20V N-Channel Enhancement Mode MOSFET

MTA340N02S3

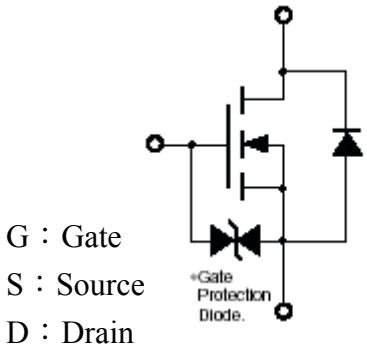
BV_{DSS}	20V
I_D@V_{GS}=4.5V, T_A=25°C	0.8A
R_{DSON}@V_{GS}=4.5V, I_D=650mA	264mΩ(typ)
R_{DSON}@V_{GS}=2.5V, I_D=500mA	325mΩ(typ)
R_{DSON}@V_{GS}=1.8V, I_D=200mA	371mΩ(typ)

Features

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

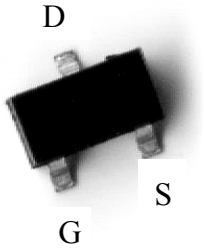
Symbol

MTA340N02S3



Outline

SOT-323



Ordering Information

Device	Package	Shipping
MTA340N02S3-0-T1-G	SOT-323 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T1 : 3000 pcs / tape & reel,7" reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	
Continuous Drain Current @ T_A=25°C, V_{GS}=4.5V (Note 3)	I_D	0.8	A
Continuous Drain Current @ T_A=70°C, V_{GS}=4.5V (Note 3)		0.64	
Pulsed Drain Current (Notes 1, 2)	I_{DM}	3.2	
Maximum Power Dissipation@ T_A=25℃ (Note 3)	P_D	0.34	W
Operating Junction and Storage Temperature Range	Tj ; Tstg	-55~+150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, max (Note3)	$R_{\theta JA}$	367	°C/W
Thermal Resistance, Junction-to-Case, max	$R_{\theta JC}$	250	

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; 270°C/W when mounted on minimum copper pad

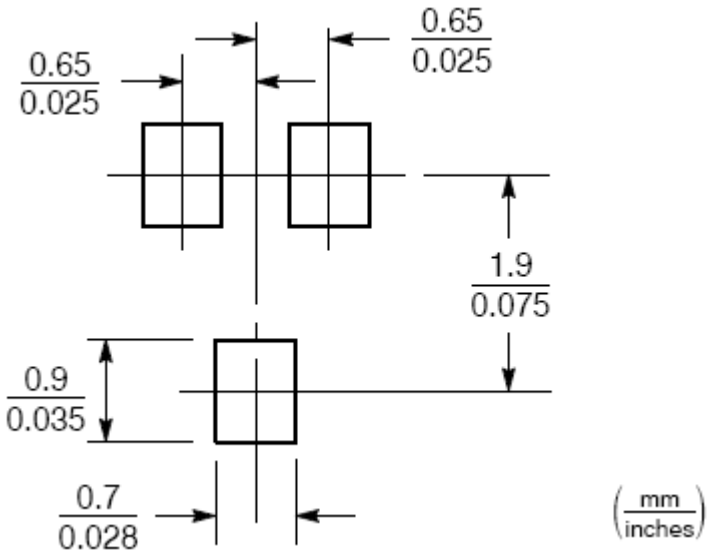
Electrical Characteristics (Tj=25°C, unless otherwise noted)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	20	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	0.45	-	1.0		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±10V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=20V, V_{GS}=0V
	-	-	25		V_{DS}=16V, V_{GS}=0V(Tj=70°C)
*$R_{DS(ON)}$	-	264	350	mΩ	V_{GS}=4.5V, I_D=650mA
	-	325	660		V_{GS}=2.5V, I_D=500mA
	-	371	2000		V_{GS}=1.8V, I_D=500mA
*G_{FS}	-	2.4	-	S	V_{DS}=5V, I_D=1A
Dynamic					
Ciss	-	64	-	pF	V_{DS}=10V, V_{GS}=0V, f=1MHz
Coss	-	17	-		
Crss	-	20	-		
$t_{d(ON)}$	-	2.6	-	ns	V_{DS}=10V, I_D=0.5A, V_{GS}=10V, R_G=1Ω
t_r	-	16	-		
$t_{d(OFF)}$	-	29.8	-		
t_f	-	11	-		
Qg	-	1.3	-	nC	V_{DS}=15V, I_D=0.5A, V_{GS}=4.5V
Qgs	-	0.5	-		
Qgd	-	0.1	-		

Source-Drain Diode					
*I_S	-	-	0.8	A	
*I_{SM}	-	-	3.2		
*V_{SD}	-	0.8	1	V	V_{GS}=0V, I_S=150mA
Trr	-	4.9	-	ns	V_{GS}=0V, I_F=0.5A, dI_F/dt=100A/μs
Qrr	-	1.0	-	nC	

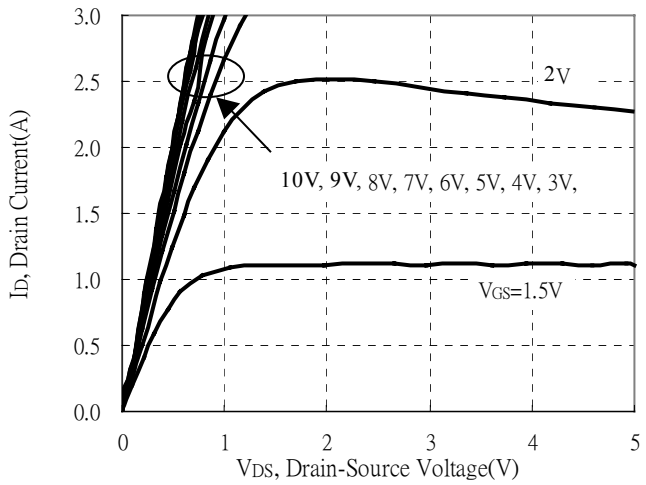
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint

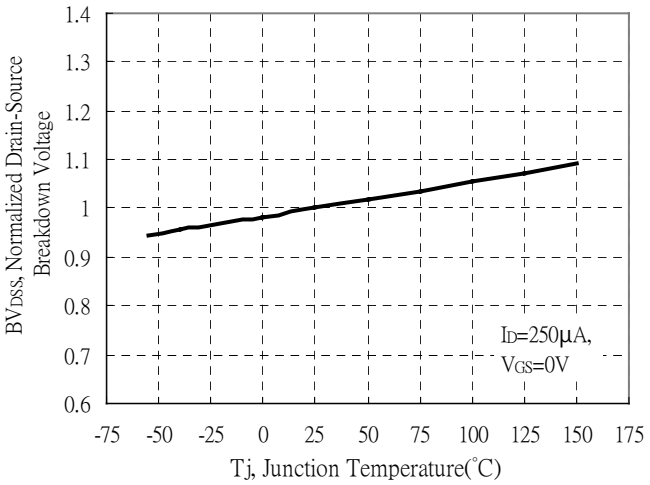


Typical Characteristics

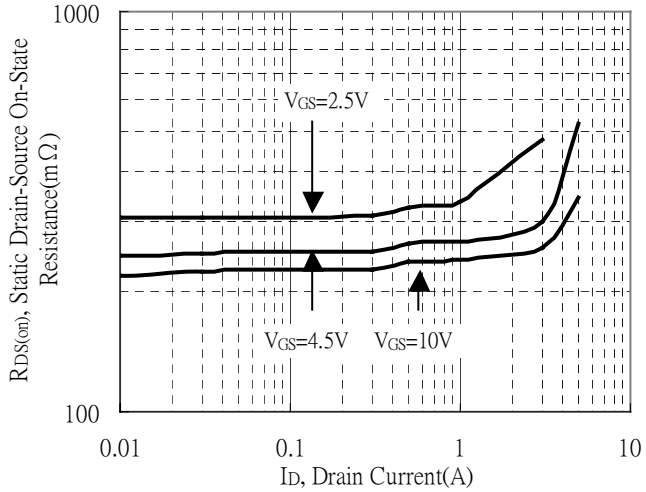
Typical Output Characteristics



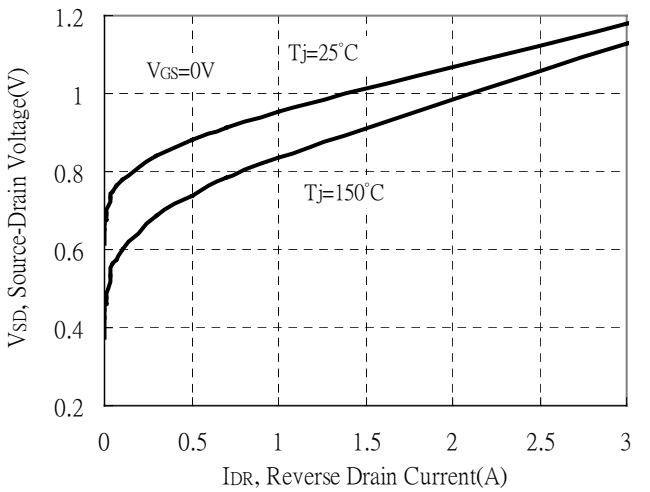
Brekdown Voltage vs Ambient Temperature



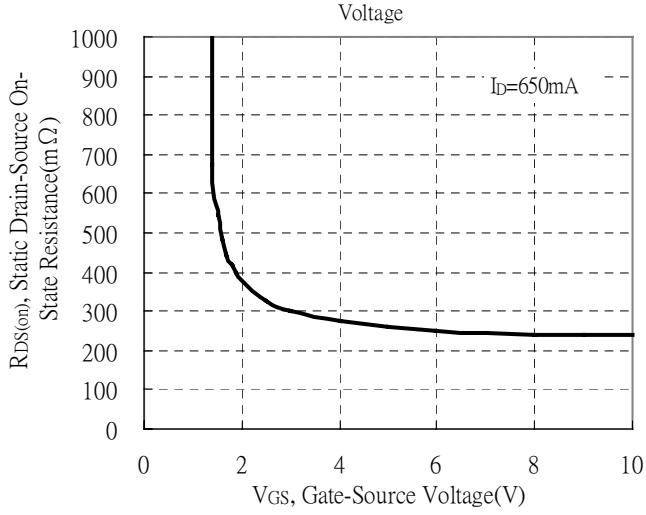
Static Drain-Source On-State resistance vs Drain Current



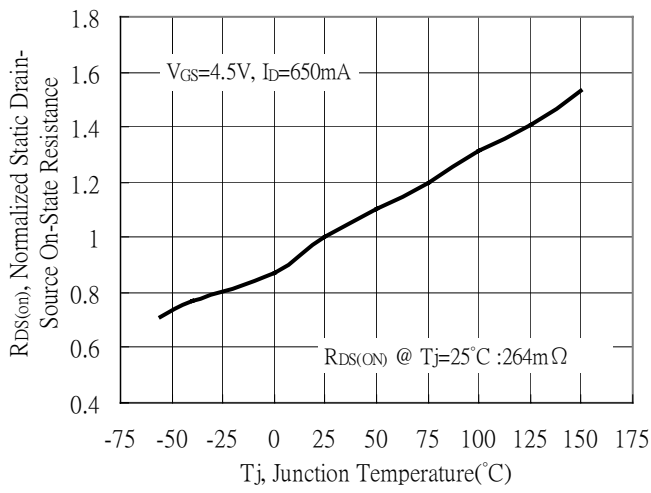
Reverse Drain Current vs Source-Drain Voltage



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

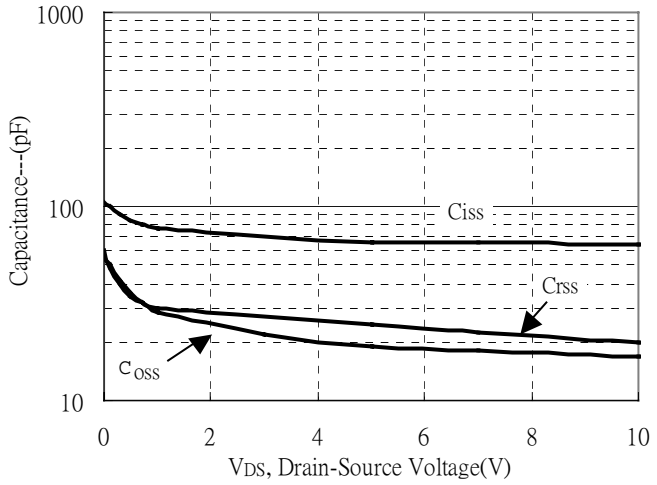


Drain-Source On-State Resistance vs Junction Tempearture

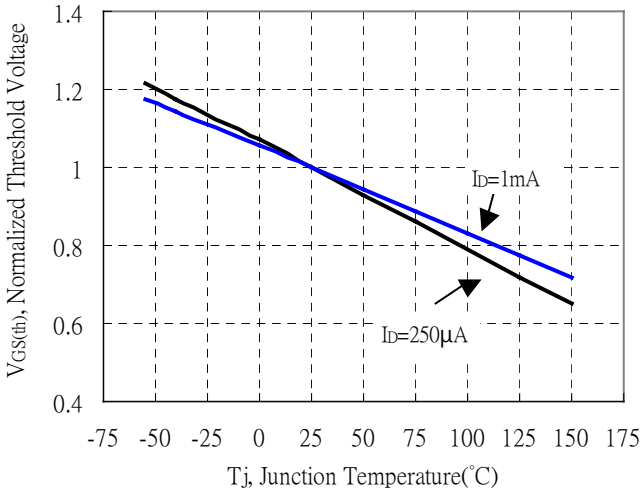


Typical Characteristics(Cont.)

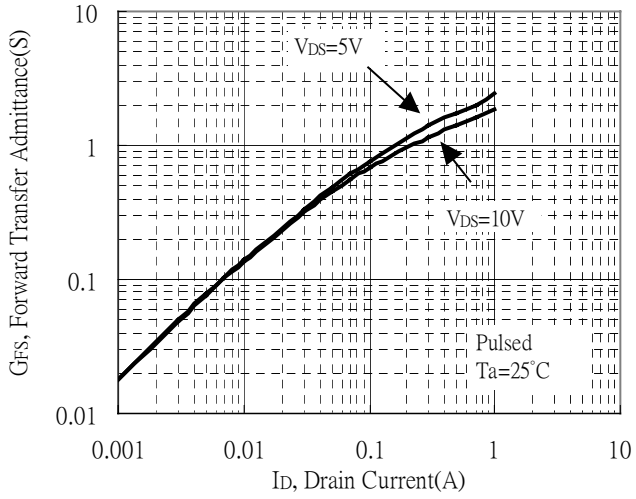
Capacitance vs Drain-to-Source Voltage



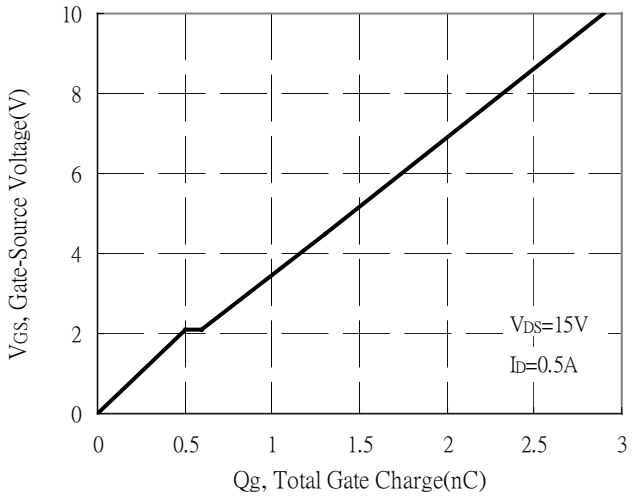
Threshold Voltage vs Junction Tempearture



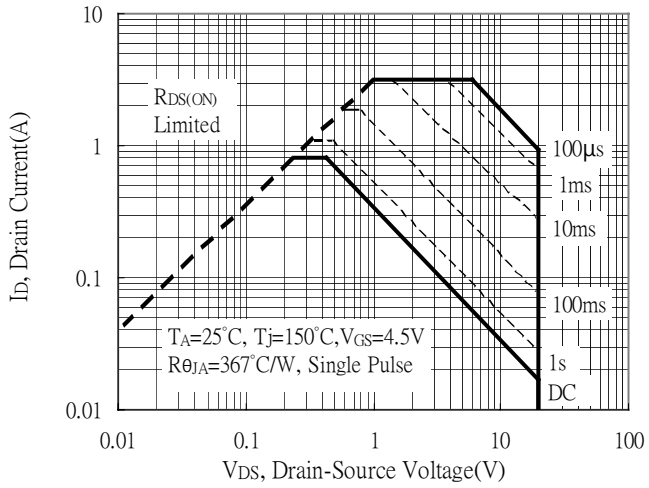
Forward Transfer Admittance vs Drain Current



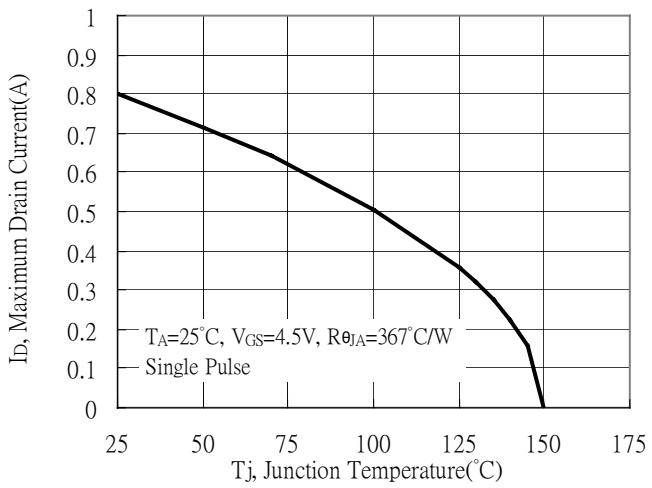
Gate Charge Characteristics



Maximum Safe Operating Area

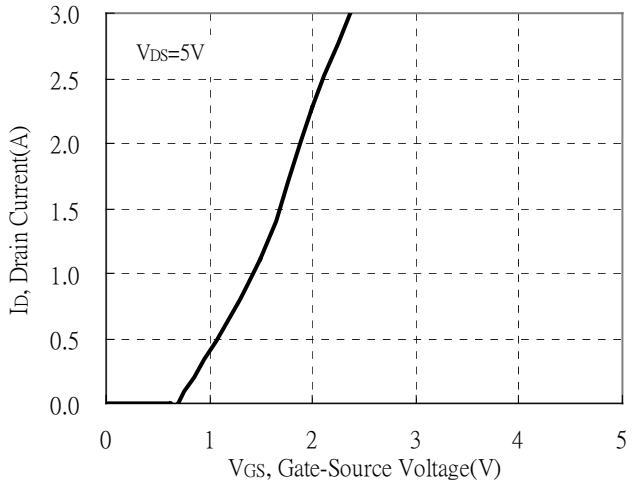


Maximum Drain Current vs JunctionTemperature

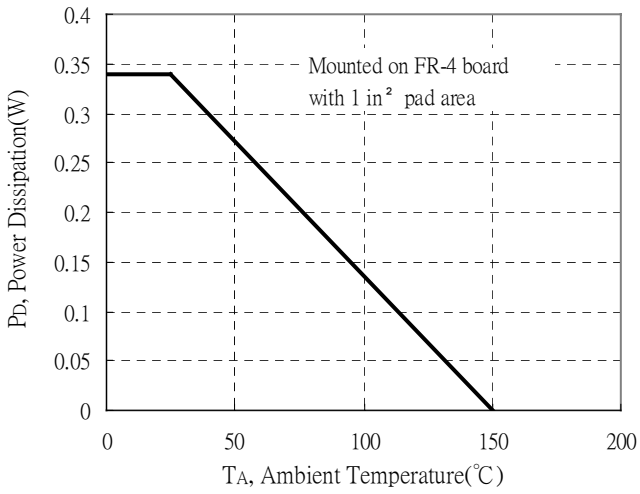


Typical Characteristics(Cont.)

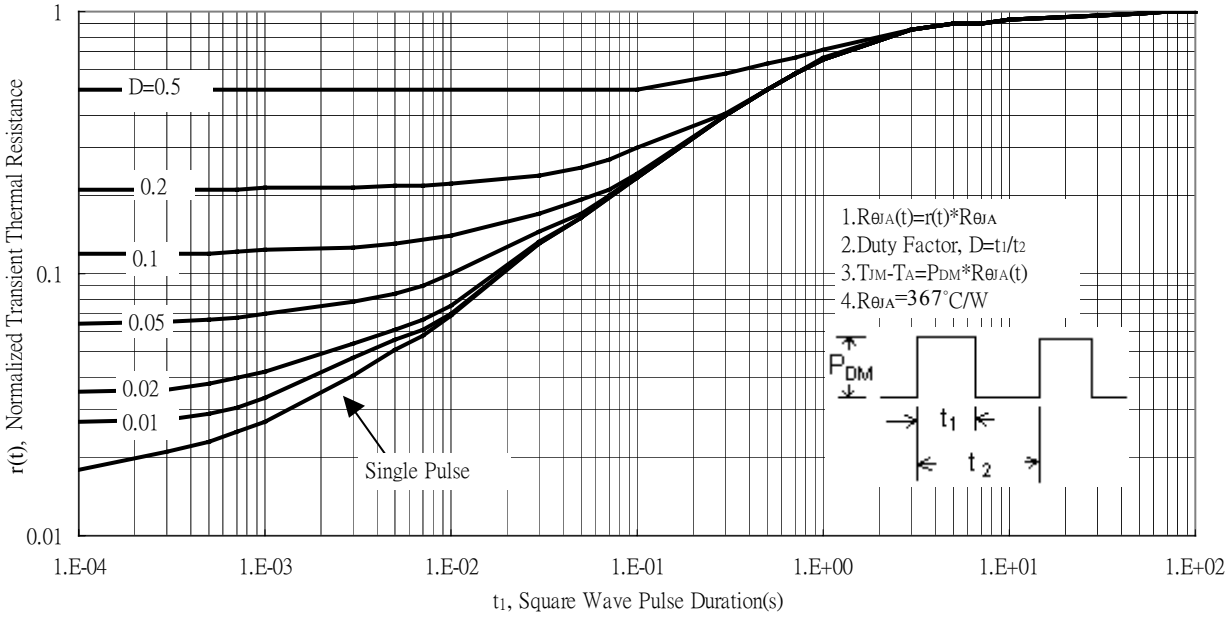
Typical Transfer Characteristics



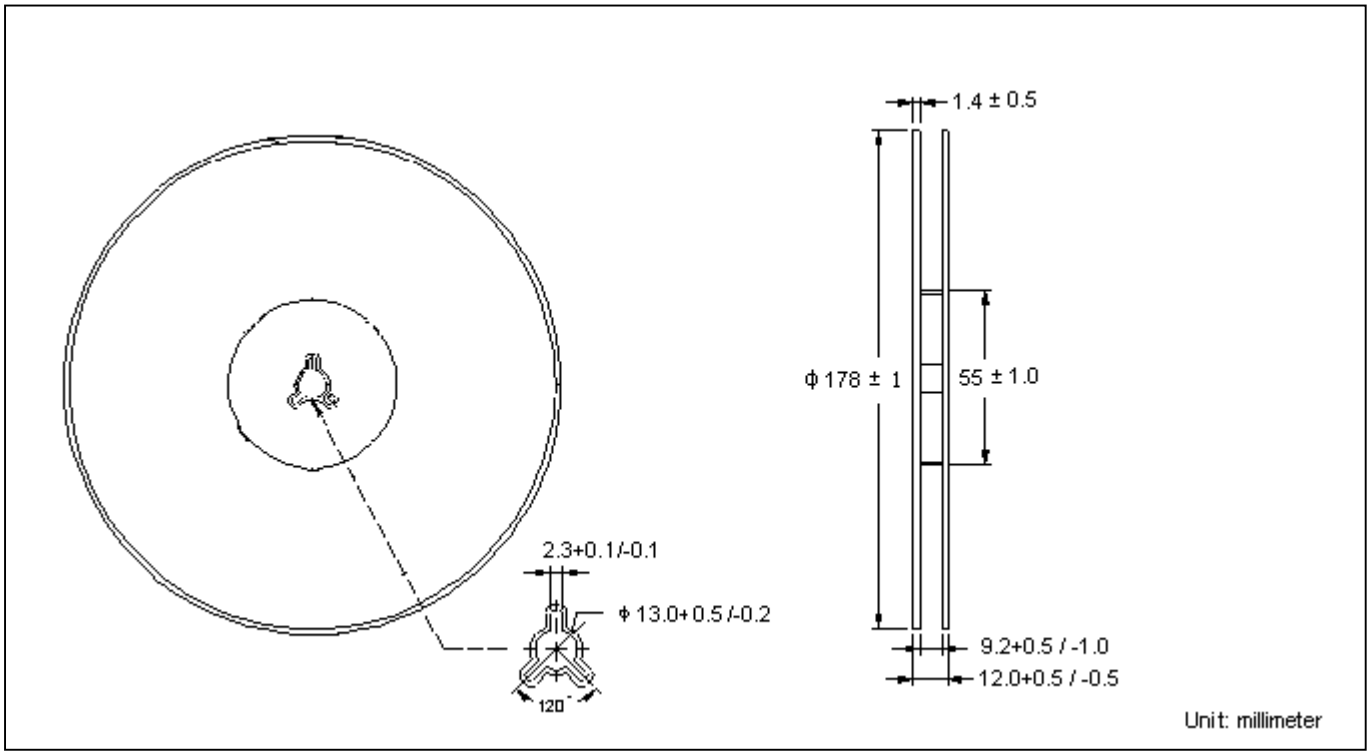
Power Derating Curve



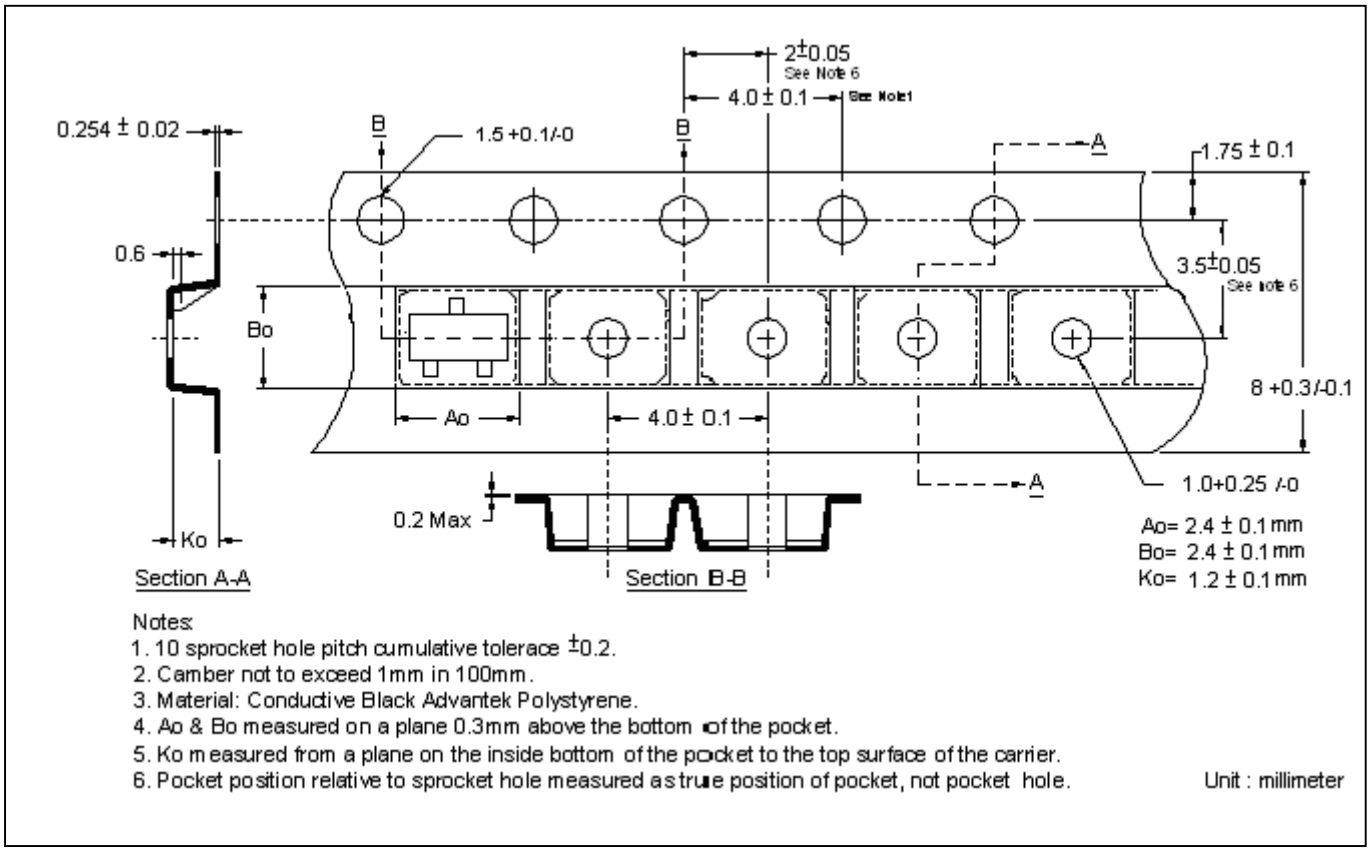
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



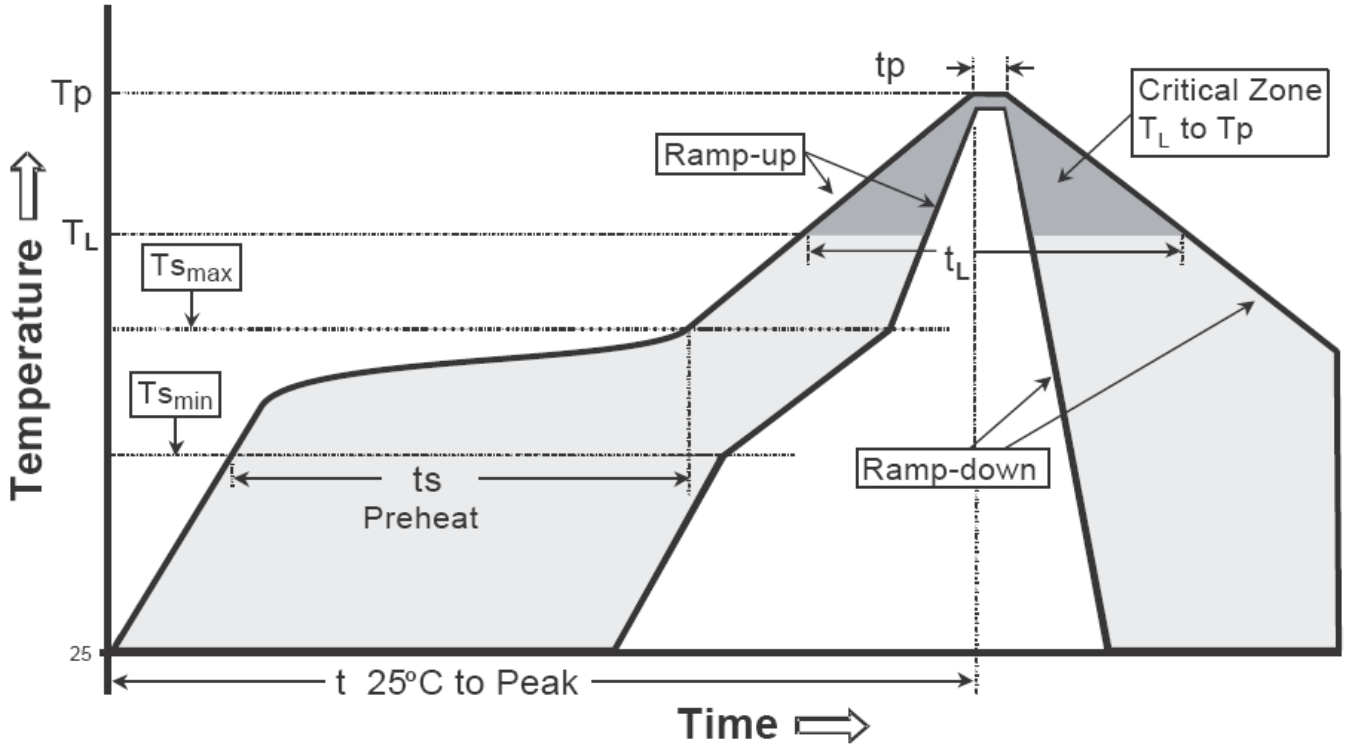
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of 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

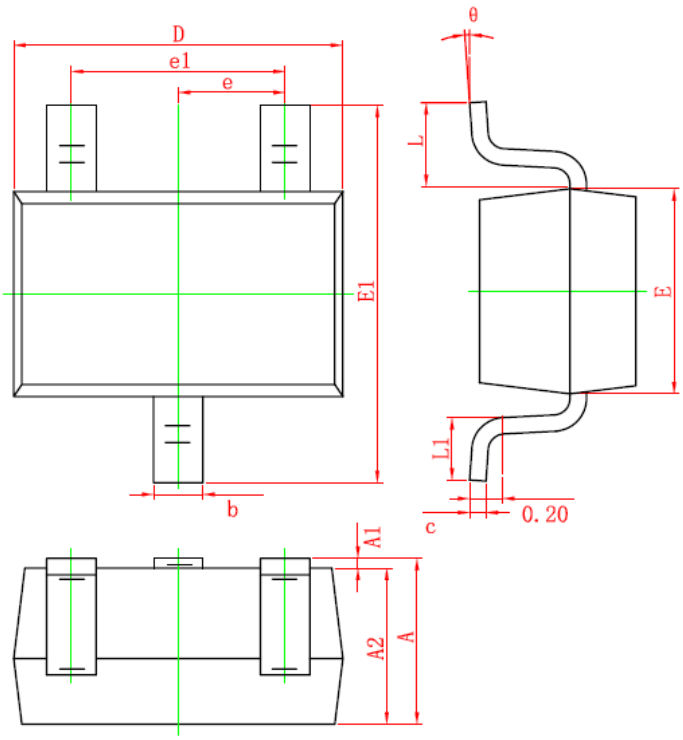
Recommended temperature profile for IR reflow

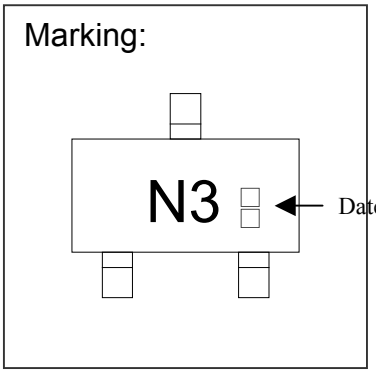


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − 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 :1. All temperatures refer to topside of the package, measured on the package body surface.
2.For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

SOT-323 Dimension





3-Lead SOT-323 Plastic
Surface Mounted Package
CYStek Package Code: S3

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

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043	E1	2.150	2.450	0.085	0.096
A1	0.000	0.100	0.000	0.004	e	0.650 TYP		0.026 TYP	
A2	0.900	1.000	0.035	0.039	e1	1.200	1.400	0.047	0.055
b	0.200	0.400	0.008	0.016	L	0.525 REF		0.021 REF	
c	0.080	0.150	0.003	0.006	L1	0.260	0.460	0.010	0.018
D	2.000	2.200	0.079	0.087	θ	0°	8°	0°	8°
E	1.150	1.350	0.045	0.053					

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.