

Dual N-CHANNEL ENHANCEMENT MODE POWER MOSFET

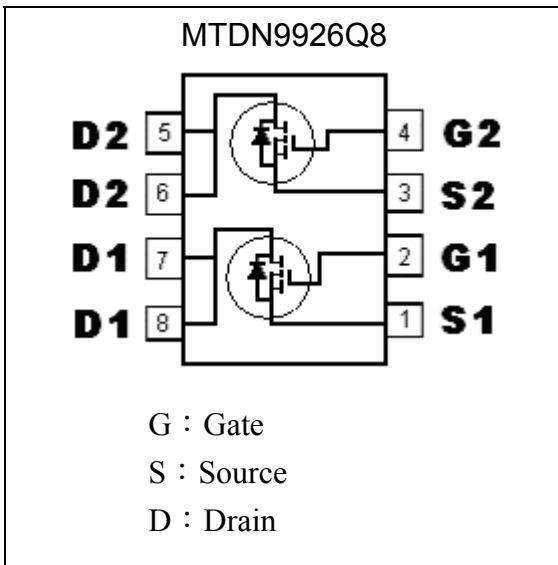
MTDN9926Q8

BV_{DSS}	20V
I_D	6A
$R_{DS(ON)(MAX)}$	28m Ω

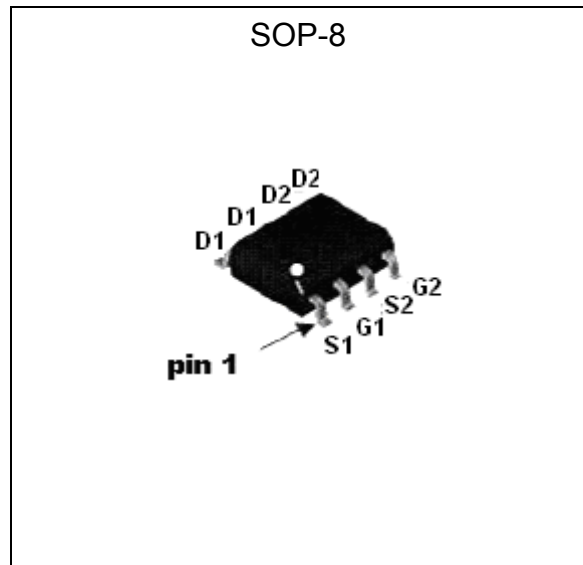
Features

- $R_{DS(ON)}=28m\Omega @V_{GS}=4.5V, I_D=6A$
- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Capable of 2.5V gate drive
- Pb-free lead plating package

Equivalent Circuit

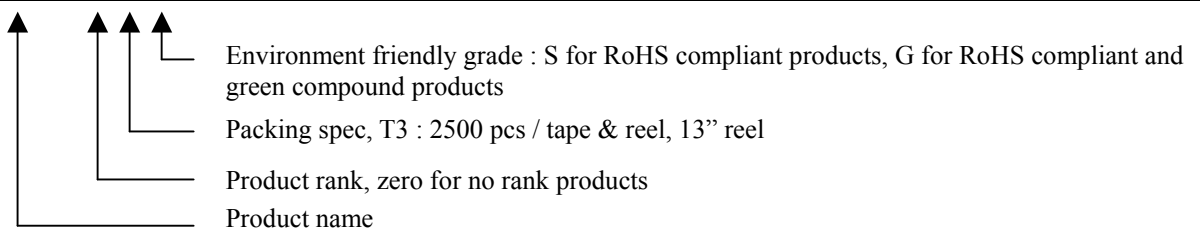


Outline



Ordering Information

Device	Package	Shipping
MTDN9926Q8-0-T3-G	SOP-8 (Pb-free lead plating and halogen-free package)	2500 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}	±12	V
Continuous Drain Current @ V _{GS} =4.5V, T _A =25 °C (Note 1)	I _D	6	A
Continuous Drain Current @ V _{GS} =4.5V, T _A =70 °C (Note 1)	I _D	4.8	A
Pulsed Drain Current (Note 2&3)	I _{DM}	20	A
Total Power Dissipation @ T _A =25 °C	P _d	2	W
Linear Derating Factor		0.016	W / °C
Operating Junction 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; 135°C/W when mounted on minimum copper pad
 2. Pulse width limited by maximum junction temperature.
 3. Pulse width ≤ 300µs, duty cycle ≤ 2%

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
B _V D _{SS}	20	-	-	V	V _{GS} =0, I _D =250µA
ΔB _V D _{SS} /ΔT _j	-	0.03	-	V/°C	Reference to 25°C, I _D =1mA
V _{GS(th)}	0.5	-	1.2	V	V _{DS} = V _{GS} , I _D =250µA
G _{FS}	-	20	-	S	V _{DS} =10V, I _D =6A
I _{GSS}	-	-	±100	nA	V _{GS} =±12V, V _{DS} =0
I _{DSS}	-	-	1	µA	V _{DS} =20V, V _{GS} =0
	-	-	25	µA	V _{DS} =16V, V _{GS} =0, T _j =70°C
*R _{DS(ON)}	-	-	28	mΩ	I _D =6A, V _{GS} =4.5V
	-	-	38		I _D =5.2A, V _{GS} =2.5V
Dynamic					
*Q _g	-	23	-	nC	V _{DS} =20V, I _D =6A, V _{GS} =5V
*Q _{gs}	-	4.5	-		
*Q _{gd}	-	7	-		
*td(ON)	-	30	-	ns	V _{DS} =10V, I _D =1A, V _{GS} =5V, R _G =6Ω, R _D =10Ω
*tr	-	70	-		
*td(OFF)	-	40	-		
*tf	-	65	-		
C _{iss}	-	1035	-	pF	V _{DS} =20V, V _{GS} =0, f=1MHz
C _{oss}	-	320	-		
C _{rss}	-	150	-		
Source-Drain Diode					
*V _{SD}	-	-	1.2	V	I _S =1.7A, V _{GS} =0V
*I _S	-	-	1.54	A	V _D =V _G =0V, V _S =1.3V

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

Typical Characteristics

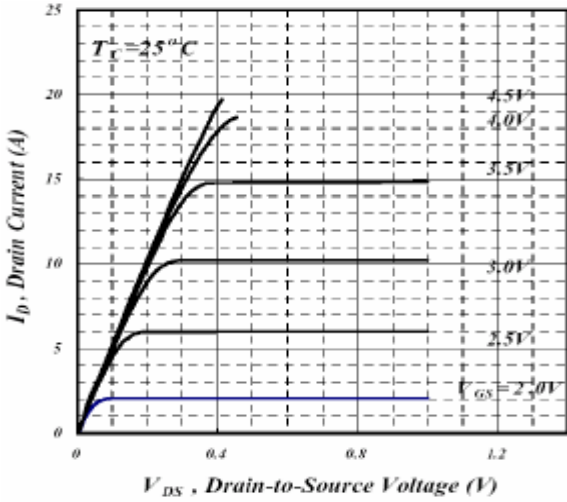


Fig 1. Typical Output Characteristics

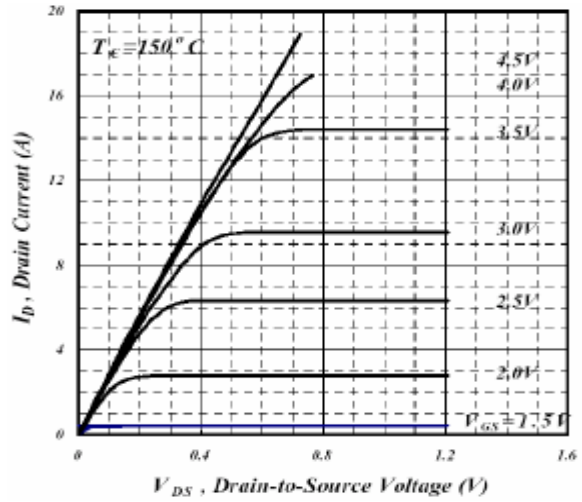


Fig 2. Typical Output Characteristics

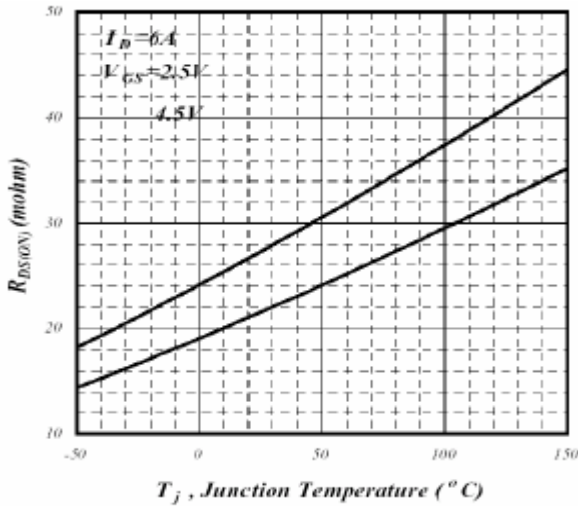


Fig 3. R_{DS(on)} v.s. Junction Temperature

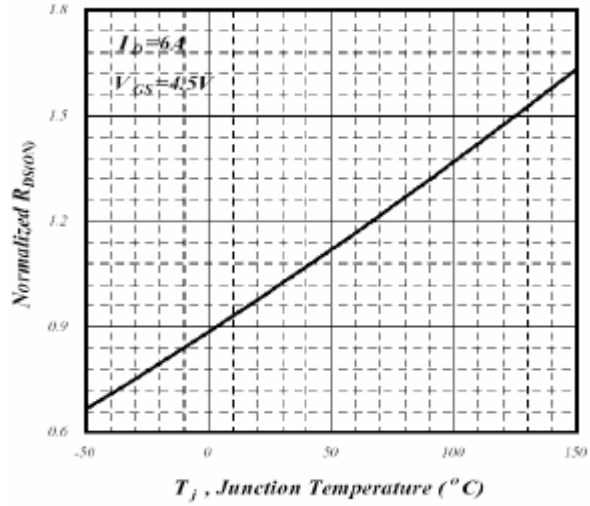


Fig 4. Normalized On-Resistance v.s. Junction Temperature

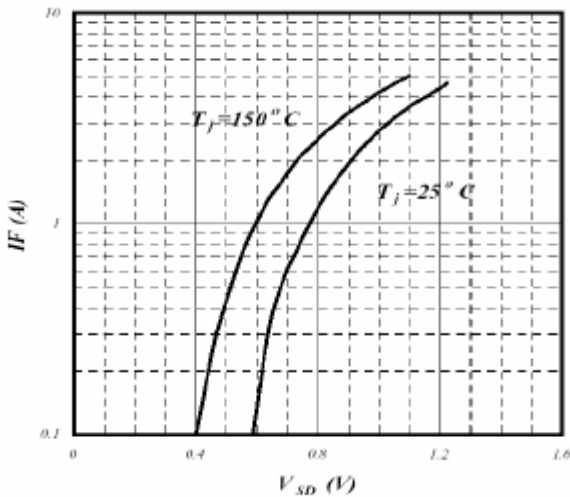


Fig 5. Forward Characteristics of Reverse Diode

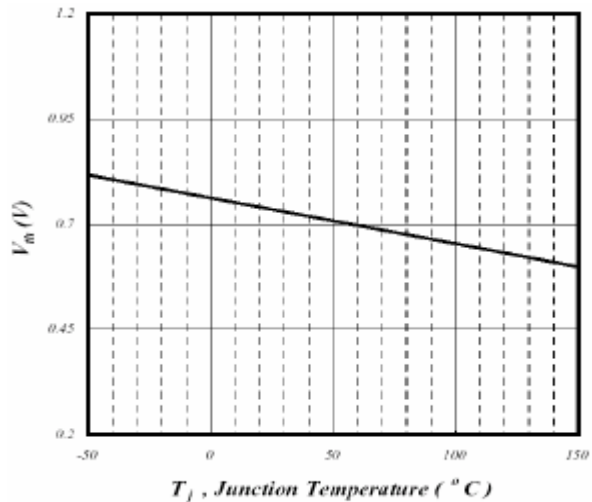


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

Typical Characteristics(Cont.)

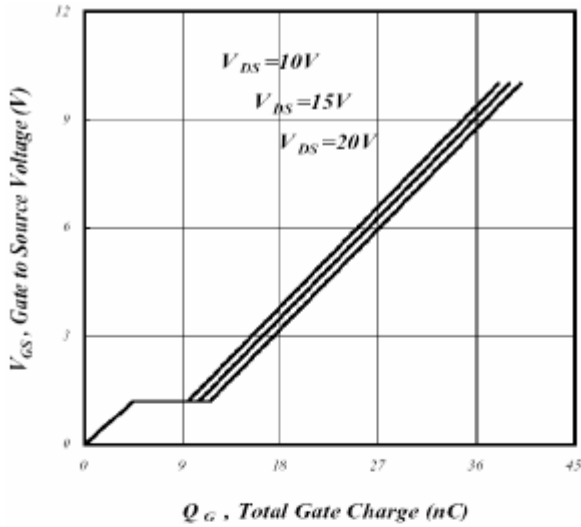


Fig 7. Gate Charge Characteristics

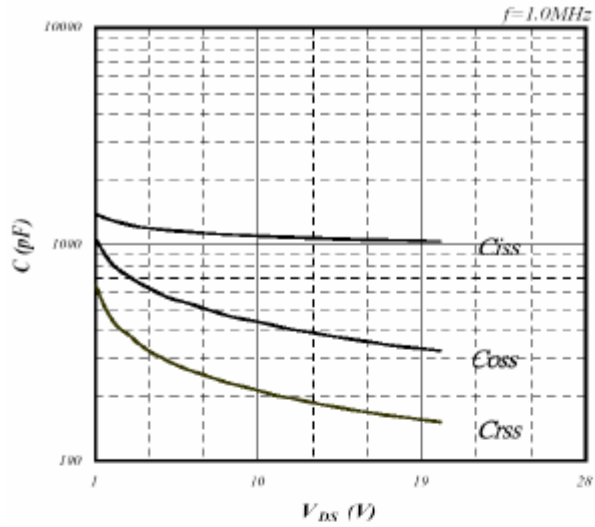


Fig 8. Typical Capacitance Characteristics

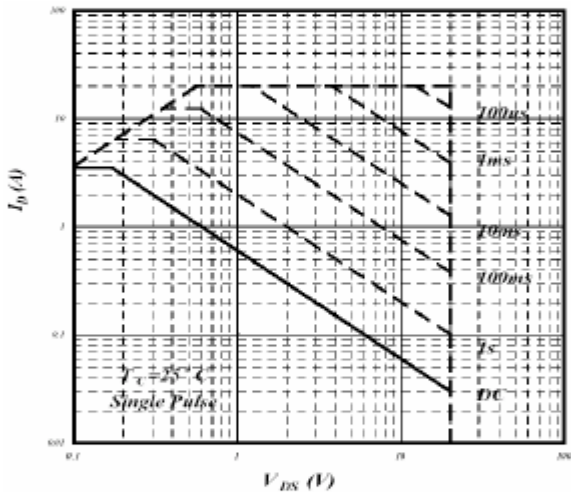


Fig 9. Maximum Safe Operating Area

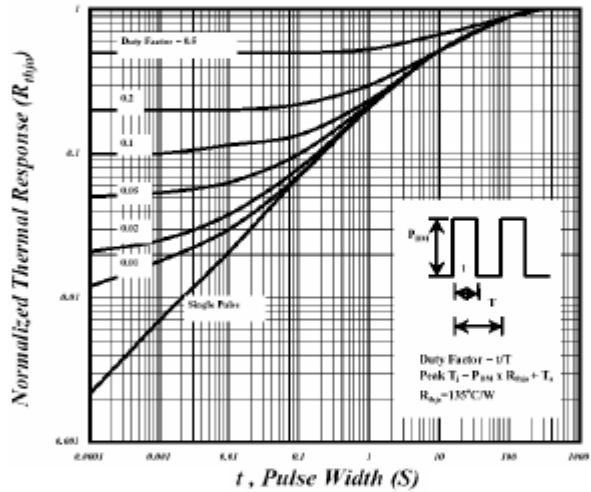


Fig 10. Effective Transient Thermal Impedance

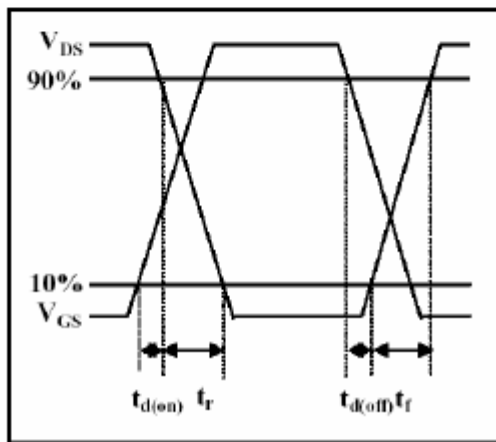


Fig 11. Switching Time Waveform

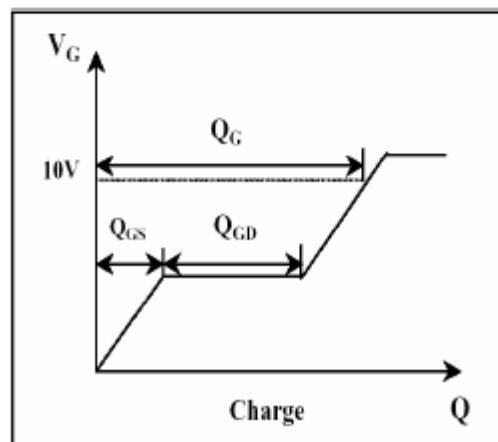
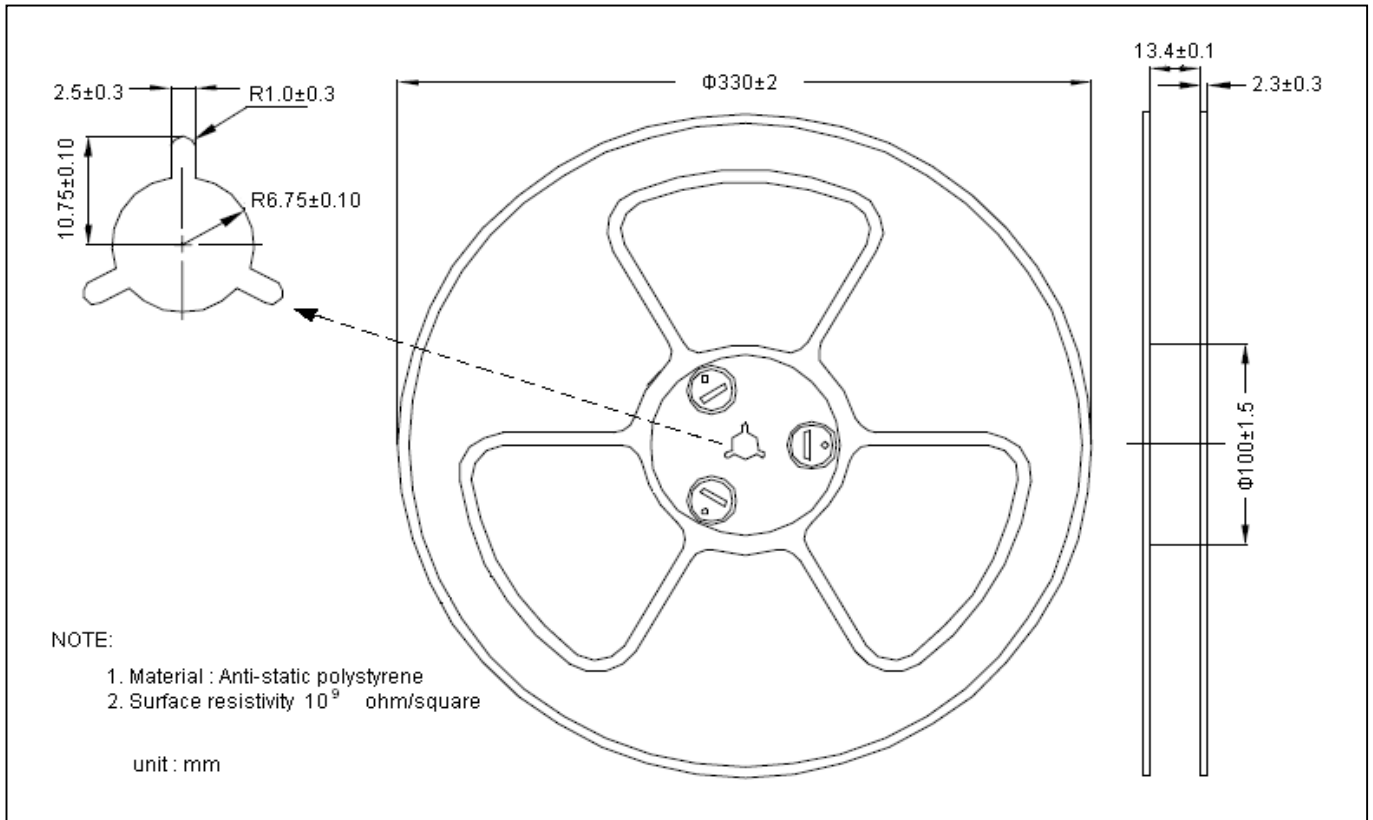
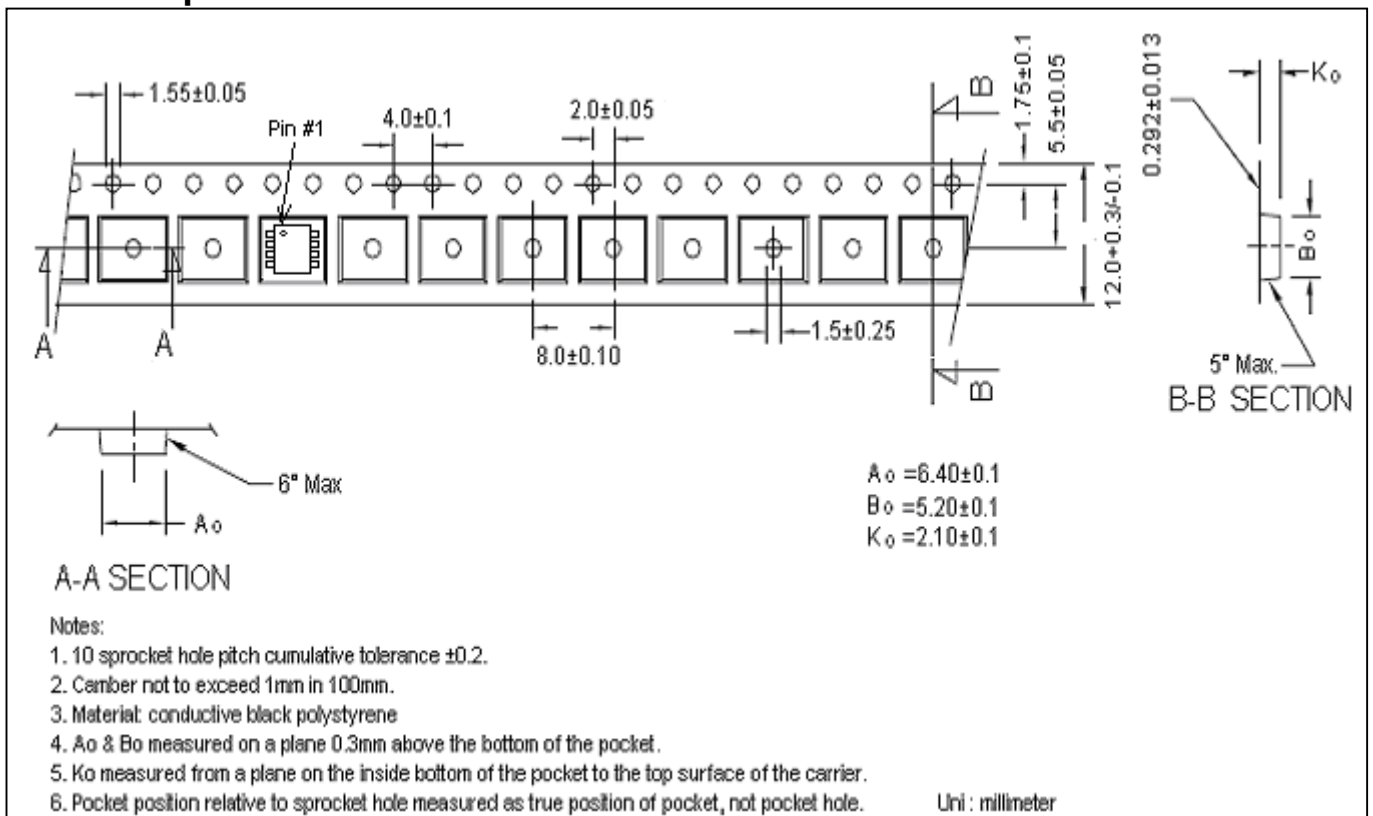


Fig 12. Gate Charge Waveform

Reel Dimension



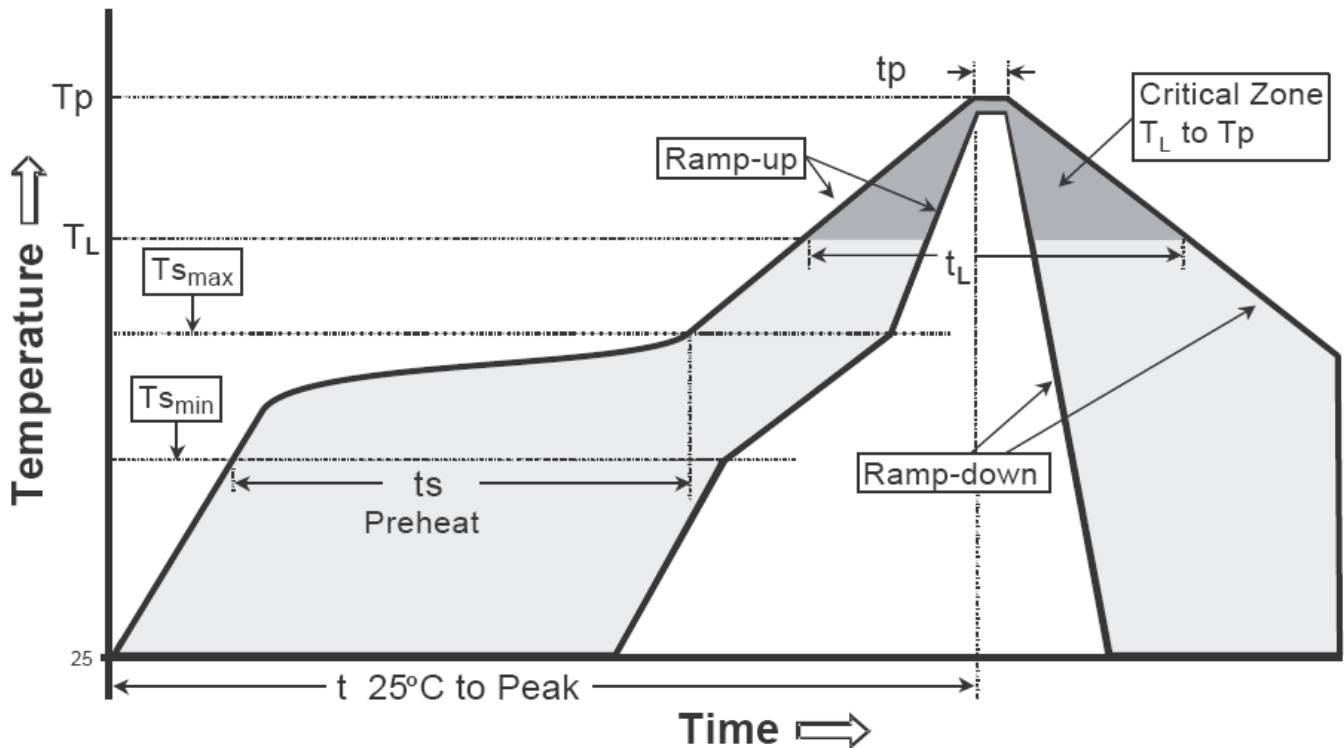
Carrier Tape Dimension



Recommended wave soldering condition

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

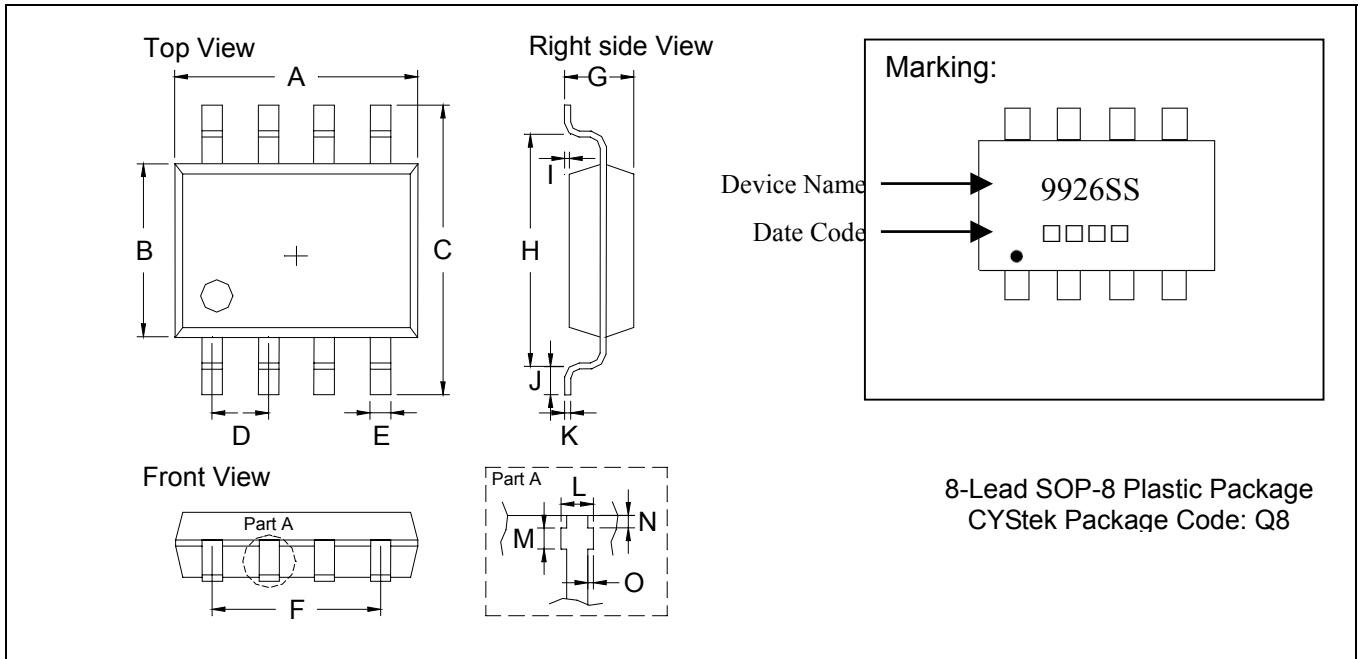
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (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:

- Leads: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

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