ESD protected N-CHANNEL Enhancement Mode MOSFET

MTN1012ZC3

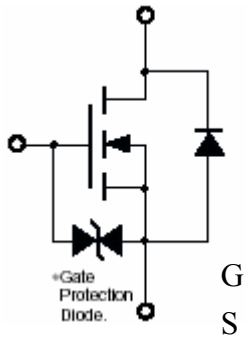
BV_{DSS}	20V
I_D	0.7A
$R_{DSON(TYP)}$	300mΩ@4.5V/0.6A
	340mΩ@2.5V/0.5A
	420mΩ@1.8V/0.4A

Description

- Low voltage drive, 1.8V
- Easy to use in parallel
- High speed switching
- ESD protected device
- Pb-free package

Symbol

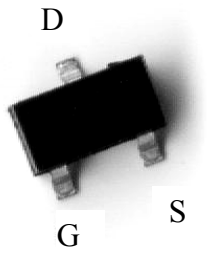
MTN1012ZC3



G：Gate
S：Source
D：Drain

Outline

SOT-523



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		BV_{DSS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25°C	I_D	0.7	A
	T_A=70°C		0.4	
Pulsed Drain Current		I_{DM}	1 *1	A
Total Power Dissipation	T_A=25°C	P_D	270	mW
	T_A=70°C		160	
Operating Junction and Storage Temperature Range		Tj ; Tstg	-55~+150	°C
Thermal Resistance, Junction-to-Ambient		Rth,ja	463	°C/W

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

Electrical Characteristics (Ta=25°C)

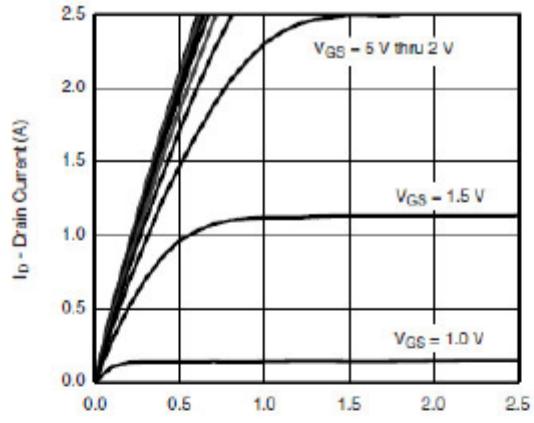
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	20	-	-	V	V_{GS}=0, I_D=100μA
$V_{GS(th)}$	0.3	-	0.8	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±1	mA	V_{GS}=±12V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=16V, V_{GS}=0
	-	-	5		V_{DS}=16V, V_{GS}=0, T_J=85°C
$I_{D(ON)}$	0.7	-	-	A	V_{DS}≧5V, V_{GS}=4.5V
$R_{DS(ON)}$	-	300	360	mΩ	V_{GS}=4.5V, I_D=600mA
	-	340	420		V_{GS}=2.5V, I_D=500mA
	-	420	560		V_{GS}=1.8V, I_D=400mA
G_{FS}	-	1	-	S	V_{DS}=10V, I_D=400mA
Dynamic					
C_{iss}	-	70	-	pF	V_{DS}=10V, V_{GS}=0, f=1MHz
C_{oss}	-	20	-		
C_{rss}	-	8	-		
Qg	-	1.06	1.38	nC	V_{DS}=10V, V_{GS}=4.5V, I_D=0.6A
Qgs	-	0.18	-		
Qgd	-	0.32	-		
$t_{d(ON)}$	-	18	26	ns	V_{DD}=10V, I_D=0.5A, V_{GEN}=4.5V, R_L=20Ω, R_G=1Ω
tr	-	20	28		
$t_{d(OFF)}$	-	70	110		
t_f	-	25	40		
Source-Drain Diode					
*V_{SD}	-	0.65	1.2	V	V_{GS}=0V, I_S=150mA

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

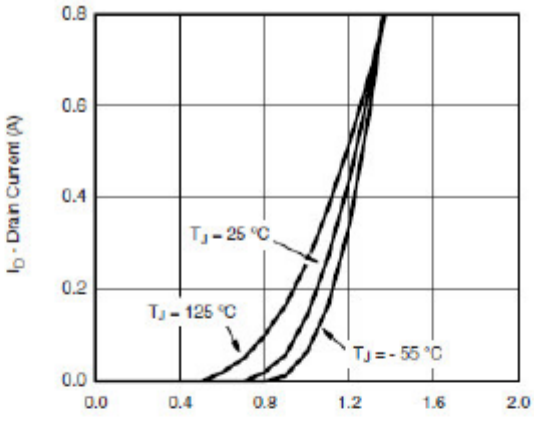
Ordering Information

Device	Package	Shipping	Marking
MTN1012ZC3	SOT-523 (Pb-free)	3000 pcs / Tape & Reel	X

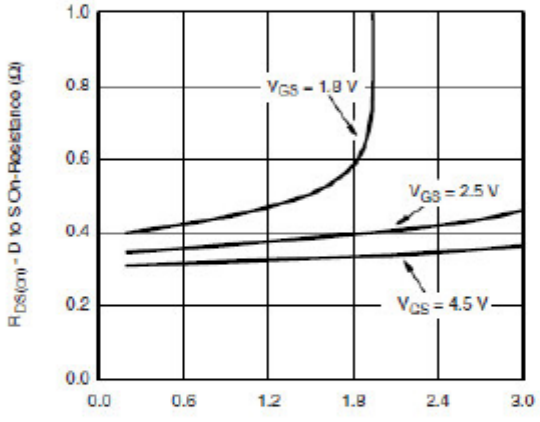
Typical Characteristics



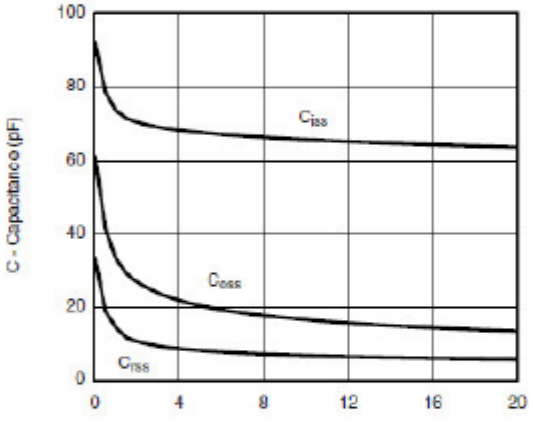
Output Characteristics



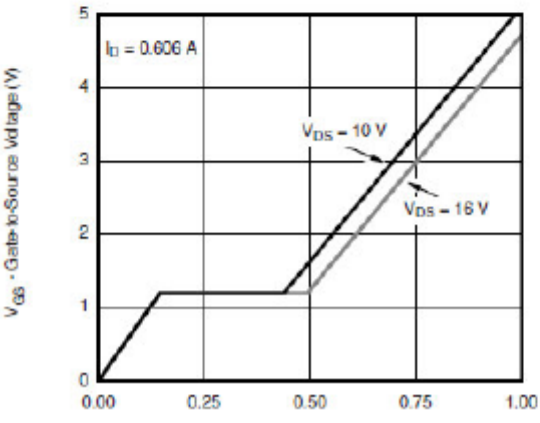
Transfer Characteristics



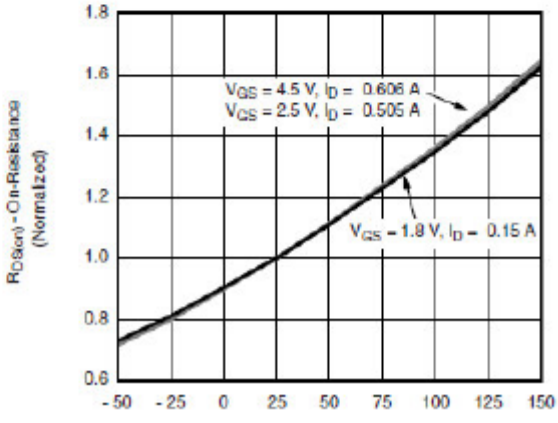
On-Resistance vs. Drain Current



Capacitance

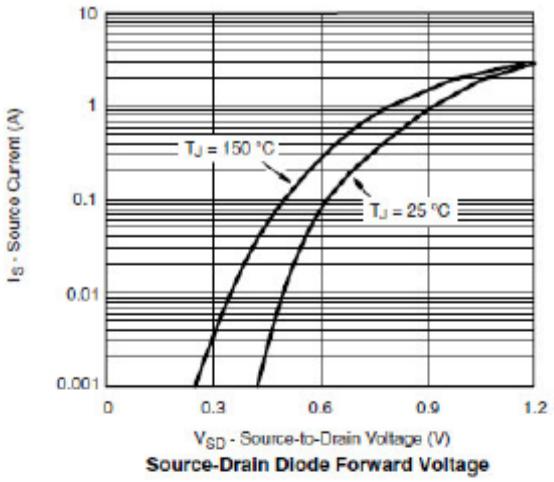


Gate Charge

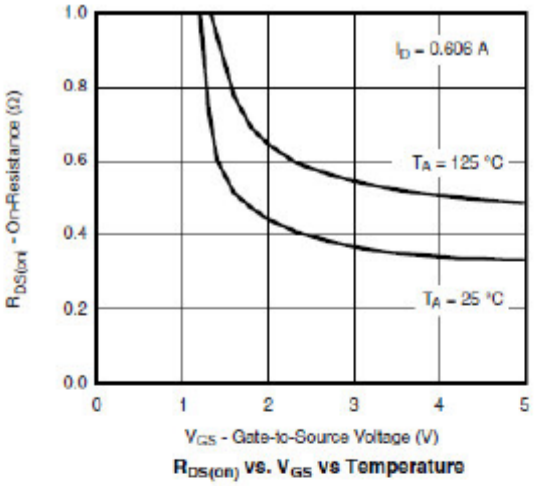


On-Resistance vs. Junction Temperature

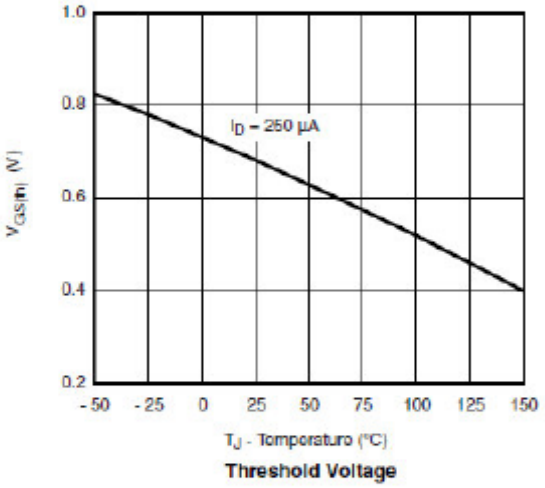
Typical Characteristics(Cont.)



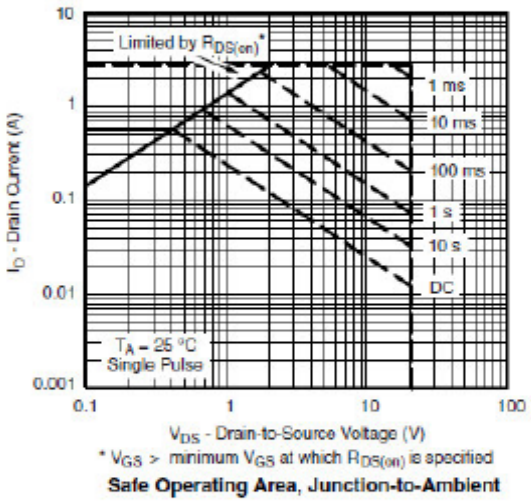
Source-Drain Diode Forward Voltage



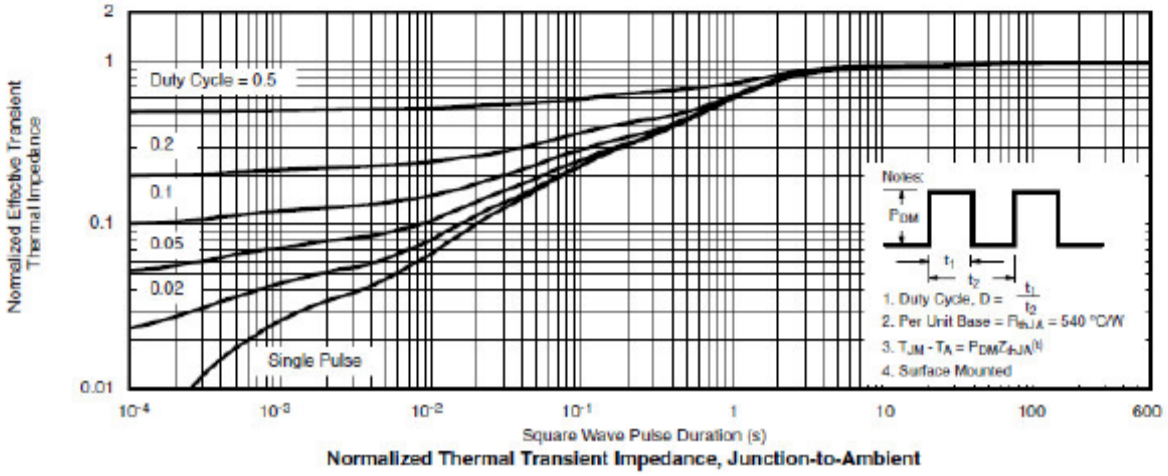
$R_{DS(on)}$ vs. V_{GS} vs Temperature



Threshold Voltage

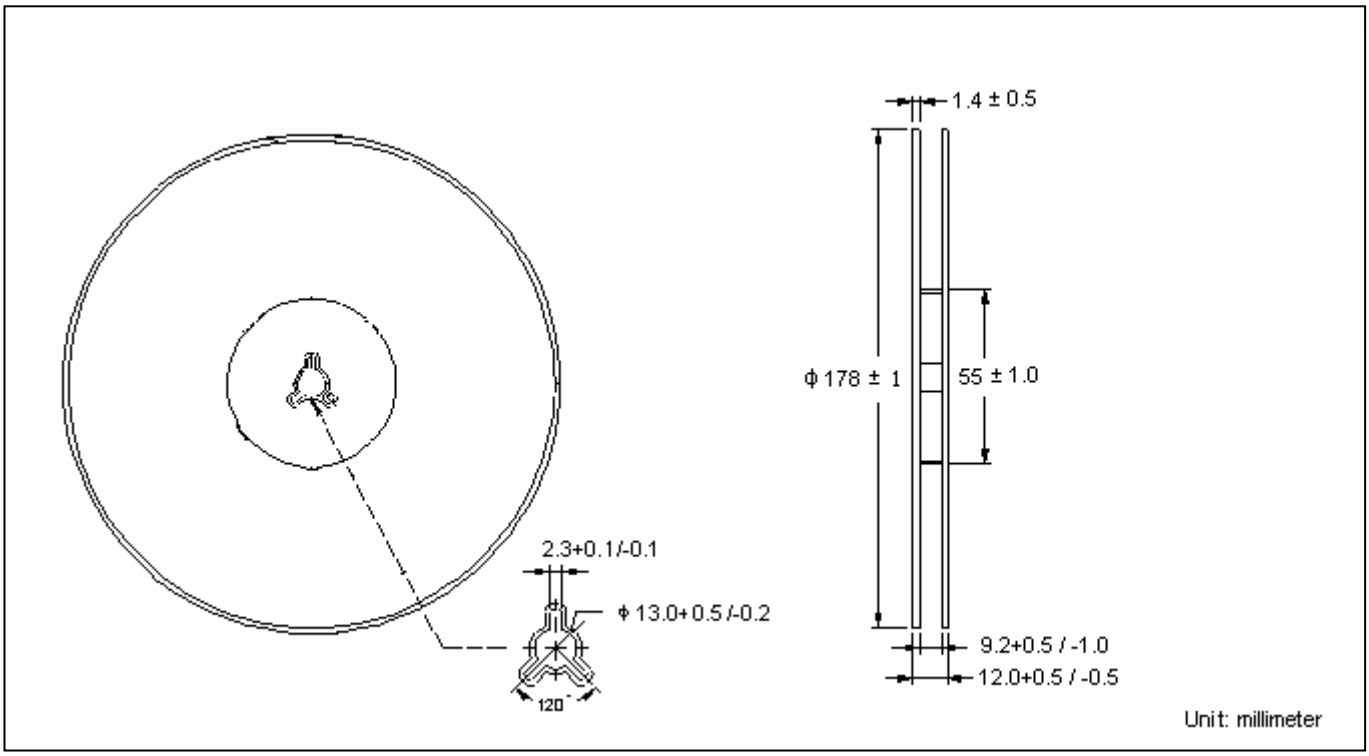


Safe Operating Area, Junction-to-Ambient

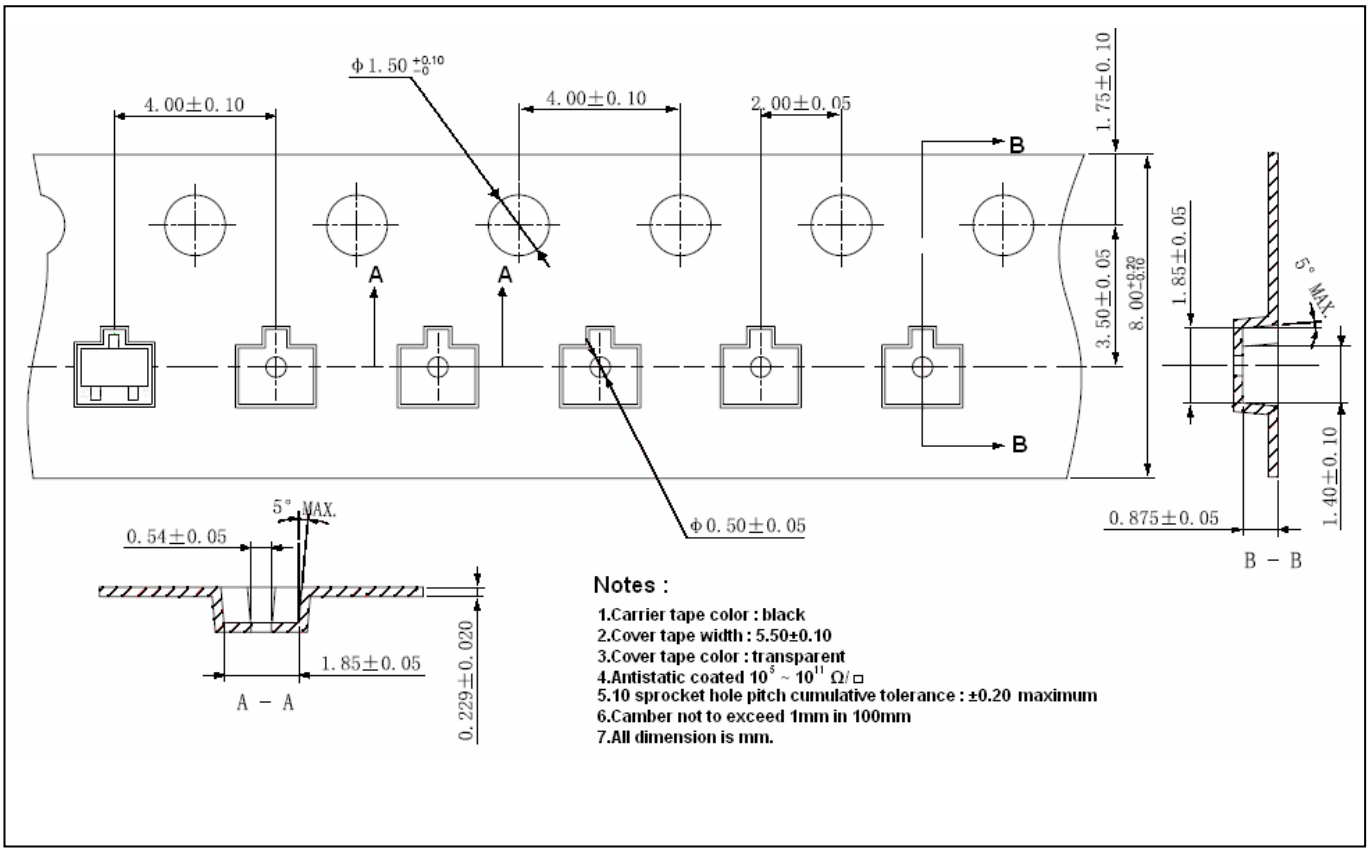


Normalized Thermal Transient Impedance, Junction-to-Ambient

Reel Dimension



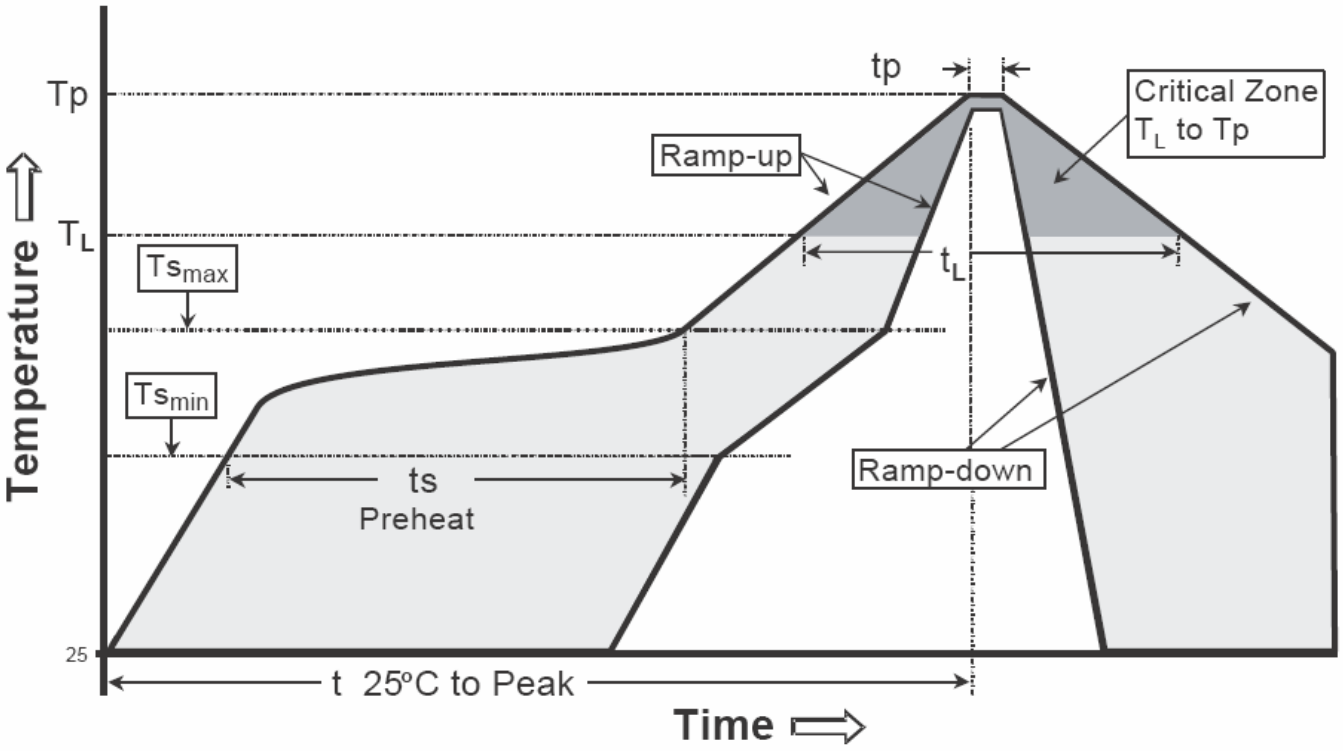
Carrier Tape Dimension



Recommended wave soldering condition

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

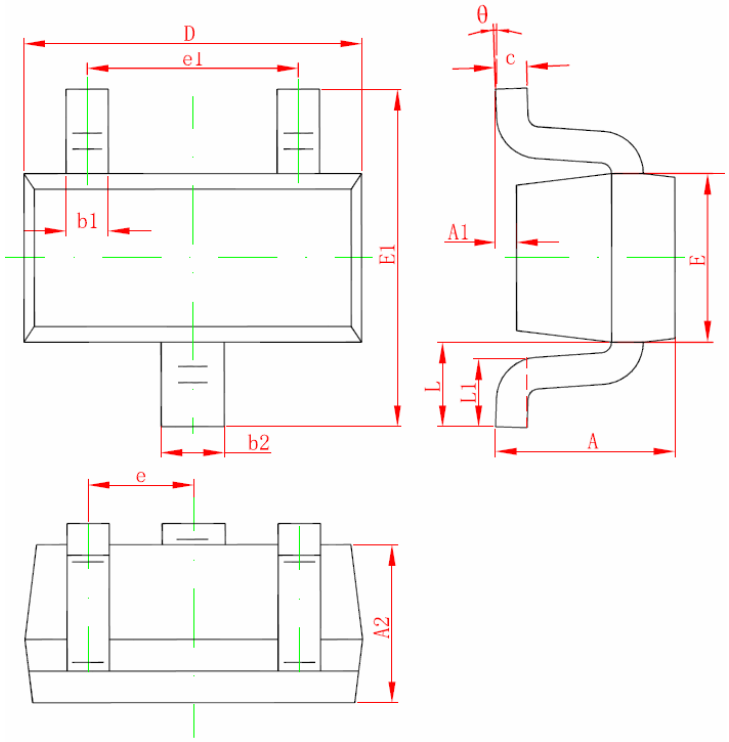
Recommended temperature profile for IR reflow



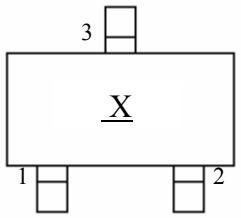
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 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.

SOT-523 Dimension



Marking:



3-Lead SOT-523 Plastic
Surface Mounted Package
CYStek Package Code: C3

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

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.028	0.035	0.700	0.900	E	0.028	0.035	0.700	0.900
A1	0.000	0.004	0.000	0.100	E1	0.057	0.069	1.450	1.750
A2	0.028	0.031	0.700	0.800	e	0.020*		0.500*	
b1	0.006	0.010	0.150	0.250	e1	0.035	0.043	0.900	1.100
b2	0.010	0.014	0.250	0.350	L	0.016 REF		0.400 REF	
c	0.004	0.008	0.100	0.200	L1	0.010	0.018	0.260	0.460
D	0.059	0.067	1.500	1.700	θ	0°	8°	0°	8°

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