N-Channel Enhancement Mode Power MOSFET

MTN4N01Q8

BV_{DSS}	20V
$R_{DSON(MAX)}$	30mΩ
I_D	6A

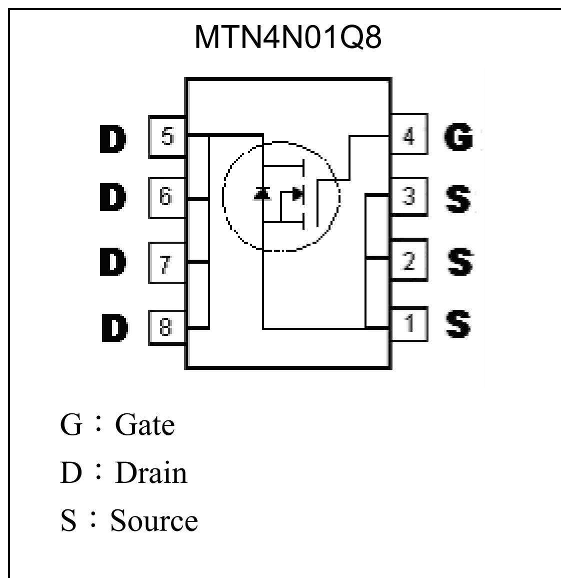
Description

The MTN4N01Q8 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

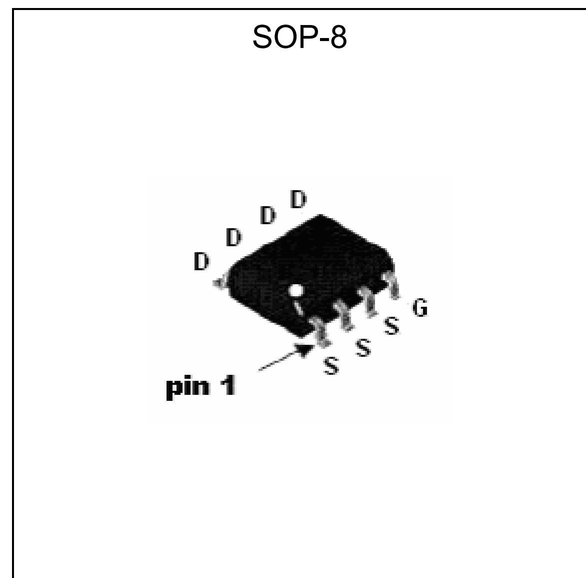
Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Low voltage drive (2.5V)
- Pb-free lead plating package

Symbol



Outline



Ordering Information

Device	Package	Shipping
MTP4N01Q8	SOP-8 (Pb-free lead plating package)	3000 pcs / Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Continuous Drain Current @ T_A=25°C, V_{GS}=4.5V	I_D	6 *1	A
Continuous Drain Current @ T_A=70°C, V_{GS}=4.5V	I_D	4.8 *1	A
Pulsed Drain Current	I_{DM}	20 *2	A
Total Power Dissipation	P_D	2.5	W
Linear Derating Factor		0.02	W/°C
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	50 *1	°C/W
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+150	°C

Note : 1. Surface mounted on 1 in² copper pad of FR-4 board, 125°C/W when mounted on minimum copper pad.
2. Pulse width limited by maximum junction temperature.

Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	20	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	0.6	-	1.2	V	V_{DS} = V_{GS}, I_D=250μA
G_{FS}	-	10	-	S	V_{DS} =2.5V, I_D=2A
I_{GSS}	-	-	±100	nA	V_{GS}=±10
I_{DSS}	-	-	1	μA	V_{DS} =20V, V_{GS} =0
I_{DSS}	-	-	25	μA	V_{DS} =16V, V_{GS} =0, Tj=70°C
*$R_{DS(ON)}$	-	-	30	mΩ	V_{GS} =4.5V, I_D=4.2A
	-	-	40	mΩ	V_{GS} =2.5V, I_D=2A
Dynamic					
*Qg	-	11	16	nC	I_D=4.2A, V_{DS}=12V, V_{GS}=4.5V
*Qgs	-	2	-		
*Qgd	-	3	-		
*$t_{d(ON)}$	-	13	-	ns	V_{DS}=12V, I_D=4.2A, V_{GS}=4.5V, R_G=2.3Ω
*t_r	-	35	-		
*$t_{d(OFF)}$	-	45	-		
*t_f	-	50	-		
Ciss	-	870	1200	pF	V_{GS}=0V, V_{DS}=10V, f=1MHz
Coss	-	260	-		
Crss	-	60	-		
Source-Drain Diode					
*V_{SD}	-	-	1.2	V	I_S=1.7A, V_{GS}=0V

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

Characteristic Curves

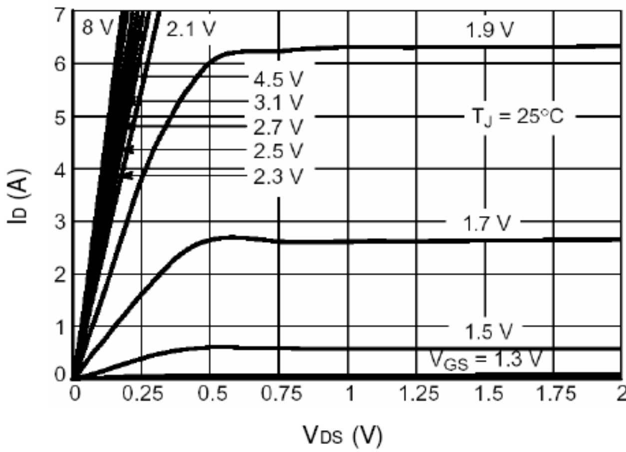


Fig 1. Typical Output Characteristics

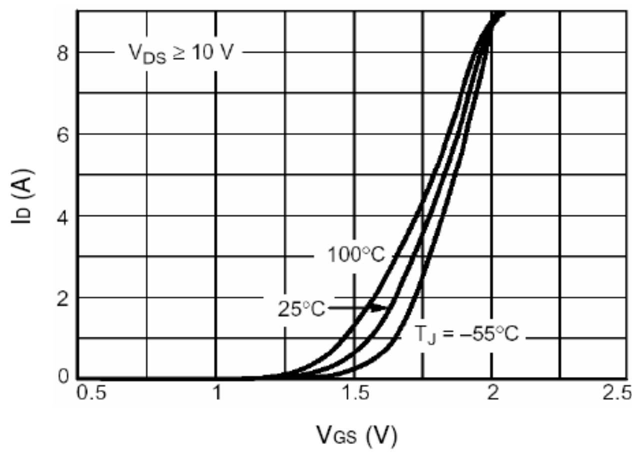


Fig 2. Transfer Characteristics

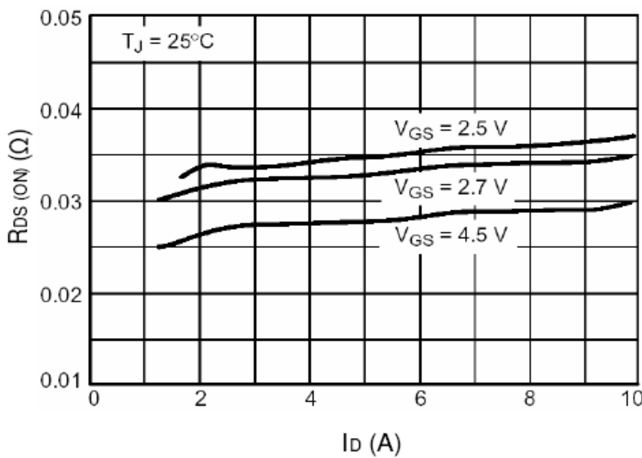


Fig 3. On-Resistance v.s. Drain Current and Gate Voltage

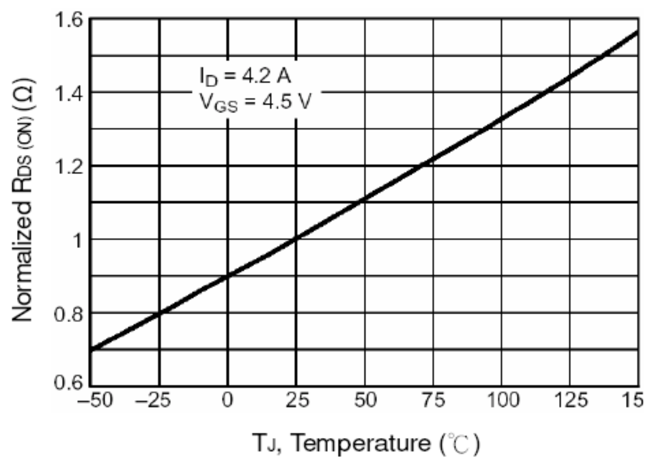


Fig 4. On-Resistance v.s. Junction Temperature

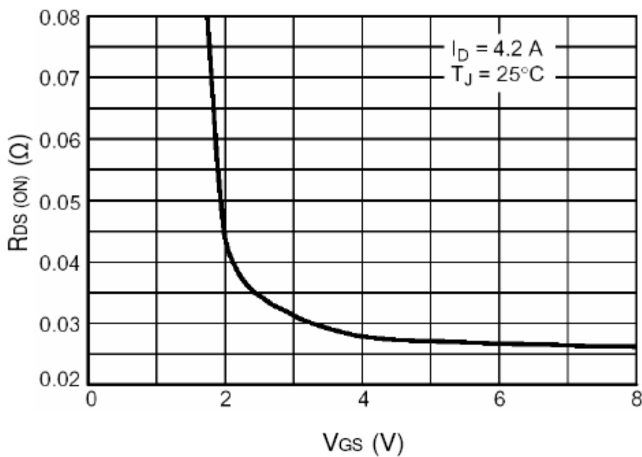


Fig 5. On-Resistance v.s. Gate-Source Voltage

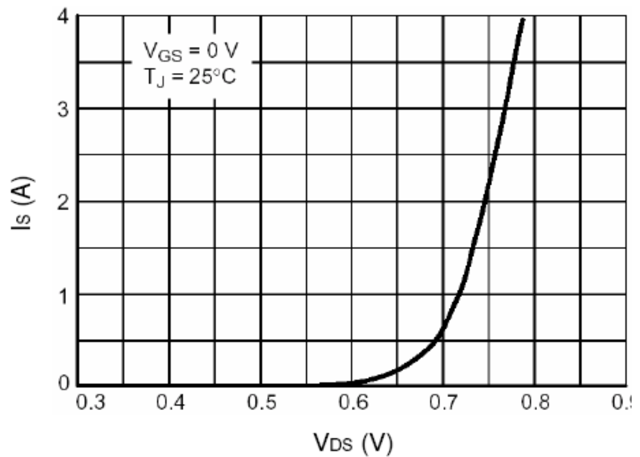


Fig 6. Body Diode Characteristics

Characteristic Curves(Cont.)

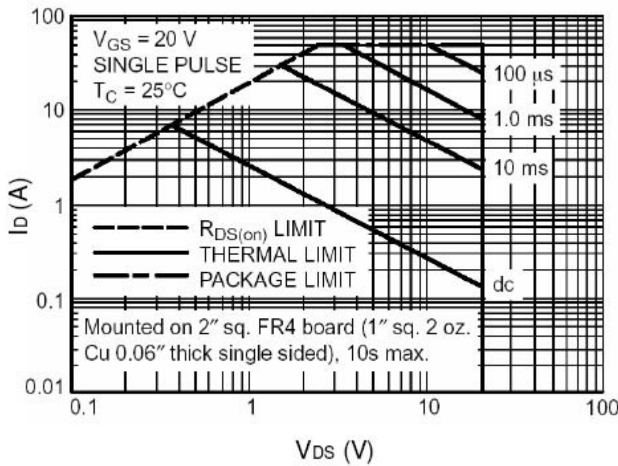


Fig 7. Maximum Safe Operating Area

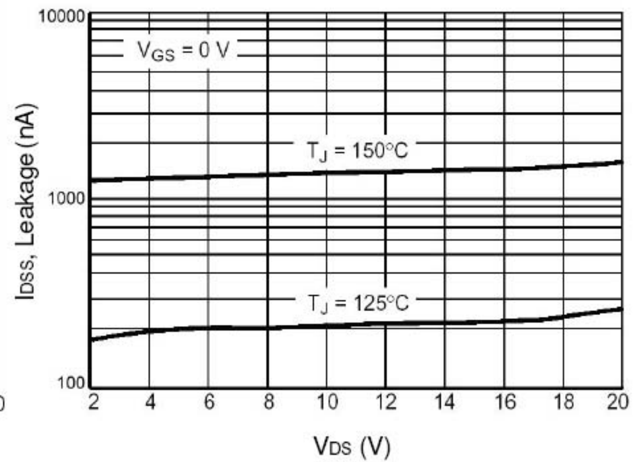


Fig 8. Drain-Source Leakage Current v.s. Voltage

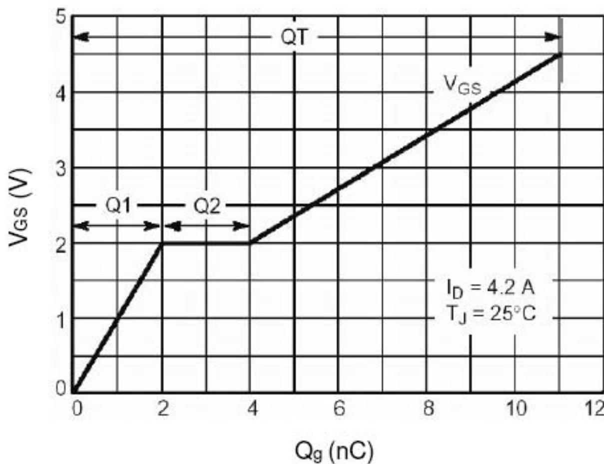


Fig 9. Gate Charge Characteristics

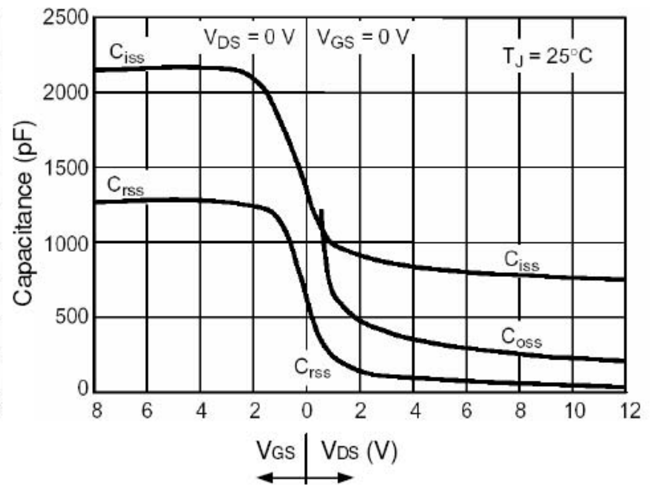


Fig 10. Typical Capacitance Characteristics

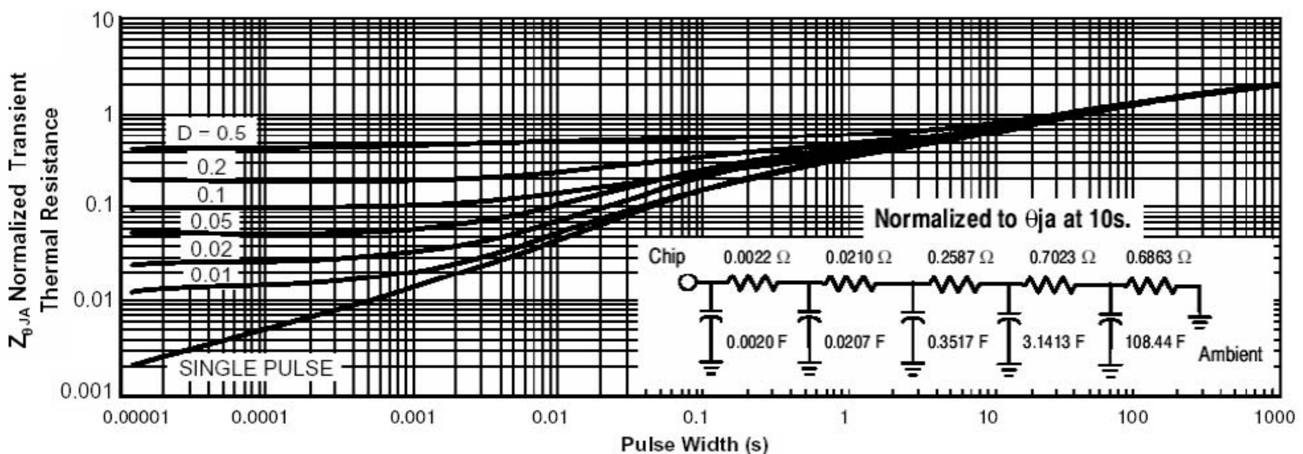
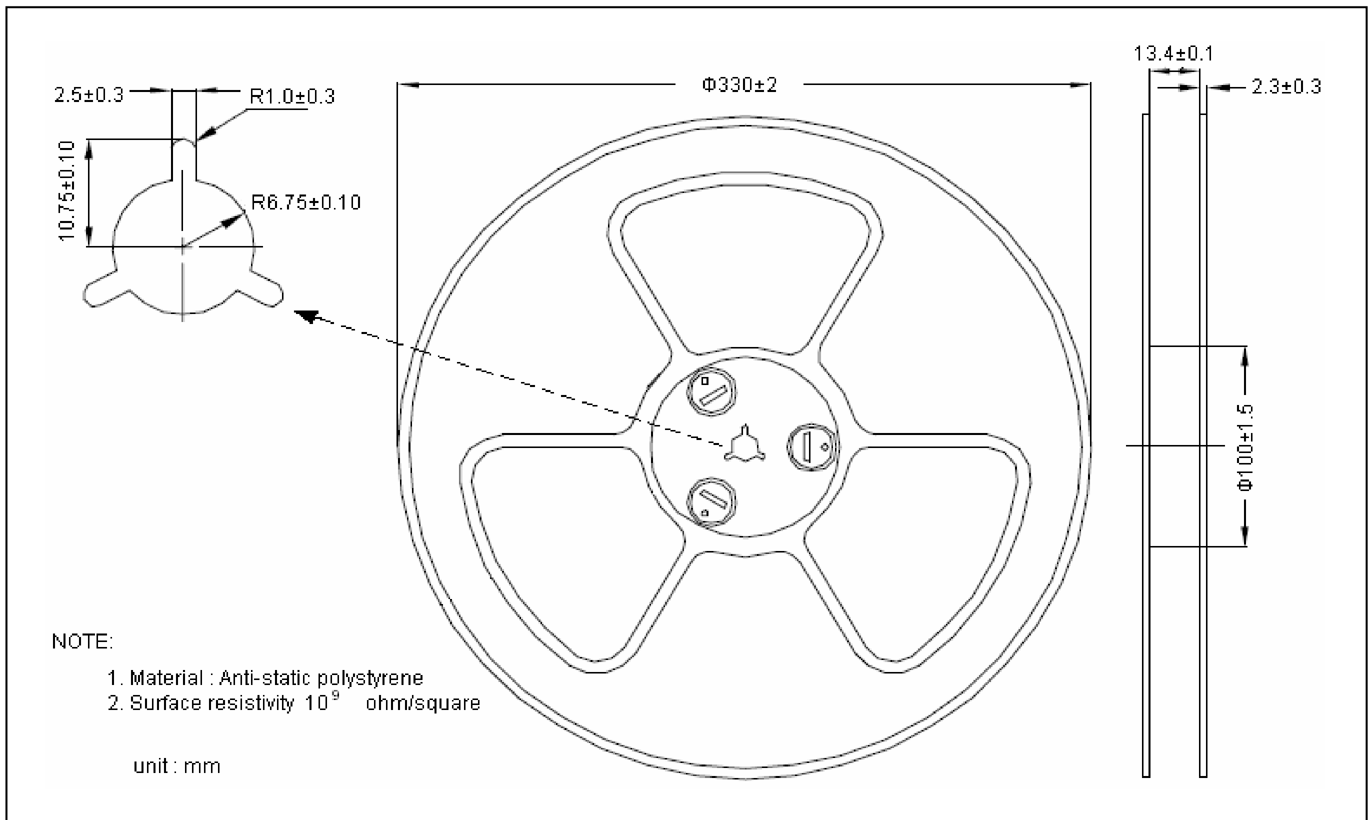
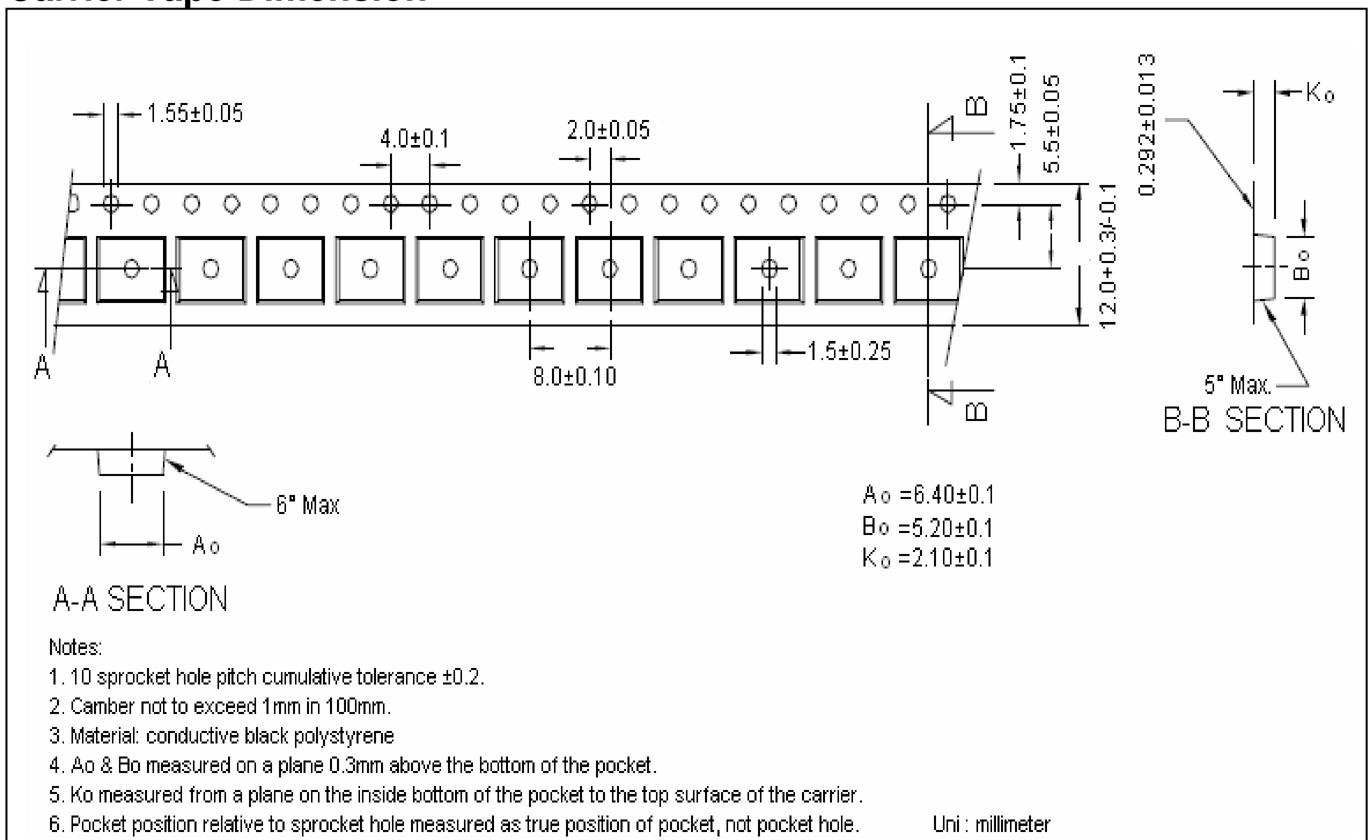


Fig 11. Normalized Maximum Transient Thermal Impedance

Reel Dimension



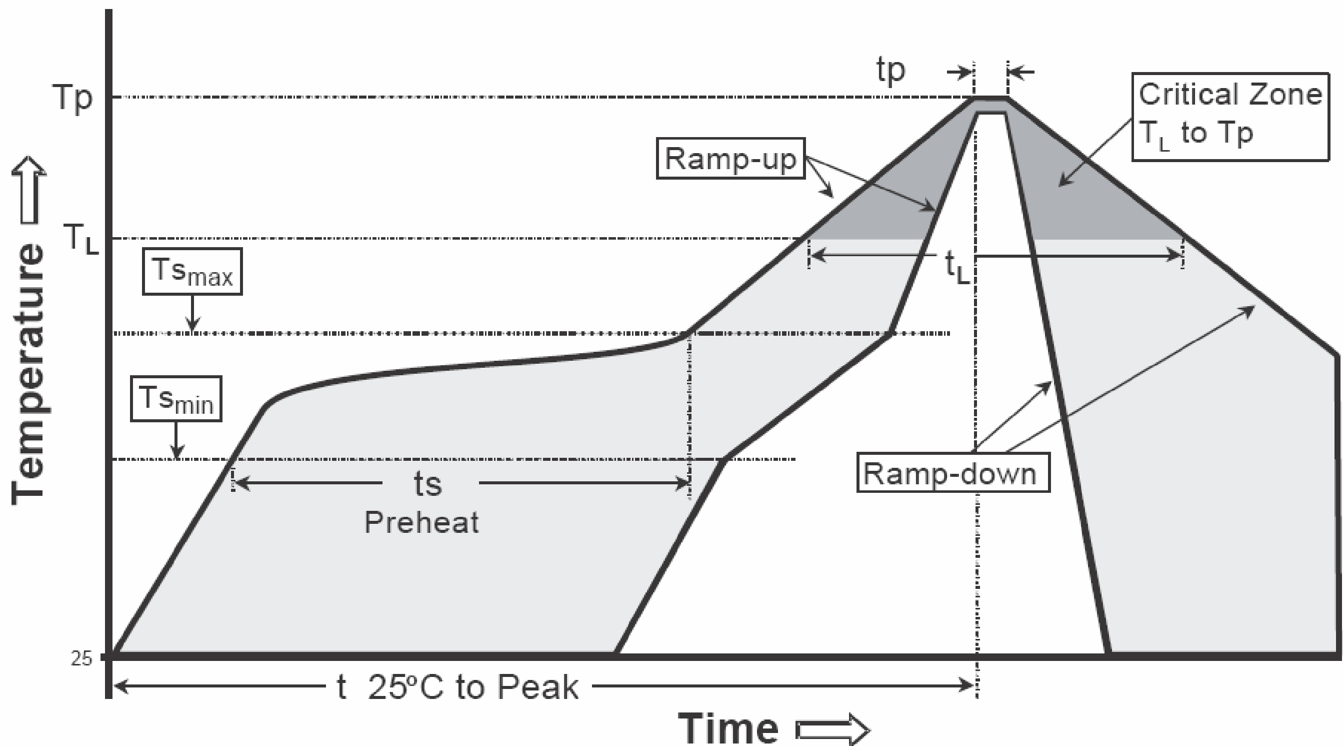
Carrier Tape Dimension



Recommended wave soldering condition

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

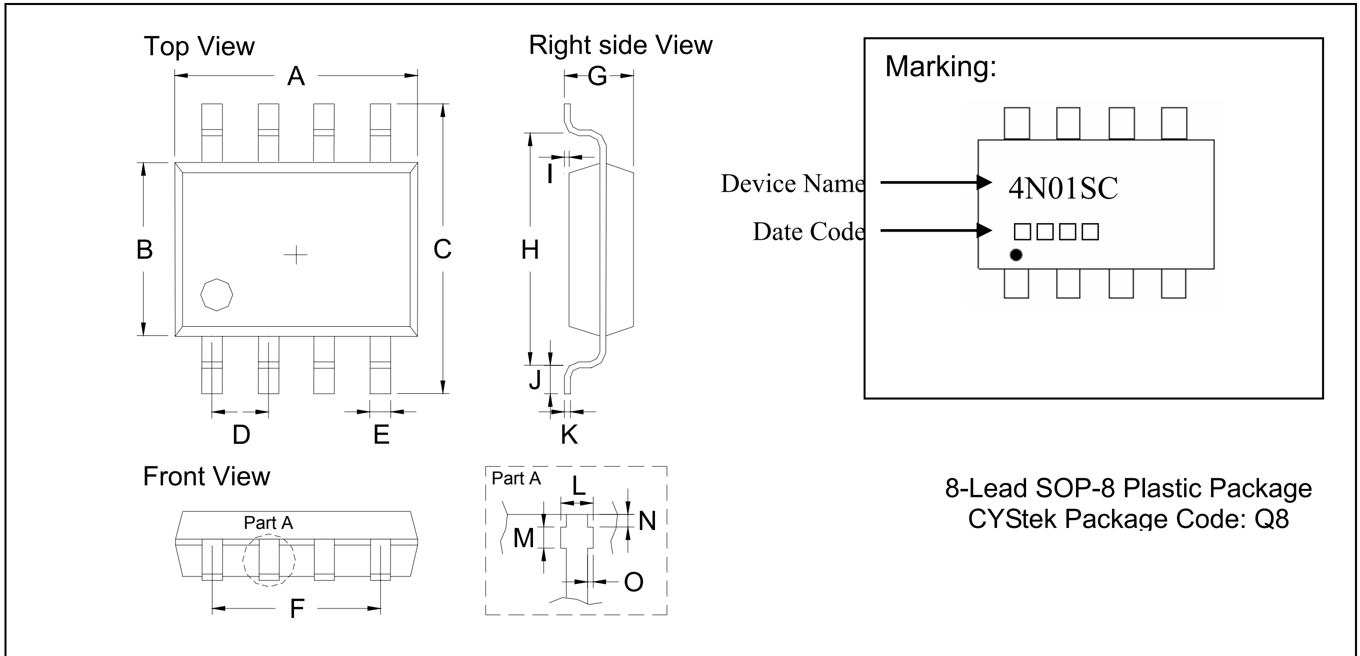
Recommended temperature profile for IR reflow



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

SOP-8 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1890	0.2007	4.80	5.10	I	0.0098	REF	0.25	REF
B	0.1496	0.1654	3.80	4.20	J	0.0118	0.0354	0.30	0.90
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0098	0.19	0.25
D	0.0480	0.0519	1.22	1.32	L	0.0145	0.0204	0.37	0.52
E	0.0138	0.0193	0.35	0.49	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0531	0.0689	1.35	1.75	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					

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.

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