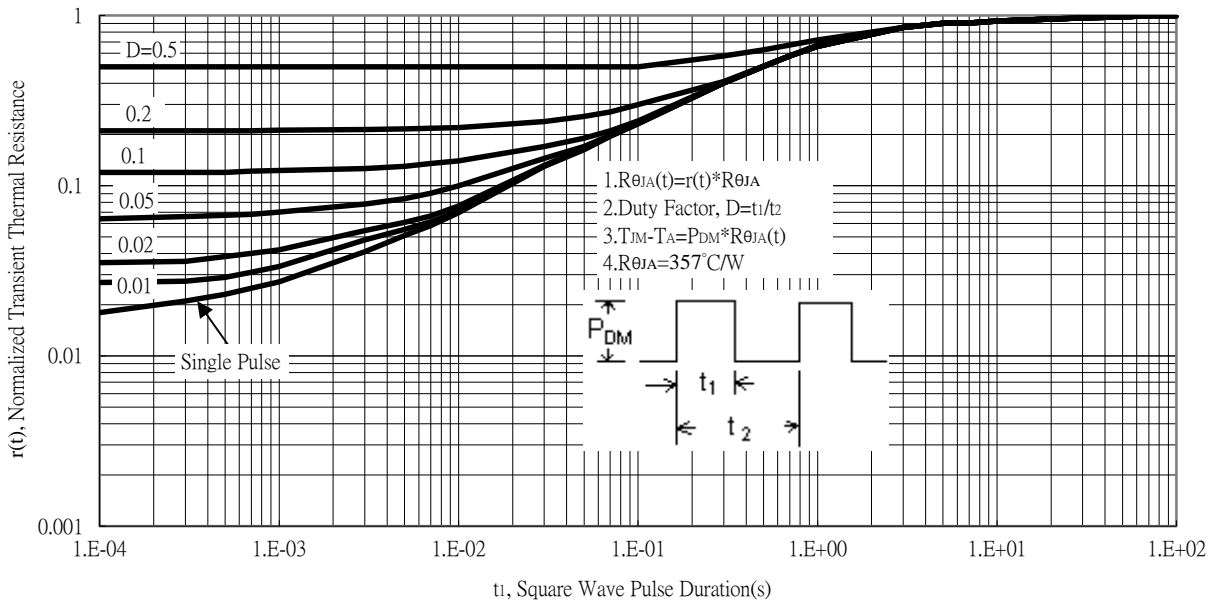
Maximum Safe Operating Area



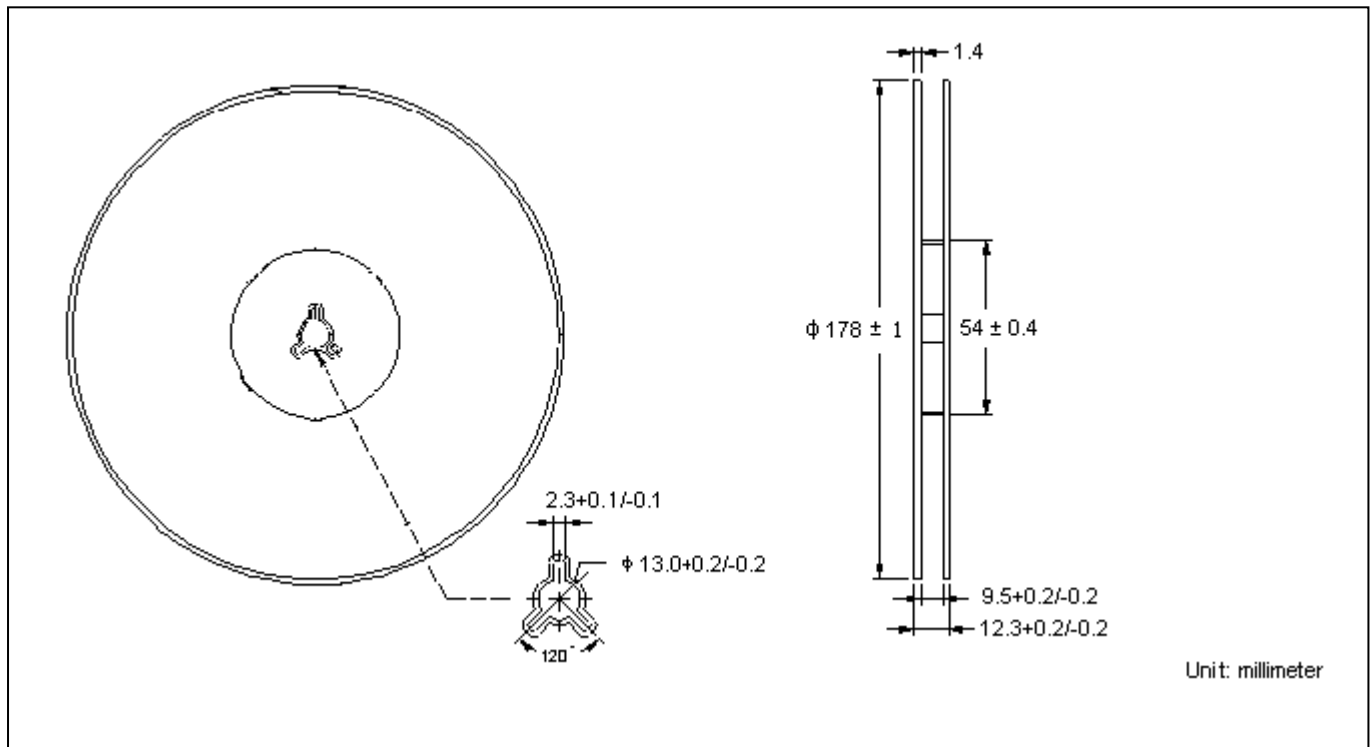
Single Pulse Power Rating, Junction to Ambient
 (Note on page 2)



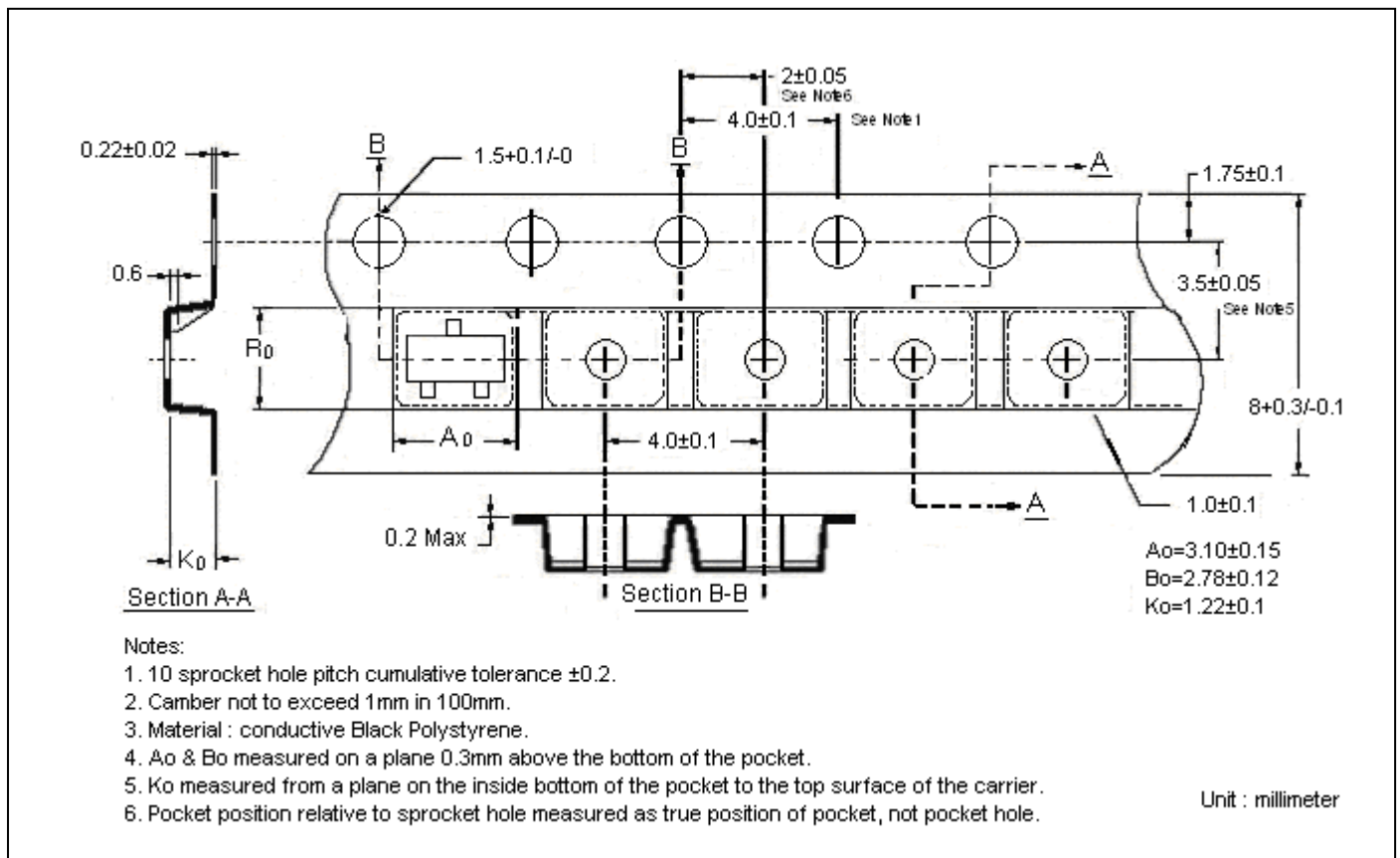
Transient Thermal Response Curves



Reel Dimension

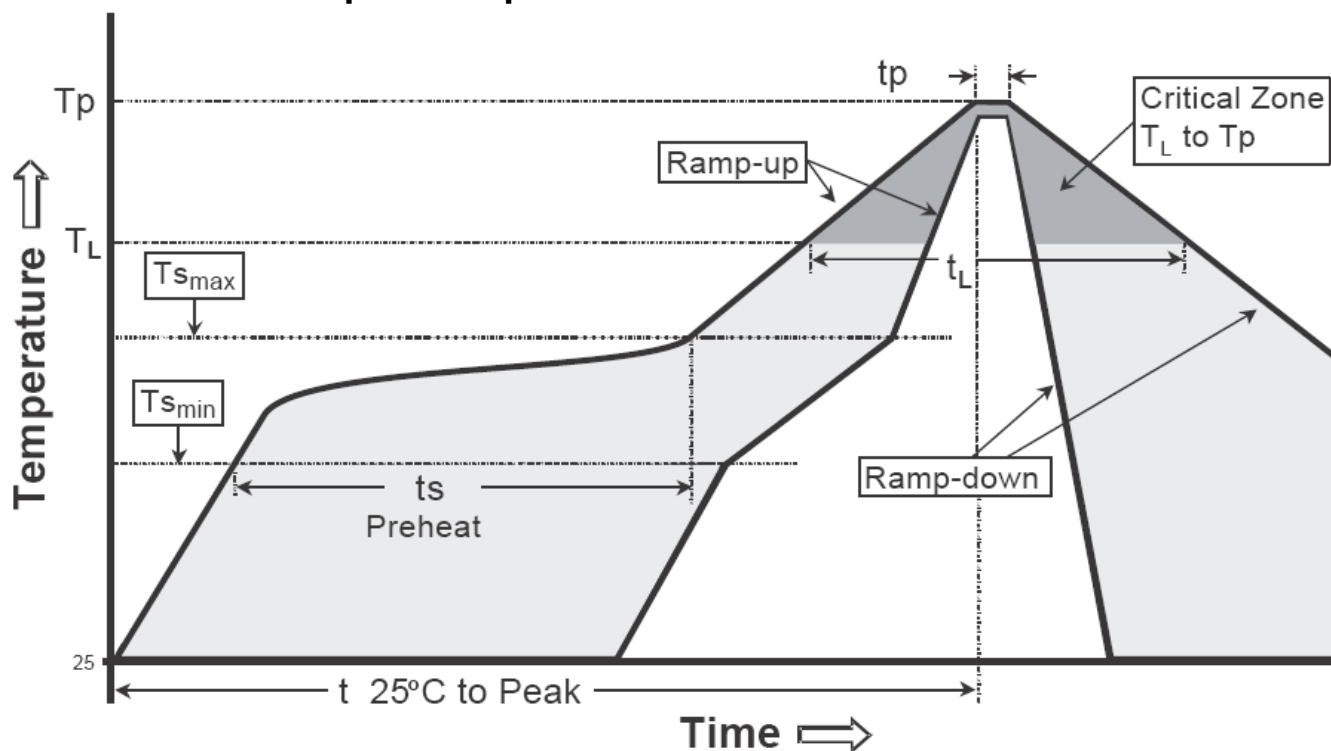


Carrier Tape Dimension



Recommended wave soldering condition

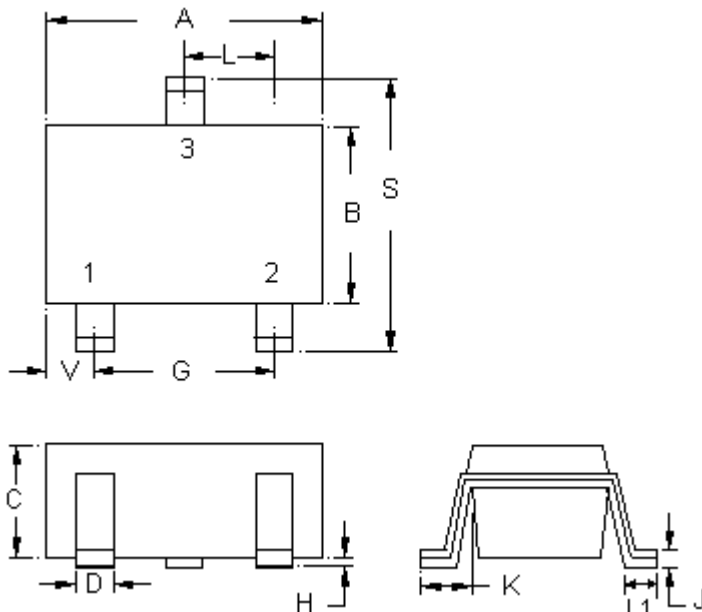
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{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(t _p)	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.

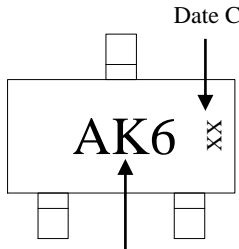
Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-23 Dimension



The diagram shows three views of the SOT-23 package: a top view with dimensions A, B, C, D, G, H, L, S, V; a side view with dimensions C, D, H, J; and a perspective view with dimensions K, L1, L, J. The top view also labels the pins as 1 (Gate), 2 (Source), and 3 (Drain).

Marking:



The marking diagram shows a rectangular package with three pins. The top pin is labeled 'Date Code' with an arrow pointing to 'XX'. The bottom-left pin is labeled 'Device Code' with an arrow pointing to 'AK6'.

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

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

Date Code : Year + Month
 Year : 9→2019,0→2020,...., etc
 Month : 1→Jan,2→Feb, ..., 9→Sep, A→Oct, B→Nov, C→Dec

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1181	2.80	3.00	J	0.0032	0.0059	0.08	0.15
B	0.0472	0.0551	1.20	1.40	K	0.0217	REF	0.55	REF
C	0.0354	0.0413	0.90	1.05	L	0.0374	TYP	0.95	TYP
D	0.0118	0.0197	0.30	0.50	S	0.0886	0.1004	2.25	2.55
G	0.0709	0.0787	1.80	2.00	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	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.

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek **semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.