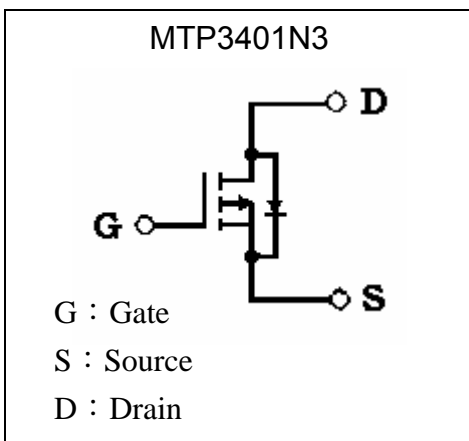
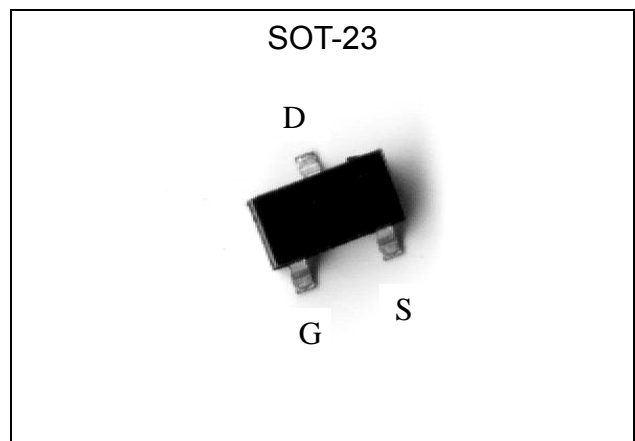


P-CHANNEL Enhancement Mode MOSFET

MTP3401N3

Features

- $V_{DS} = -30V$
 $R_{DS(ON)} = 65m\Omega @ V_{GS} = -4.5V, I_{DS} = -4A$
 $R_{DS(ON)} = 120m\Omega @ V_{GS} = -2.5V, I_{DS} = -1A$
- Advanced trench process technology
- High density cell design for ultra low on resistance
- Low gate charge
- Compact and low profile SOT-23 package
- Pb-free & Halogen-free package

Equivalent Circuit

Outline

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current @ $T_A = 25^\circ C$ (Note 1)	I_D	-4.2	A
Continuous Drain Current @ $T_A = 70^\circ C$ (Note 1)	I_D	-3.5	A
Pulsed Drain Current (Note 2)	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.38	W
Linear Derating Factor		0.01	W/°C
Operating Junction and Storage Temperature	T_j, T_{stg}	-55~+150	°C

Note : 1. Surface mounted on 1 in² copper pad of FR-4 board, 270°C/W when mounted on minimum copper pad.
 2. Pulse width limited by maximum junction temperature.



Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient	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 specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV _{DSS}	-30	-	-	V	V _{GS} =0, I _D =-250μA
V _{GS(th)}	-0.7	-	-1.3	V	V _{DS} =V _{GS} , I _D =-250μA
I _{GSS}	-	-	±100	nA	V _{GS} =±12V, V _{DS} =0
I _{DSS}	-	-	-1	μA	V _{DS} =-24V, V _{GS} =0
I _{DSS}	-	-	-5	μA	V _{DS} =-24V, V _{GS} =0, Tj=55°C
*R _{DS(ON)}	-	-	60	mΩ	I _D =-4.2A, V _{GS} =-10V
	-	-	65		I _D =-4.0A, V _{GS} =-4.5V
	-	-	120		I _D =-1.0A, V _{GS} =-2.5V
*G _{FS}	-	11	-	S	V _{DS} =-5V, I _D =-5A
Dynamic					
C _{iSS}	-	954	-	pF	V _{DS} =-15V, V _{GS} =0, f=1MHz
C _{oSS}	-	115	-		
C _{rSS}	-	77	-		
*t _{d(ON)}	-	6.3	-	ns	V _{DS} =-15V, V _{GS} =-10V, R _L =3.6Ω, R _G =6Ω
*t _r	-	3.2	-		
*t _{d(OFF)}	-	38.2	-		
*t _f	-	12	-		
*Q _g	-	9.4	-	nC	V _{DS} =-15V, I _D =-4A, V _{GS} =-4.5V,
*Q _{gs}	-	2	-		
*Q _{gd}	-	3	-		
R _g	-	6	-	Ω	f=1.0MHz
Source-Drain Diode					
*I _{SD}	-	-	-2.2	A	V _D =V _G =0, V _S =-1.0V
*V _{SD}	-	-	-1.0	V	V _{GS} =0V, I _{SD} =-1.0A
*t _{rr}	-	20.2	-	ns	I _S =-4A, V _{GS} =0V, dI/dt=100A/μs
*Q _{rr}	-	11.2	-	nC	

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

Ordering Information

Device	Package	Shipping	Marking
MTP3401N3	SOT-23 (Pb-free)	3000 pcs / Tape & Reel	3401

Characteristic Curves

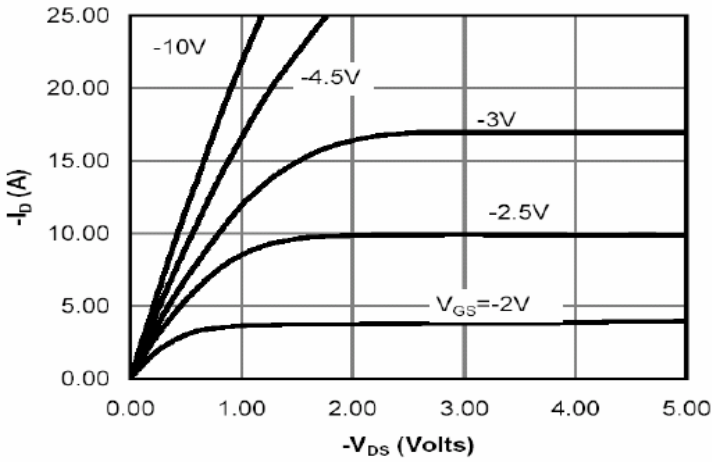


Fig 1. Typical Output Characteristics

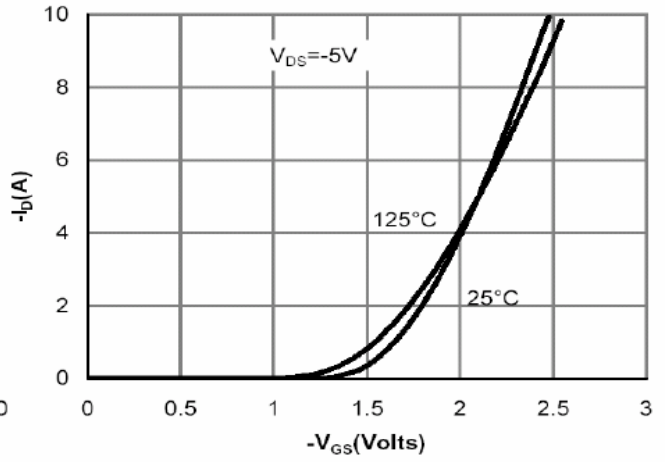


Fig 2. Transfer Characteristics

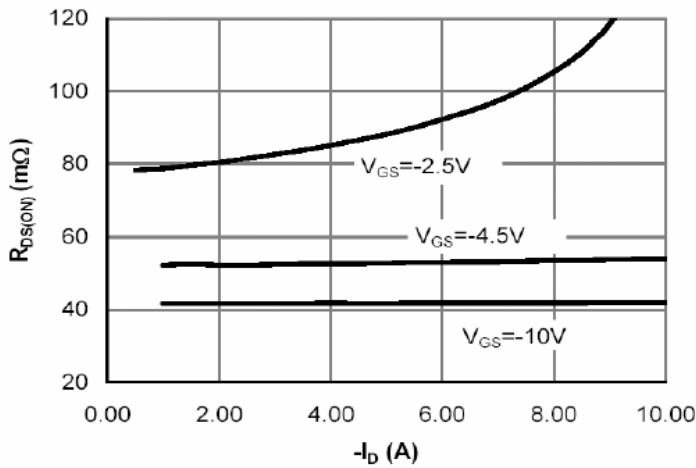


Fig 3. On-Resistance v.s. Drain Current and Gate Voltage

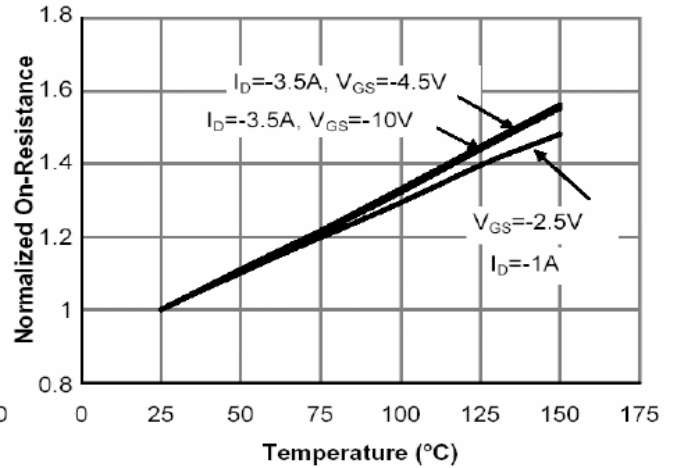


Fig 4. On-Resistance v.s. Junction Temperature

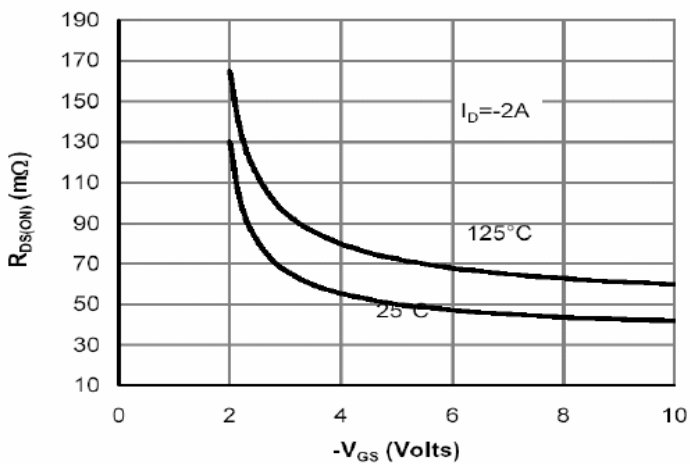


Fig 5. On-Resistance v.s. Gate-Source Voltage

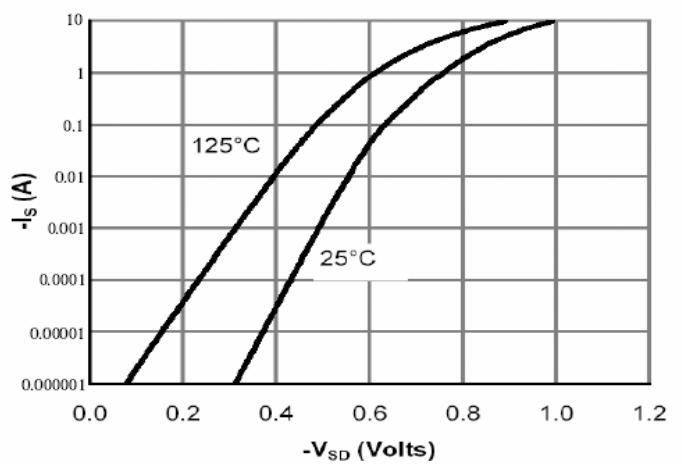


Fig 6. Body Diode Characteristics

Characteristic Curves(Cont.)

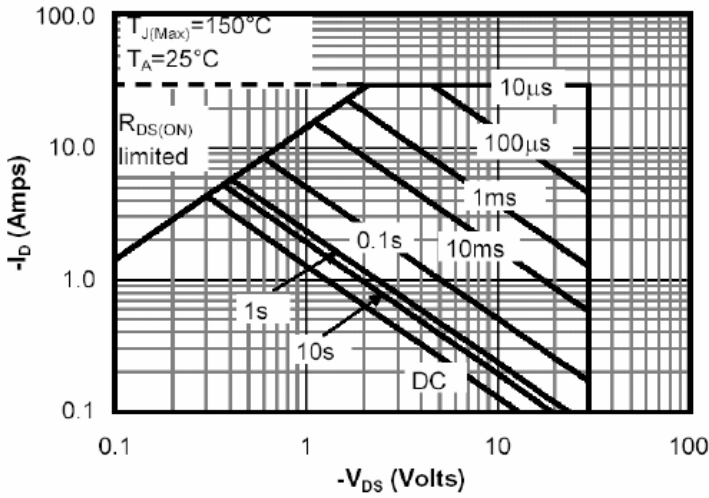


Fig 7. Maximum Safe Operating Area

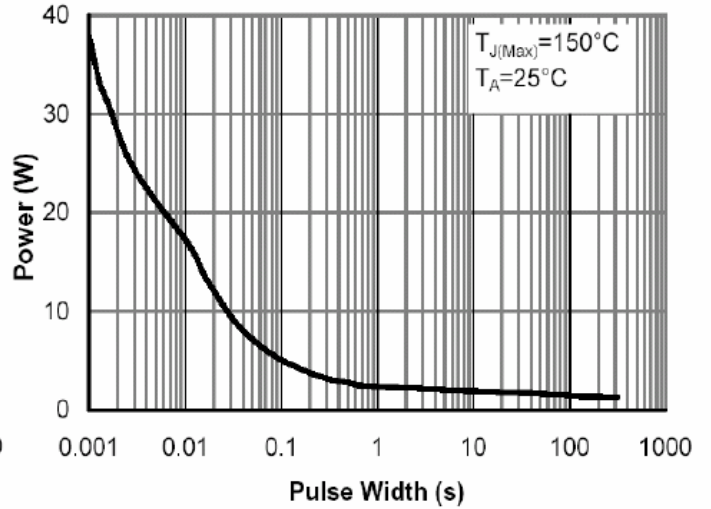


Fig 8. Single Pulse Power Rating Junction-to-Ambient

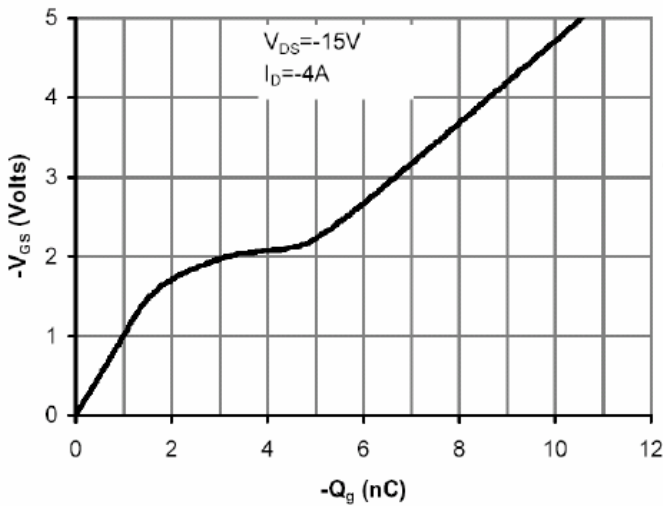


Fig 9. Gate Charge Characteristics

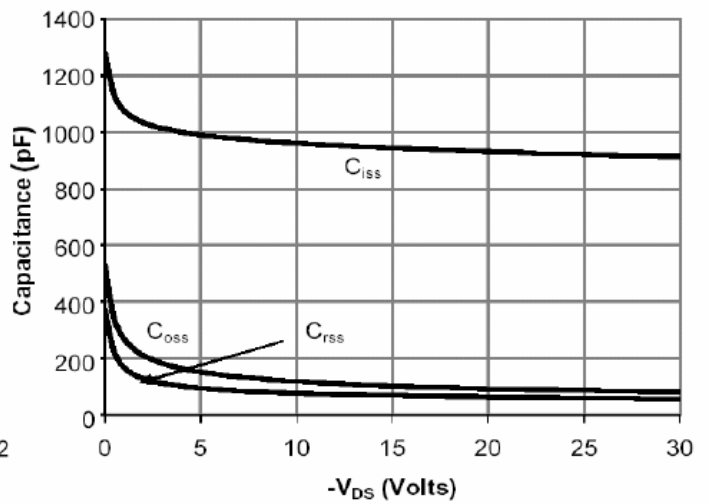


Fig 10. Typical Capacitance Characteristics

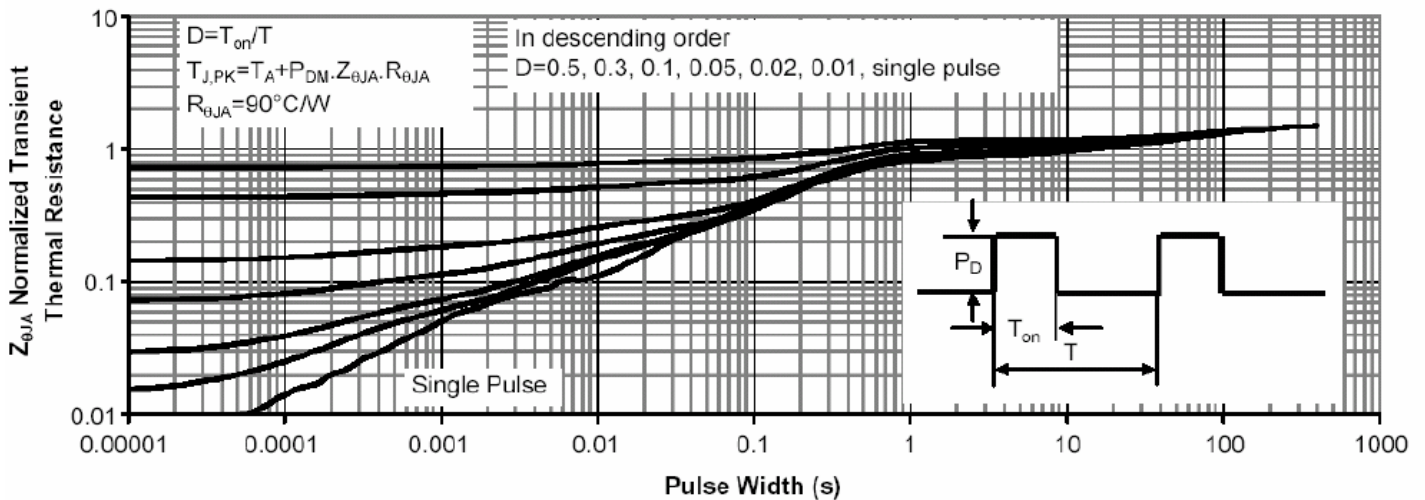


Fig 11. Normalized Maximum Transient Thermal Impedance



Characteristic Curves(Cont.)

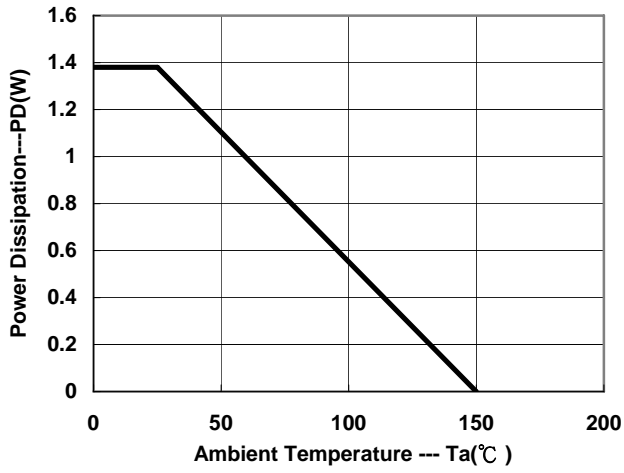
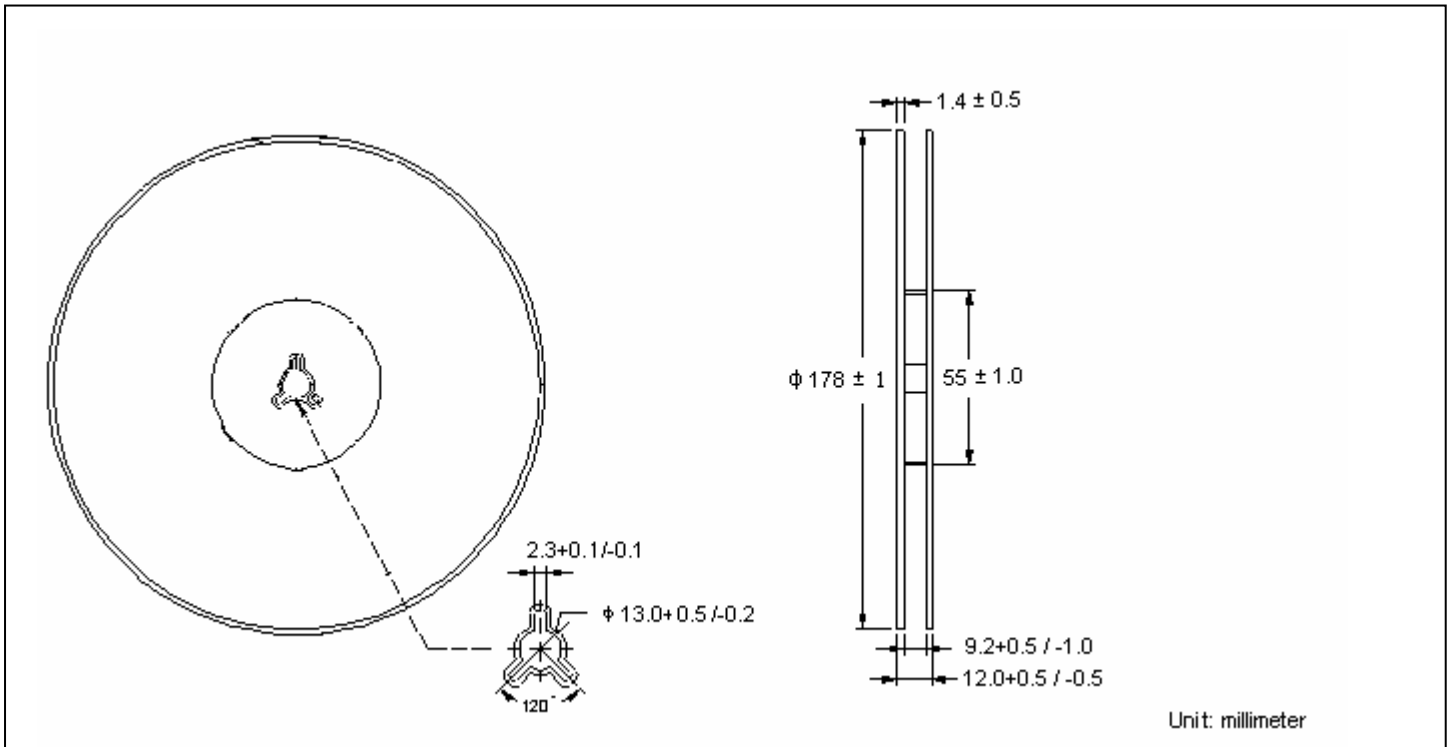
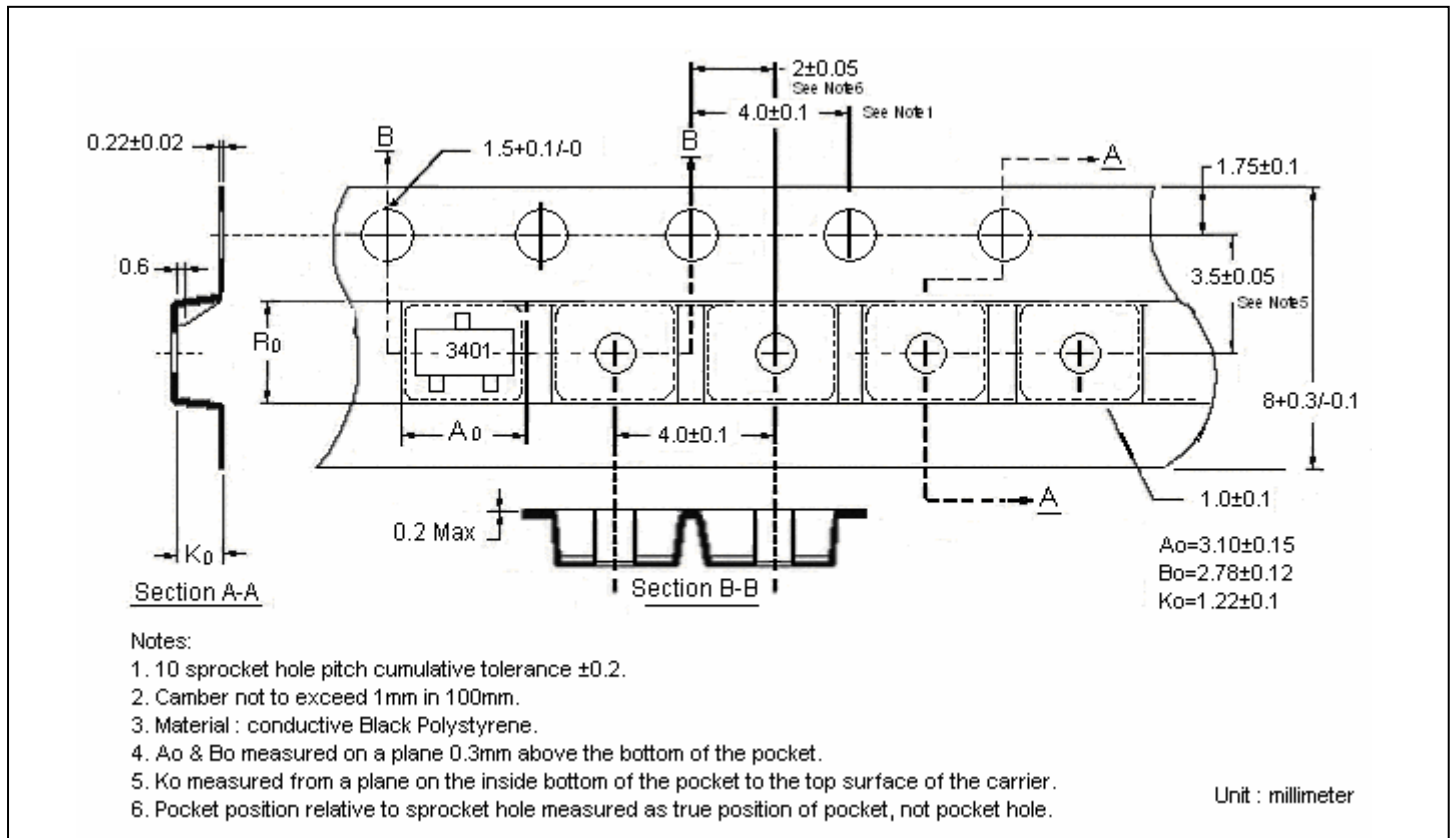


Fig. 12 Power Derating Curve

Reel Dimension



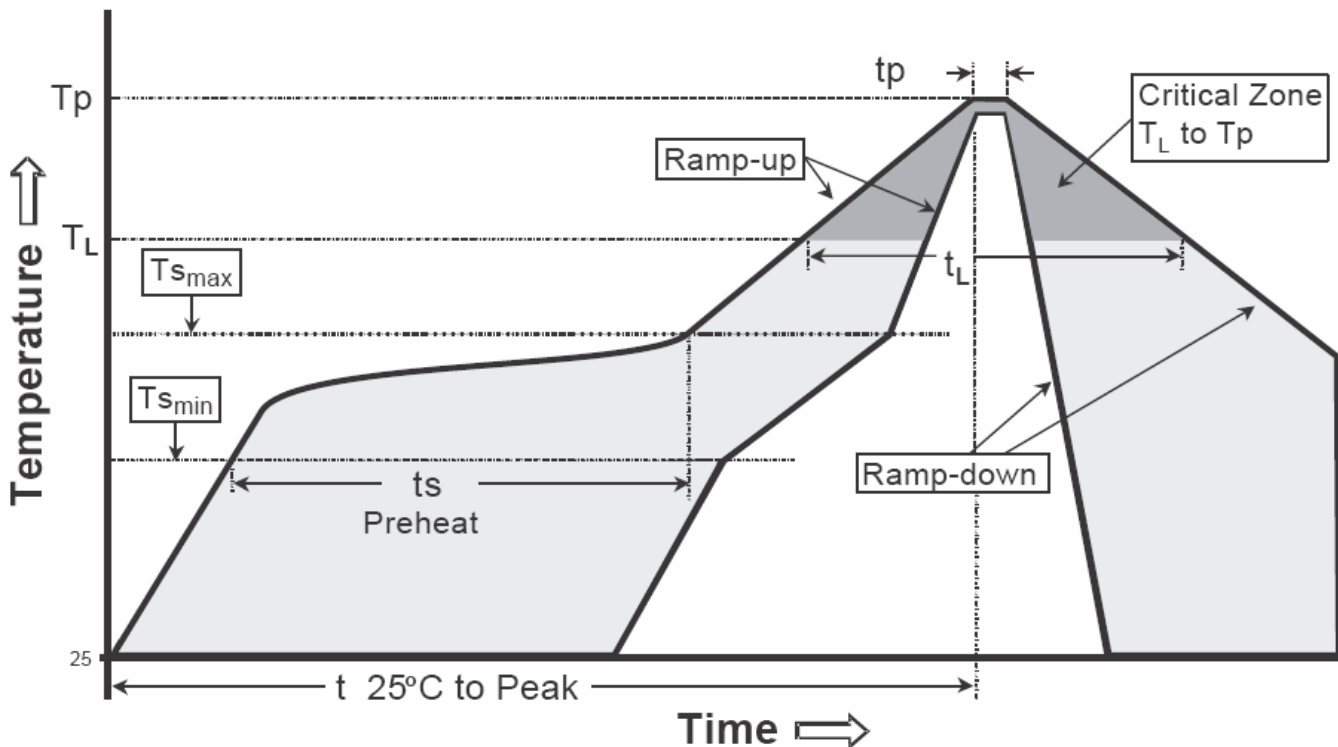
Carrier Tape Dimension



Recommended wave soldering condition

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

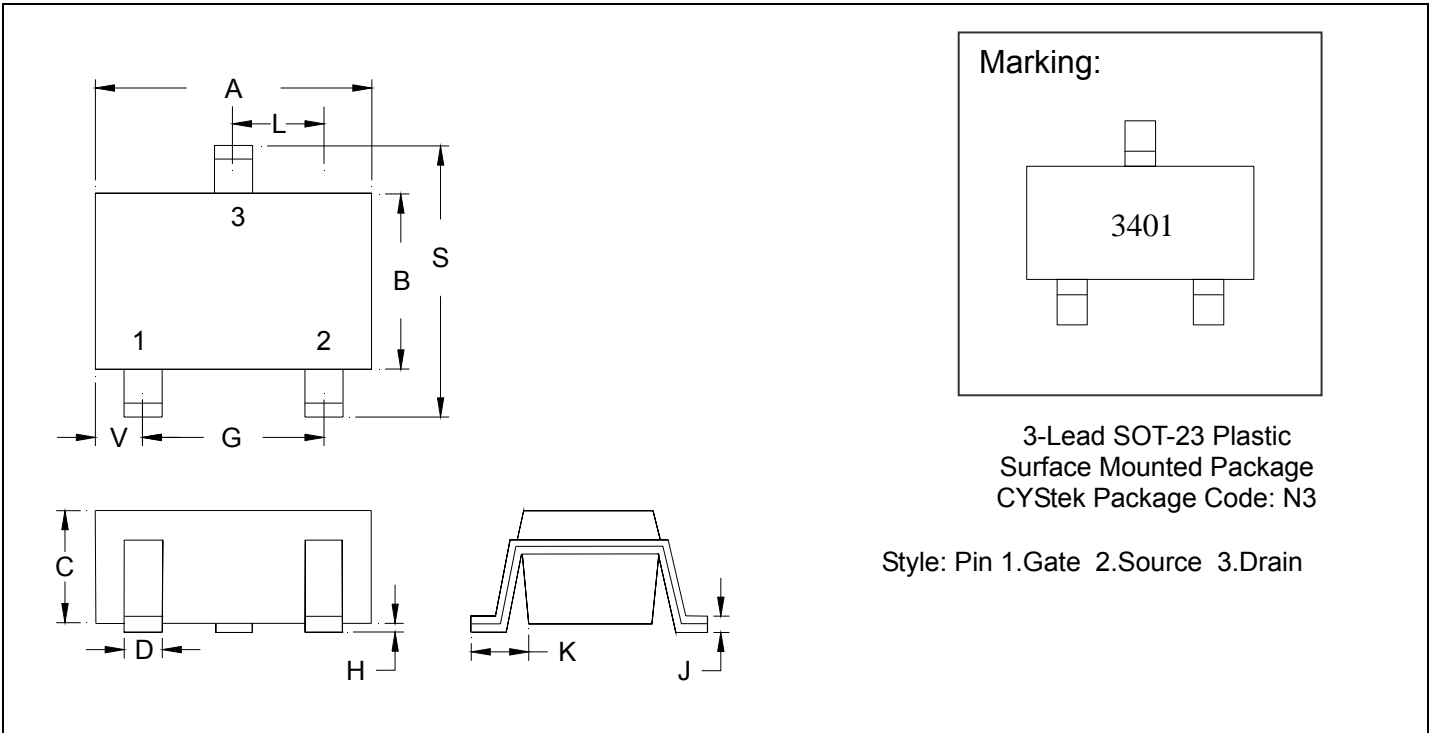
Recommended temperature profile for IR reflow



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_{smin})	100°C	150°C
-Temperature Max(T_{smax})	150°C	200°C
-Time(t_{smin} to t_{smax})	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



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0034	0.0070	0.085	0.177
B	0.0472	0.0630	1.20	1.60	K	0.0128	0.0266	0.32	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1083	2.10	2.75
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0005	0.0040	0.013	0.10					

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: 42 Alloy ; pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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