

P-CHANNEL ENHANCEMENT MODE POWER MOSFET

MTP2603N6

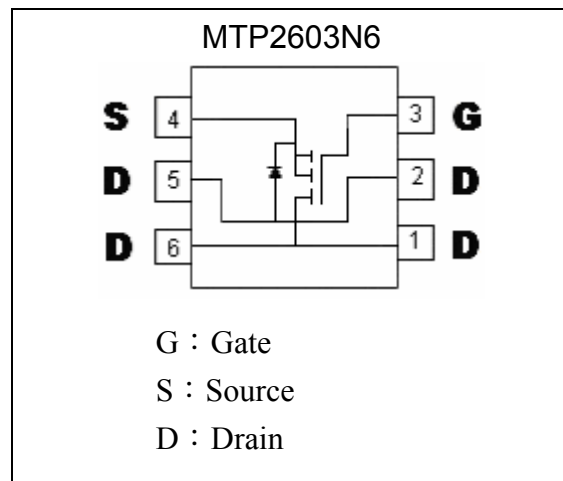
Description

The MTP2603N6 is a P-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The SOT-26 package is universally preferred for all commercial-industrial surface mount applications.

Features

- Simple drive requirement
- Low on-resistance
- Small package outline
- Pb-free lead plating package

Equivalent Circuit



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V _{DS}	-20	V
Gate-Source Voltage	V _{GS}	±8	V
Continuous Drain Current @T _A =25 °C (Note 1)	I _D	-5	A
Continuous Drain Current @T _A =70 °C (Note 1)	I _D	-4	A
Pulsed Drain Current (Note 2, 3)	I _{DM}	-20	A
Total Power Dissipation @ T _A =25 °C Linear Derating Factor	P _d	2	W
		0.016	W / °C
Operating Junction Temperature and Storage Temperature Range	T _j , T _{stg}	-55~+150	°C
Thermal Resistance, Junction-to-Ambient (Note 1)	R _{th,ja}	62.5	°C/W

Note : 1.Surface mounted on 1 in² copper pad of FR-4 board. 156°C/W when mounted on minimum copper pad.

2.Pulse width limited by maximum junction temperature.

3.Pulse Width ≤300μs, Duty Cycle≤2%



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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{DSS}	-20	-	-	V	V _{GS} =0, I _D =-250μA
ΔBV _{DSS} /ΔT _j	-	-0.1	-	V/°C	Reference to 25°C, I _D =-1mA
V _{GS(th)}	-0.5	-	-1.2	V	V _{DS} =V _{GS} , I _D =-250μA
I _{GSS}	-	-	±100	nA	V _{GS} =±8V, V _{DS} =0
I _{DSS}	-	-	-1	μA	V _{DS} =-20V, V _{GS} =0, T _j =25°C
I _{DSS}	-	-	-10	μA	V _{DS} =-16V, V _{GS} =0, T _j =55°C
*R _{DS(ON)}	-	-	53	mΩ	I _D =-4.5A, V _{GS} =-10V
	-	-	65		I _D =-4.2A, V _{GS} =-4.5V
	-	-	120		I _D =-2.0A, V _{GS} =-2.5V
	-	-	250		I _D =-1.0A, V _{GS} =-1.8V
*G _{FS}	-	9	-	S	V _{DS} =-5V, I _D =-2.8A
C _{iss}	-	740	1200	pF	V _{DS} =-15V, V _{GS} =0, f=1MHz
C _{oss}	-	167	-		
C _{rss}	-	126	-		
t _{d(ON)}	-	5.9	-	ns	V _{DS} =-15V, I _D =-4.2A, V _{GS} =-10V, R _G =6Ω, R _D =3.6Ω
t _r	-	3.6	-		
t _{d(OFF)}	-	32.4	-		
t _f	-	2.6	-		
Q _g	-	10.6	16	nC	V _{DS} =-16V, I _D =-4.2A, V _{GS} =-4.5V,
Q _{gs}	-	2.32	-		
Q _{gd}	-	3.68	-		

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

Source Drain Diode

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
*V _{SD}	-	-	-1.2	V	I _S =-1.2A, V _{GS} =0V
*T _{rr}	-	27.7	-	ns	I _S =-4.2A, V _{GS} =0V, dI/dt=100A/μs
Q _{rr}	-	22	-	nC	

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

Ordering Information

Device	Package	Shipping	Marking
MTP2603N6	SOT-26 (Pb-free lead plating package)	3000 pcs / Tape & Reel	2603

Characteristic Curves

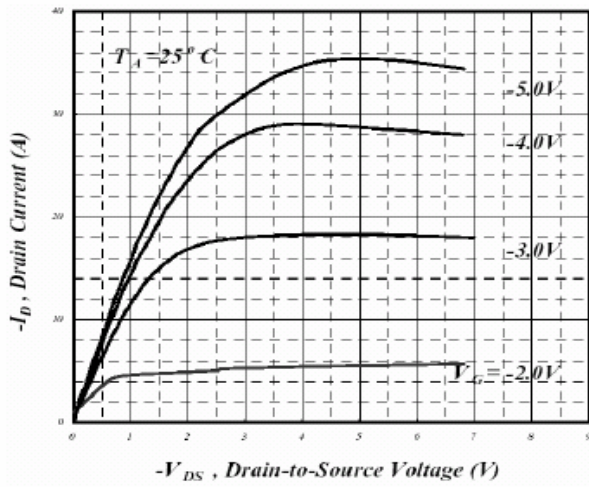


Fig 1. Typical Output Characteristics

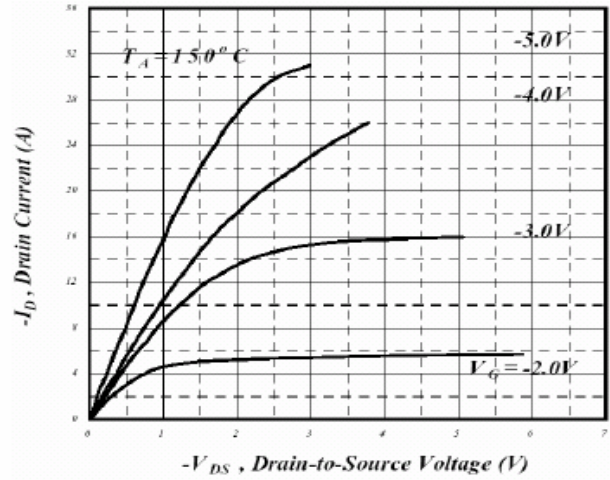


Fig 2. Typical Output Characteristics

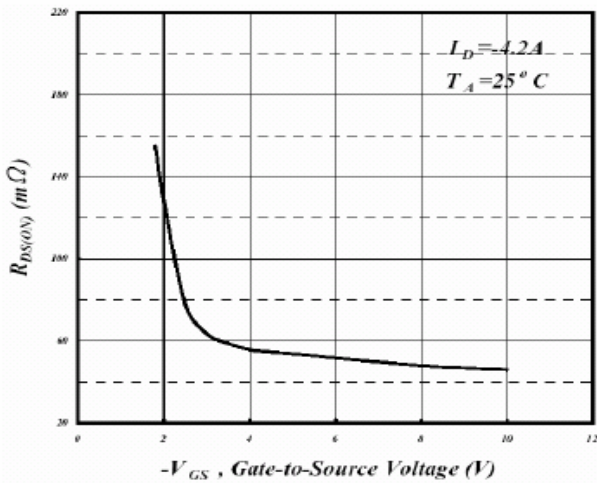


Fig 3. On-Resistance v.s. Gate Voltage

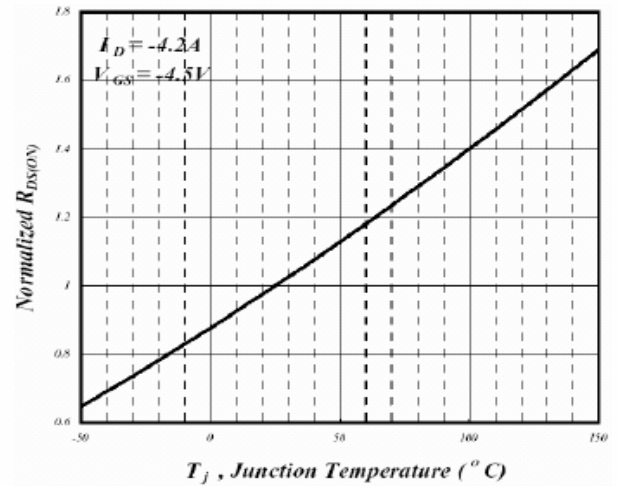


Fig 4. Normalized On-Resistance v.s. Junction Temperature

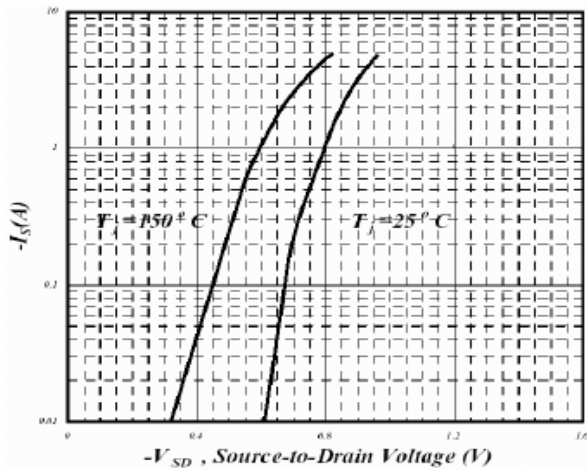


Fig 5. Forward Characteristics of Reverse Diode

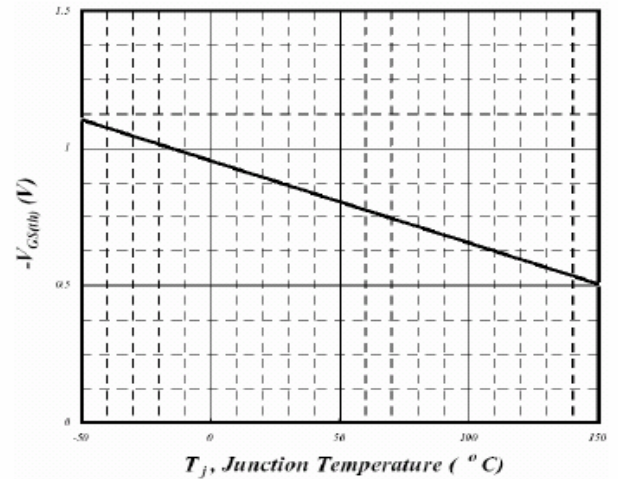


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

Characteristic Curves(Cont.)

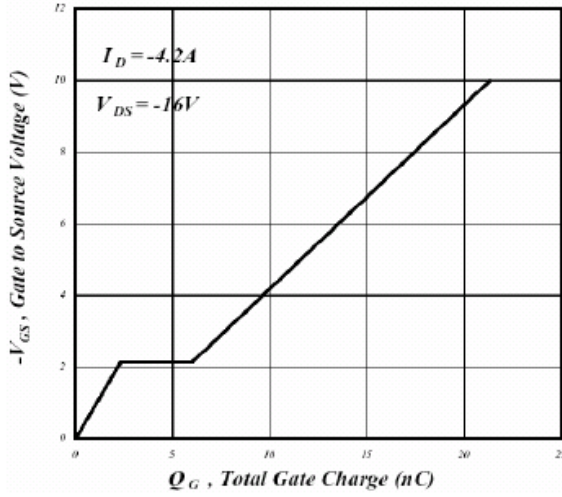


Fig 7. Gate Charge Characteristics

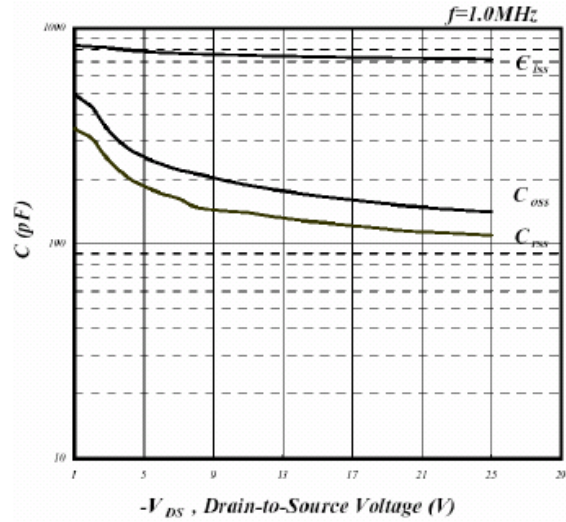


Fig 8. Typical Capacitance Characteristics

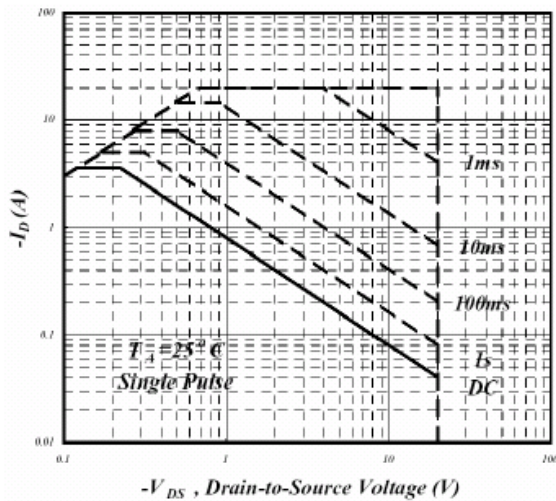


Fig 9. Maximum Safe Operating Area

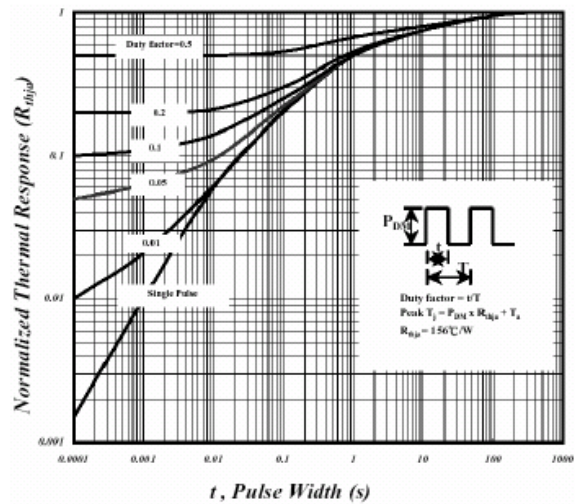


Fig 10. Effective Transient Thermal Impedance

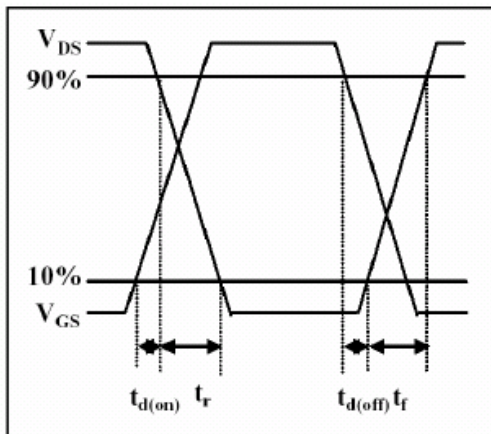


Fig 11. Switching Time Waveform

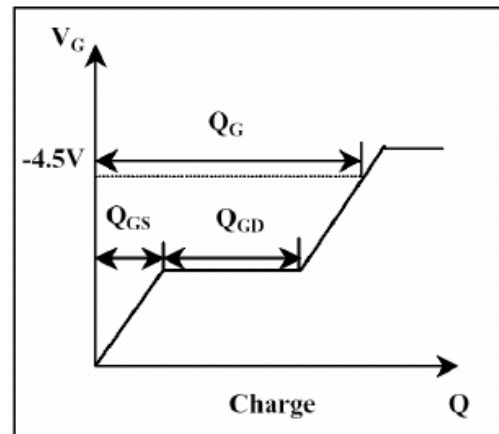
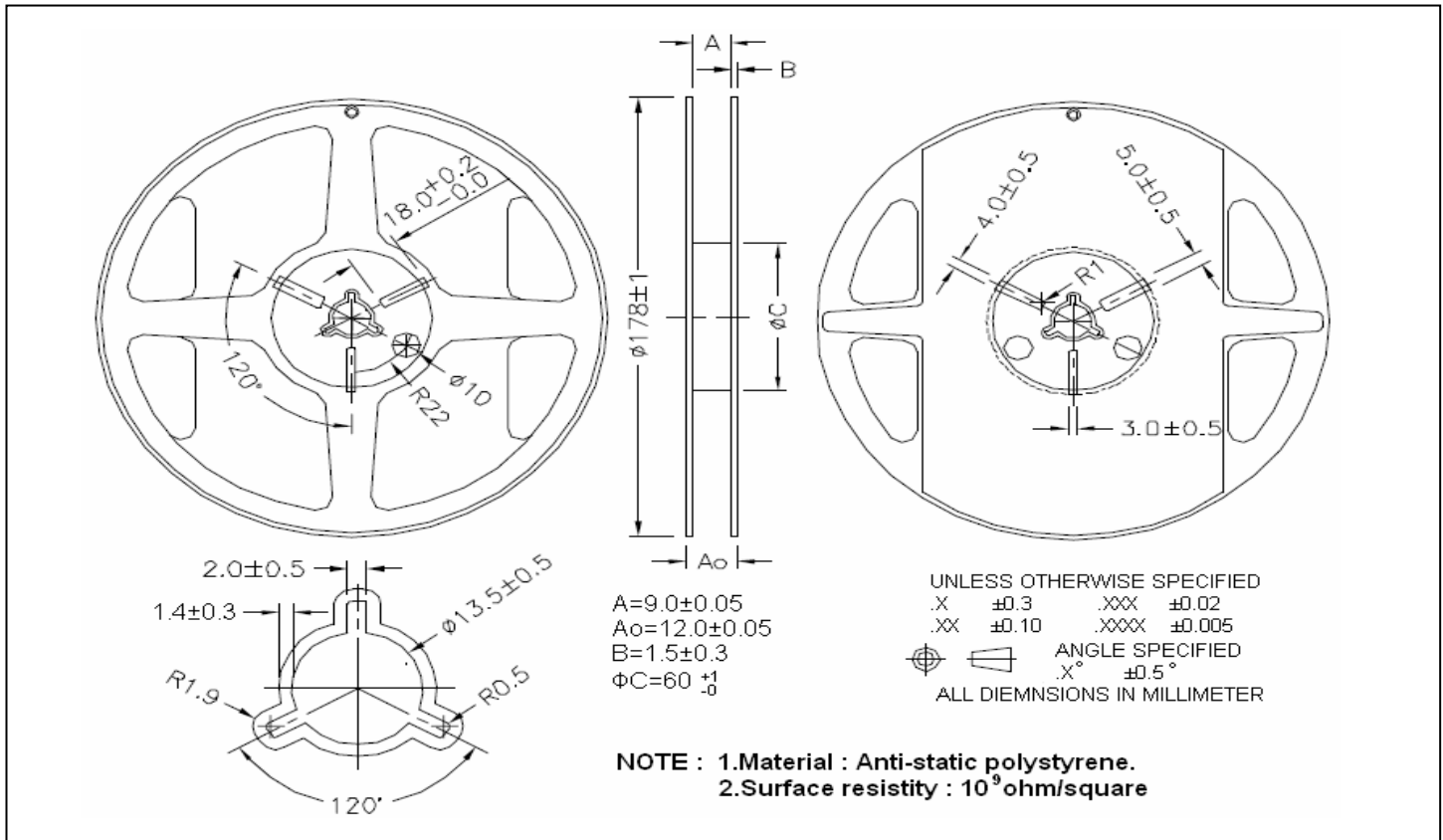
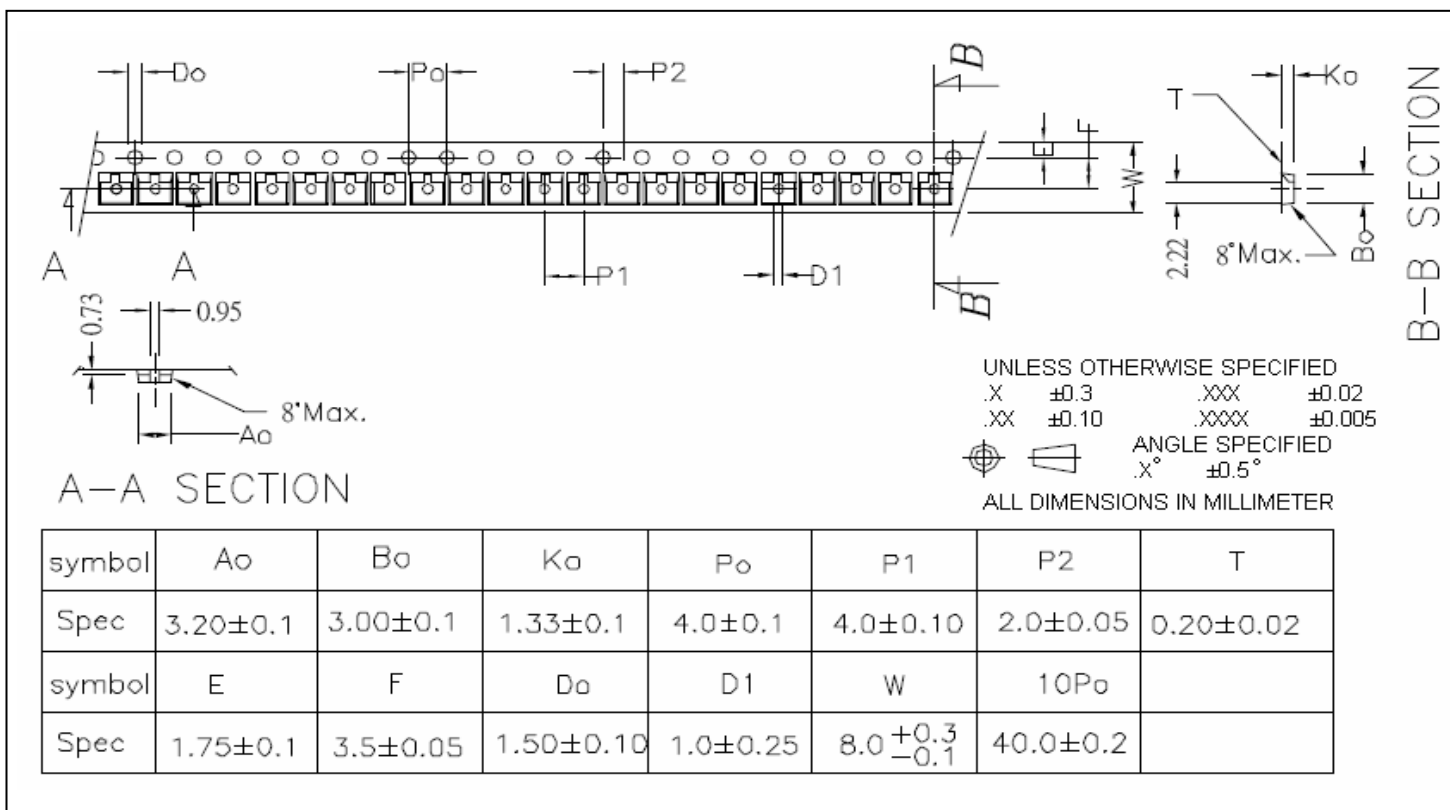


Fig 12. Gate Charge Waveform

Reel Dimension



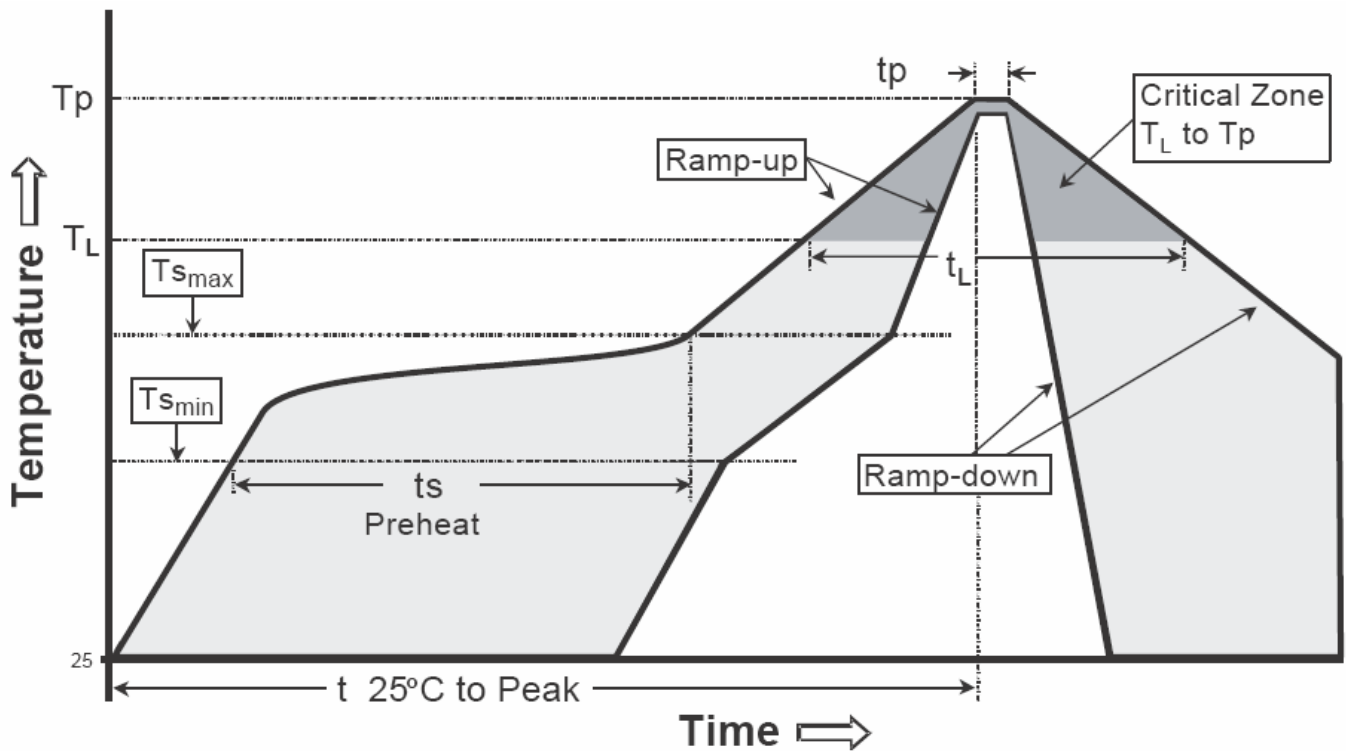
Carrier Tape Dimension



Recommended wave soldering condition

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

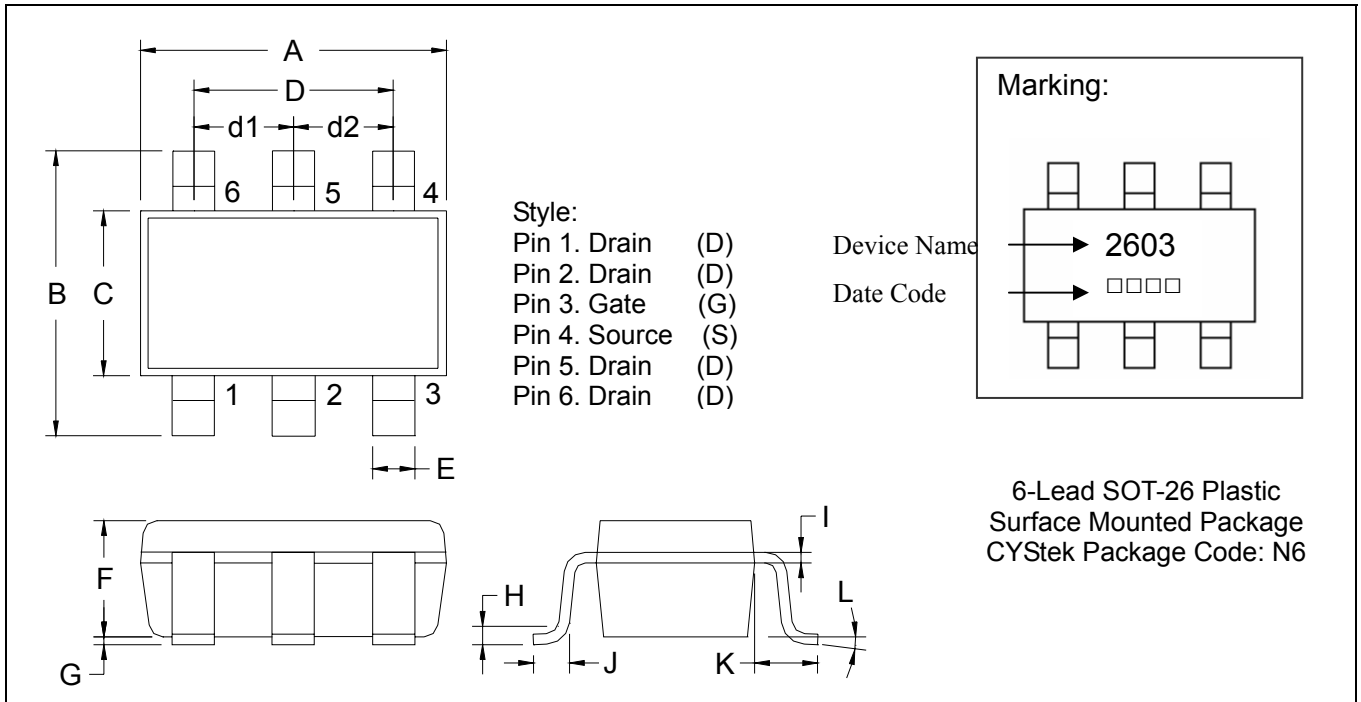
Recommended temperature profile for IR reflow



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(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-26 Dimension



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1063	0.1220	2.70	3.10	F	0.0472 REF		1.20 REF	
B	0.1024	0.1181	2.60	3.00	G	0	0.0039	0	0.10
C	0.0551	0.0709	1.40	1.80	H	-	0.0079	-	0.20
D	0.0748 REF		1.90 REF		I	0.0047 REF		0.12 REF	
d1	0.0374 REF		0.95 REF		J	0.0146 REF		0.37 REF	
d2	0.0374 REF		0.95 REF		K	0.0236 REF		0.60 REF	
E	0.0118	0.0217	0.30	0.55	L	0°	10°	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 : 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.