

# N-Channel Enhancement Mode Power MOSFET

## MTN4N01Q8

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

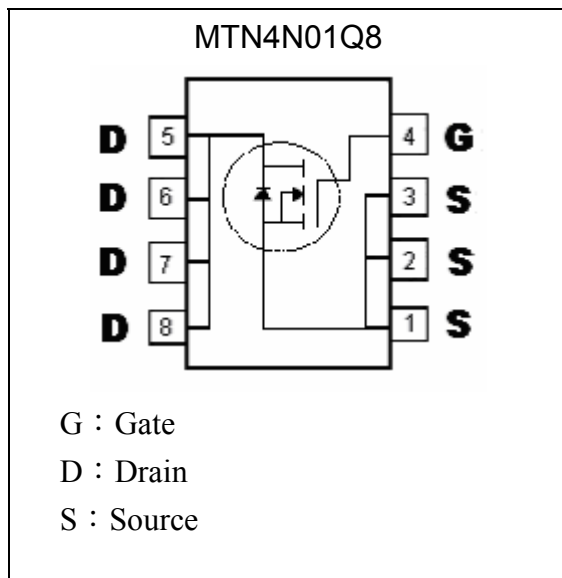
### Description

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.

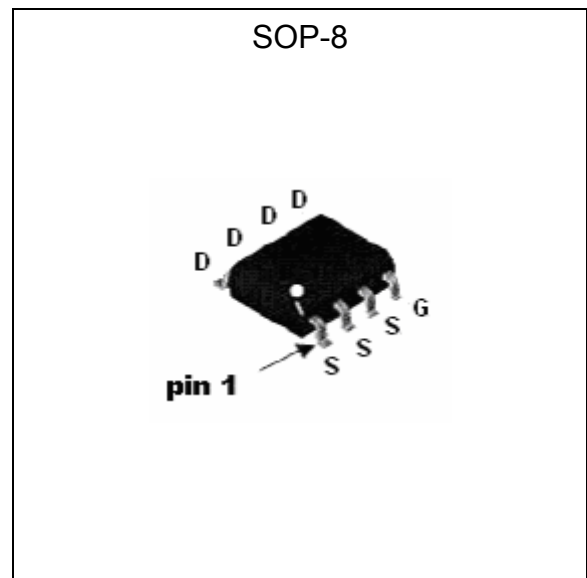
### Features

- 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 <sub>DS</sub>	20	V
Gate-Source Voltage	V <sub>GS</sub>	±10	V
Continuous Drain Current @ T <sub>A</sub> =25°C, V <sub>GS</sub> =4.5V	I <sub>D</sub>	6 *1	A
Continuous Drain Current @ T <sub>A</sub> =70°C, V <sub>GS</sub> =4.5V	I <sub>D</sub>	4.8 *1	A
Pulsed Drain Current	I <sub>DM</sub>	20 *2	A
Total Power Dissipation	P <sub>D</sub>	2.5	W
Linear Derating Factor		0.02	W/°C
Thermal Resistance, Junction-to-ambient, max	R <sub>th,j-a</sub>	50 *1	°C/W
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55~+150	°C

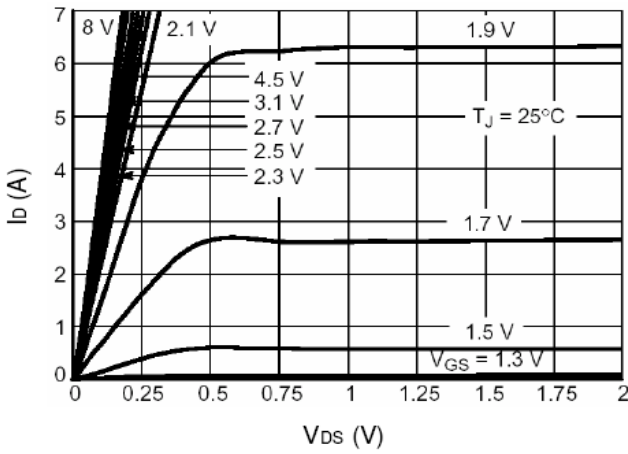
Note : 1. Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board, 125°C/W when mounted on minimum copper pad.  
 2. Pulse width limited by maximum junction temperature.

**Characteristics (T<sub>j</sub>=25°C, unless otherwise specified)**

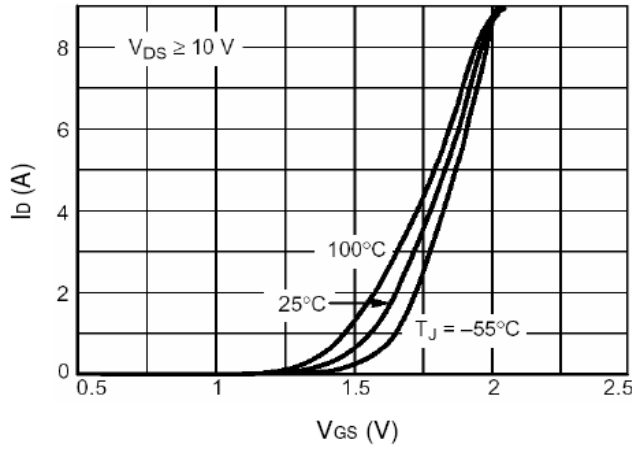
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	20	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	0.6	-	1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA
G <sub>FS</sub>	-	10	-	S	V <sub>DS</sub> =2.5V, I <sub>D</sub> =2A
I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±10
I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> =20V, V <sub>GS</sub> =0
I <sub>DSS</sub>	-	-	25	μA	V <sub>DS</sub> =16V, V <sub>GS</sub> =0, T <sub>j</sub> =70°C
*R <sub>DS(ON)</sub>	-	-	30	mΩ	V <sub>GS</sub> =4.5V, I <sub>D</sub> =4.2A
	-	-	40	mΩ	V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A
<b>Dynamic</b>					
*Q <sub>g</sub>	-	11	16	nC	I <sub>D</sub> =4.2A, V <sub>DS</sub> =12V, V <sub>GS</sub> =4.5V
*Q <sub>gs</sub>	-	2	-		
*Q <sub>gd</sub>	-	3	-		
*t <sub>d(ON)</sub>	-	13	-	ns	V <sub>DS</sub> =12V, I <sub>D</sub> =4.2A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =2.3Ω
*t <sub>r</sub>	-	35	-		
*t <sub>d(OFF)</sub>	-	45	-		
*t <sub>f</sub>	-	50	-		
C <sub>iss</sub>	-	870	1200	pF	V <sub>GS</sub> =0V, V <sub>DS</sub> =10V, f=1MHz
C <sub>oss</sub>	-	260	-		
C <sub>rss</sub>	-	60	-		
<b>Source-Drain Diode</b>					
*V <sub>SD</sub>	-	-	1.2	V	I <sub>S</sub> =1.7A, V <sub>GS</sub> =0V

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

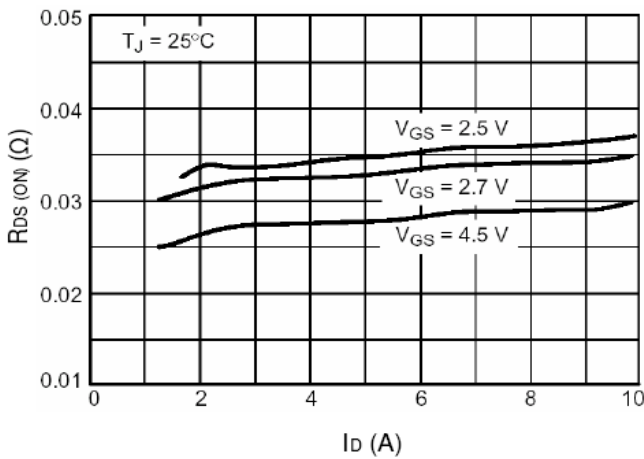
**Characteristic Curves**



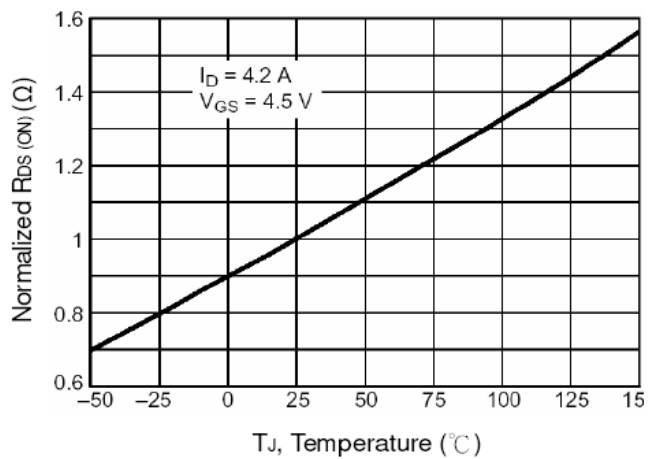
**Fig 1. Typical Output Characteristics**



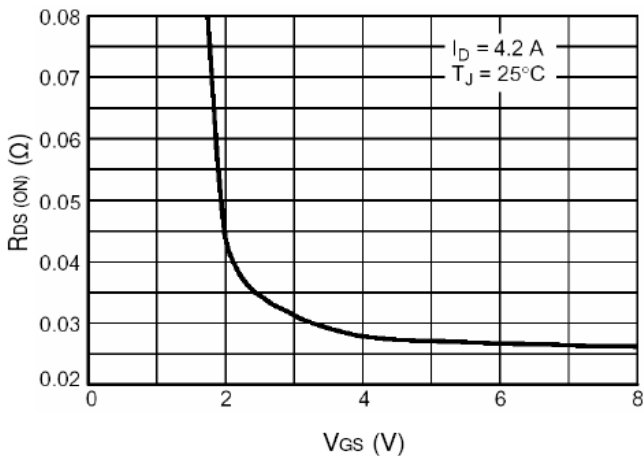
**Fig 2. Transfer Characteristics**



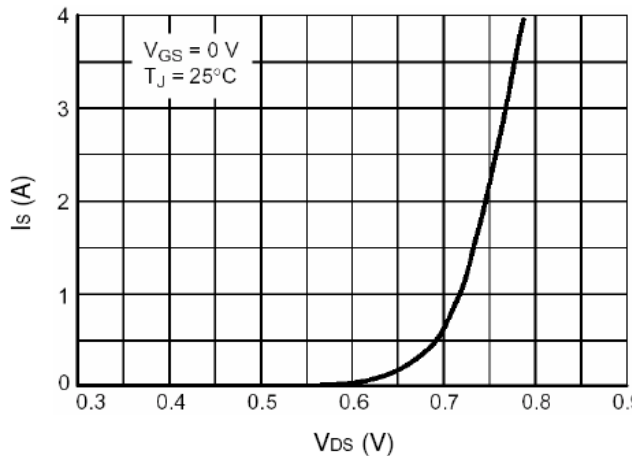
**Fig 3. On-Resistance v.s. Drain Current and Gate Voltage**



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

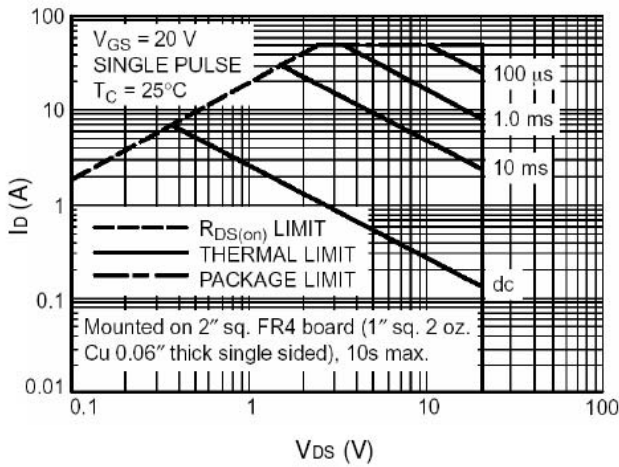


**Fig 5. On-Resistance v.s. Gate-Source Voltage**

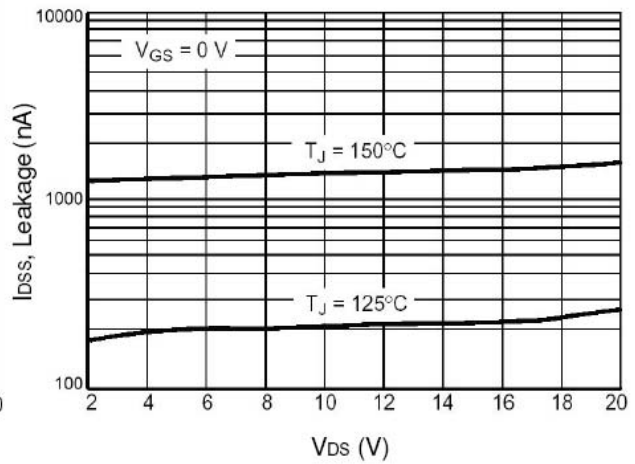


**Fig 6. Body Diode Characteristics**

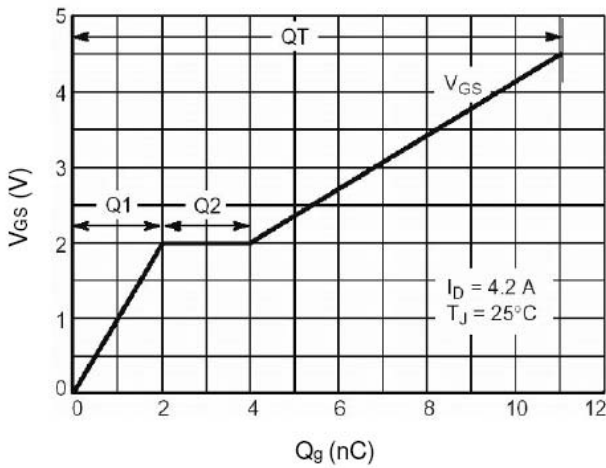
**Characteristic Curves(Cont.)**



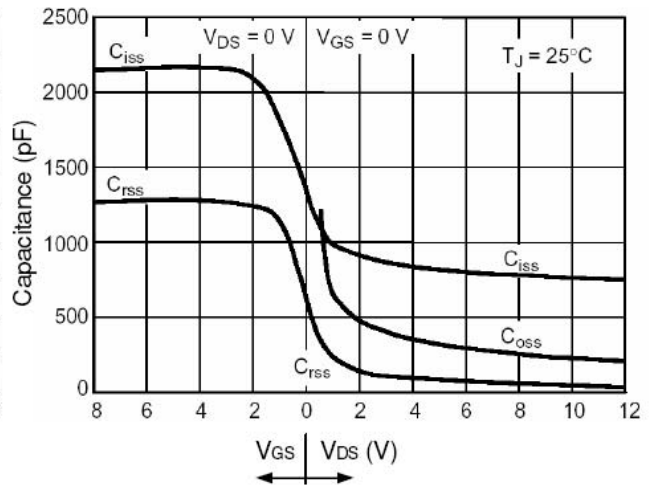
**Fig 7. Maximum Safe Operating Area**



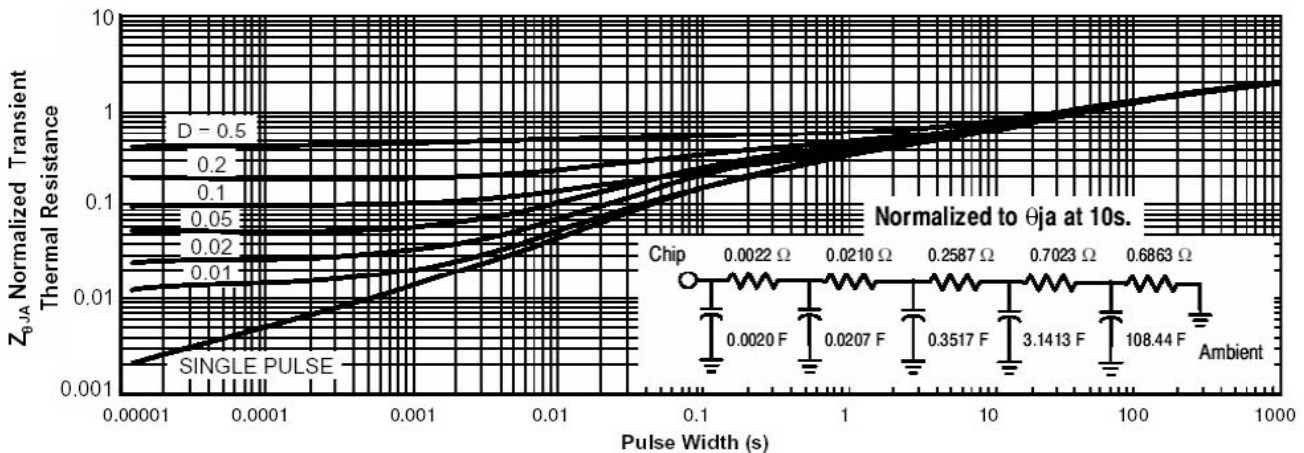
**Fig 8. Drain-Source Leakage Current vs. Voltage**



**Fig 9. Gate Charge Characteristics**

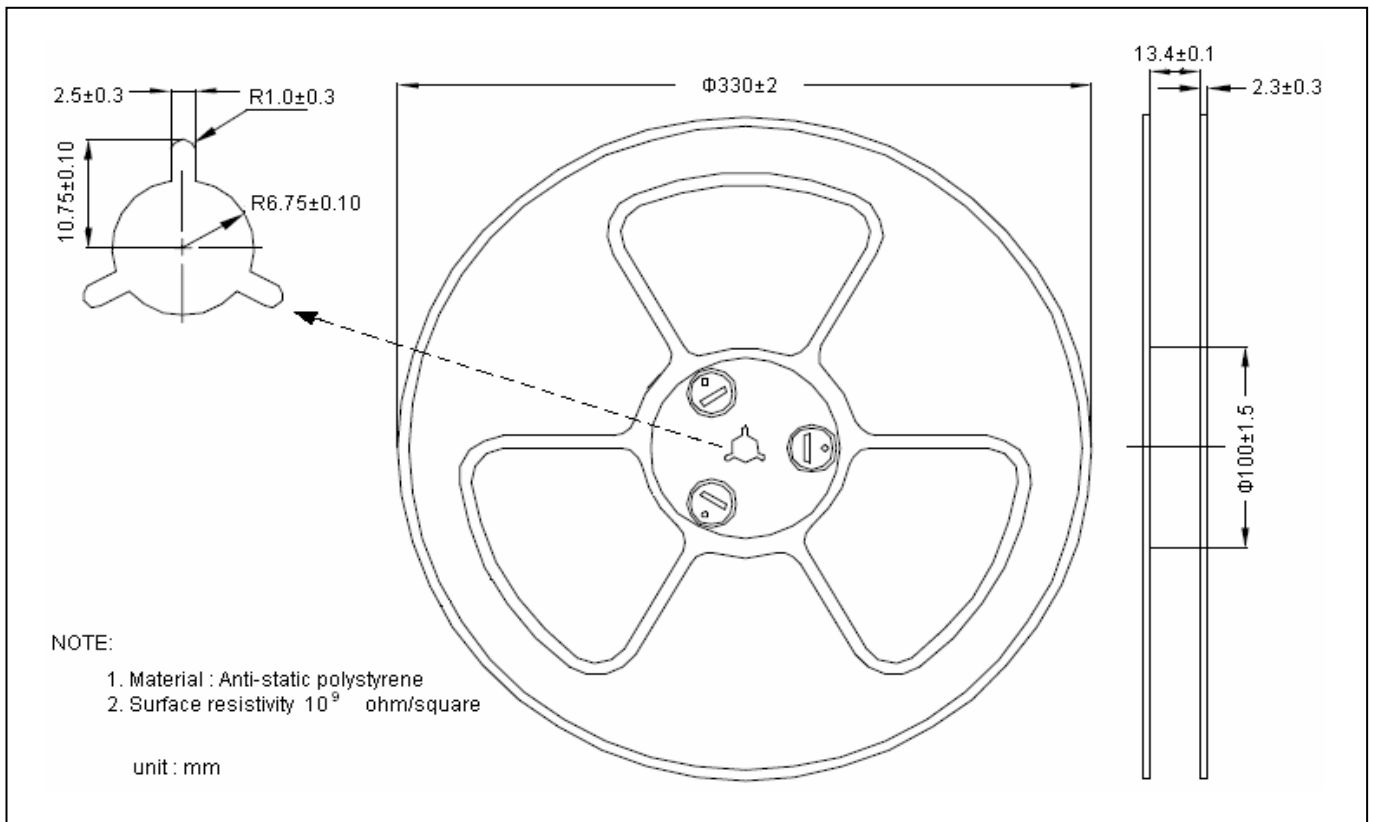


**Fig 10. Typical Capacitance Characteristics**

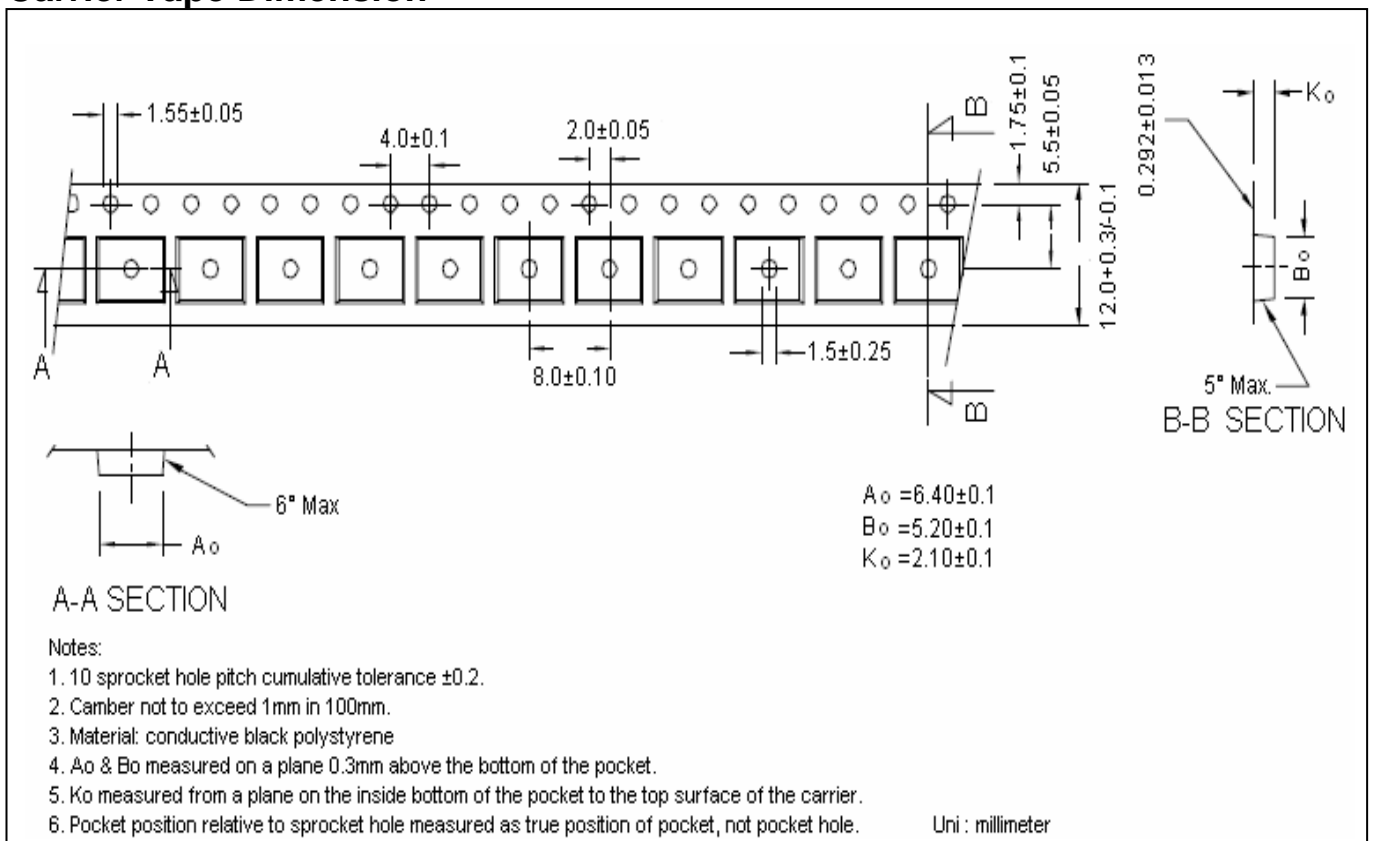


**Fig 11. Normalized Maximum Transient Thermal Impedance**

**Reel Dimension**



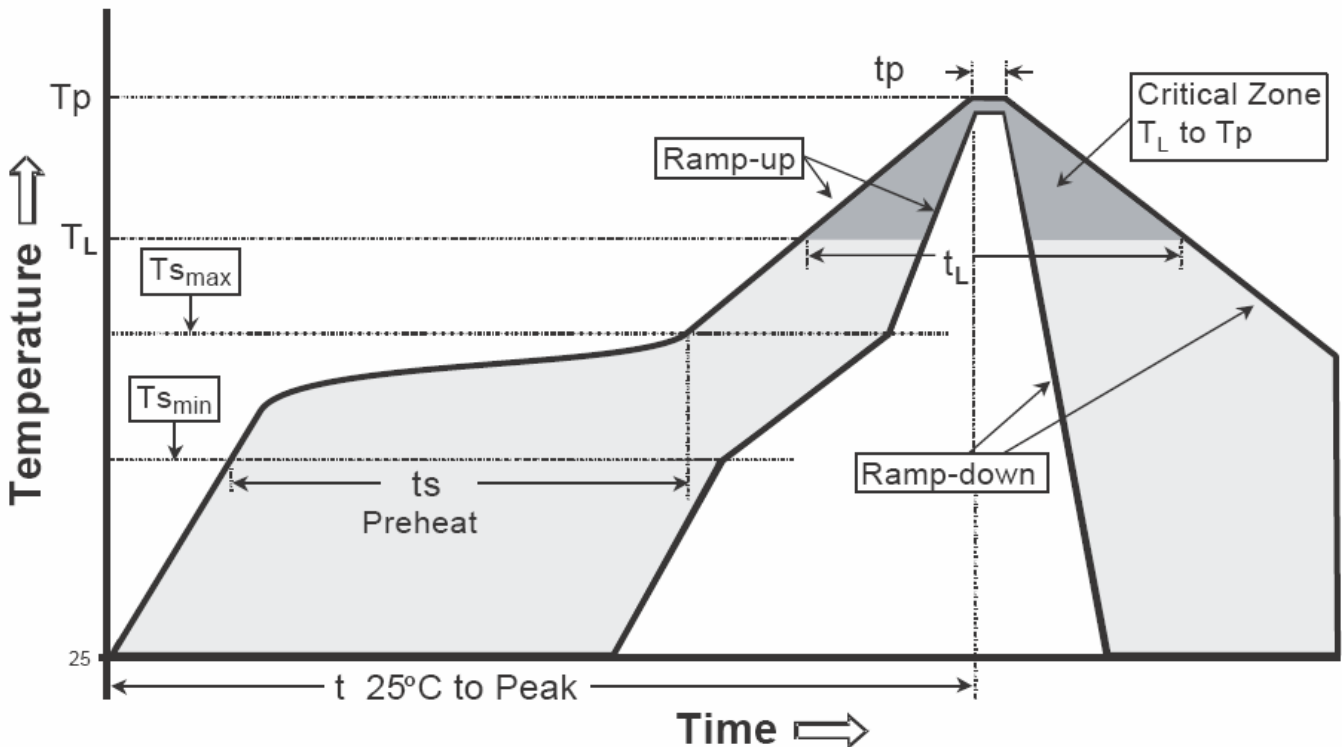
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

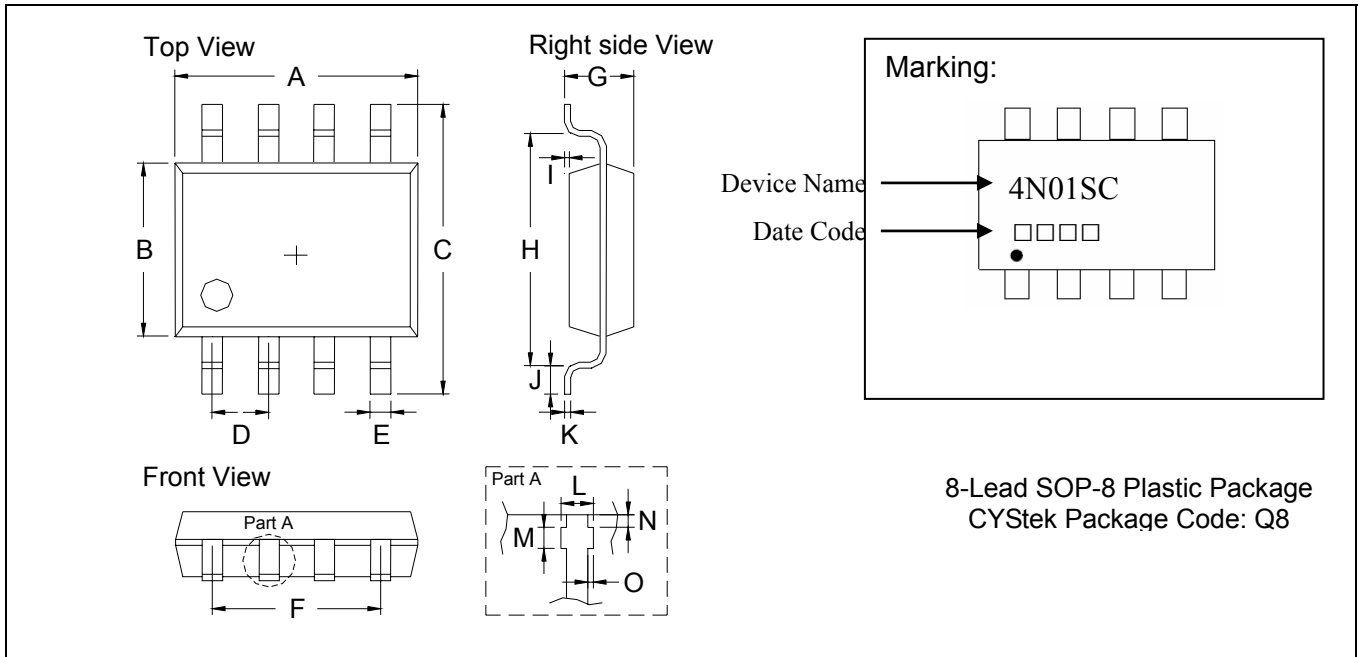
**Recommended temperature profile for IR reflow**



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(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (TL)	183°C	217°C
- Time (tL)	60-150 seconds	60-150 seconds
Peak Temperature(TP)	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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