



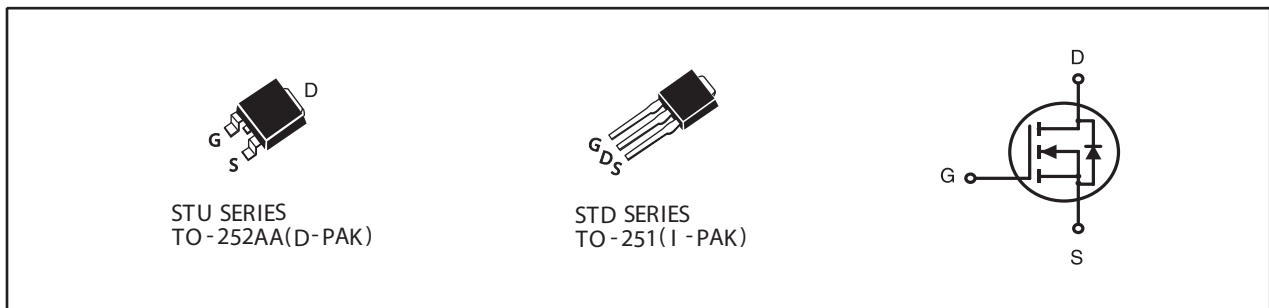
## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (Ω) Max
250V	7.5A	0.4 @ V <sub>GS</sub> =10V

### FEATURES

- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- TO-252 and TO-251 Package.



### ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C unless otherwise noted)

Symbol	Parameter	Limit	Units	
V <sub>DS</sub>	Drain-Source Voltage	250	V	
V <sub>GS</sub>	Gate-Source Voltage	±20	V	
I <sub>D</sub>	Drain Current-Continuous <sup>a d</sup>	T <sub>C</sub> =25°C	7.5	A
		T <sub>C</sub> =100°C	4.74	A
I <sub>DM</sub>	-Pulsed <sup>b</sup>	25	A	
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	52	W
		T <sub>C</sub> =100°C	21	W
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	°C	

### THERMAL CHARACTERISTICS

R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	2.4	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	50	°C/W

# STU09N25

## STD09N25

Ver 1.0

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =10mA	250			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =200V , V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V			±100	nA
<b>ON CHARACTERISTICS</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.9	3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =3.75A		0.31	0.4	ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V , I <sub>D</sub> =3.75A		6.5		S
<b>DYNAMIC CHARACTERISTICS <sup>c</sup></b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V f=1.0MHz		940		pF
C <sub>OSS</sub>	Output Capacitance			58		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			39		pF
<b>SWITCHING CHARACTERISTICS <sup>c</sup></b>						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =125V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>GEN</sub> = 6 ohm		19.2		ns
t <sub>r</sub>	Rise Time			21		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			29.2		ns
t <sub>f</sub>	Fall Time			14.3		ns
Q <sub>g</sub>	Total Gate Charge		V <sub>DS</sub> =125V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V		12.8	
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =125V, I <sub>D</sub> =1A, V <sub>GS</sub> =10V		1.7		nC
Q <sub>gd</sub>	Gate-Drain Charge			4.3		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =4A		0.81	1.3	V
<b>Notes</b>						
<p>a.Surface Mounted on FR4 Board, t ≤ 10sec.</p> <p>b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.</p> <p>c.Guaranteed by design, not subject to production testing.</p> <p>d.Drain current limited by maximum junction temperature.</p>						

Sep,09,2013

# STU09N25 STD09N25

Ver 1.0

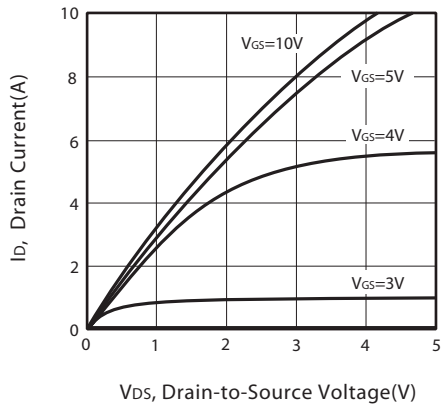


Figure 1. Output Characteristics

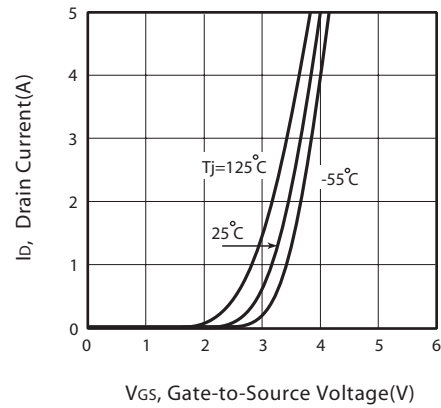


Figure 2. Transfer Characteristics

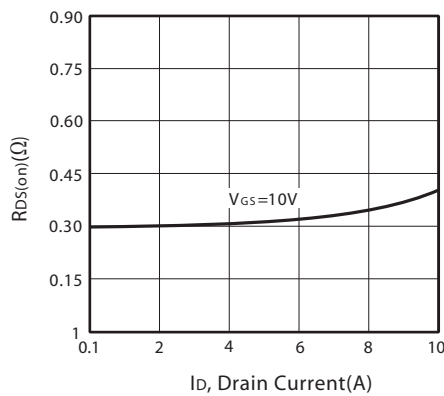


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

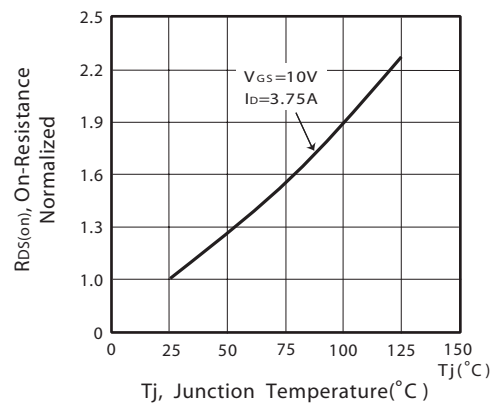


Figure 4. On-Resistance Variation with Drain Current and Temperature

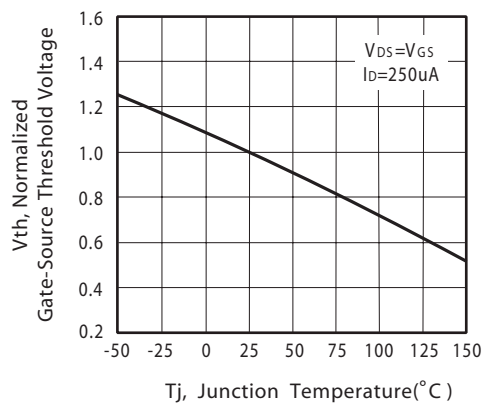


Figure 5. Gate Threshold Variation with Temperature

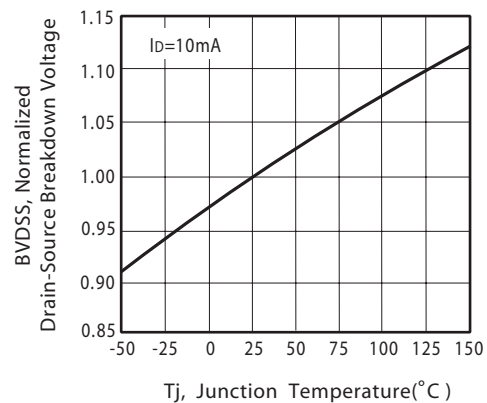


Figure 6. Breakdown Voltage Variation with Temperature

Sep,09,2013

# STU09N25 STD09N25

Ver 1.0

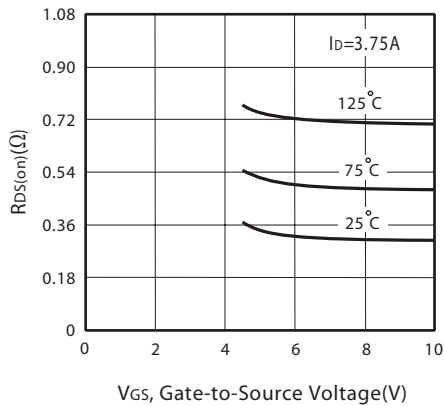


Figure 7. On-Resistance vs. Gate-Source Voltage

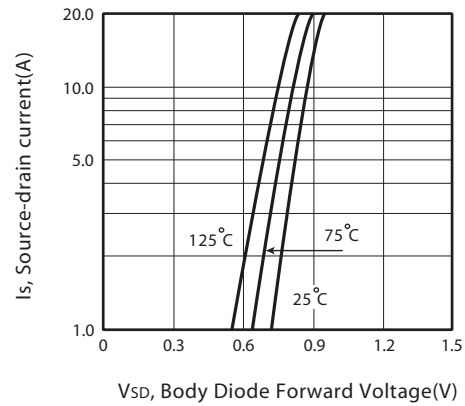


Figure 8. Body Diode Forward Voltage Variation with Source Current

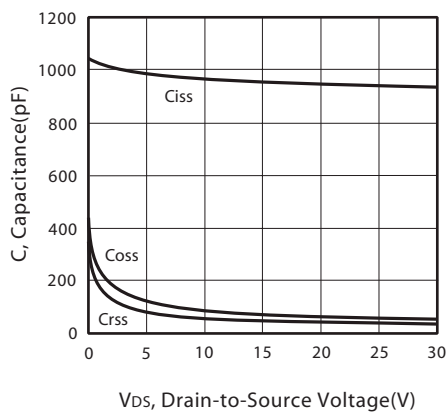


Figure 9. Capacitance

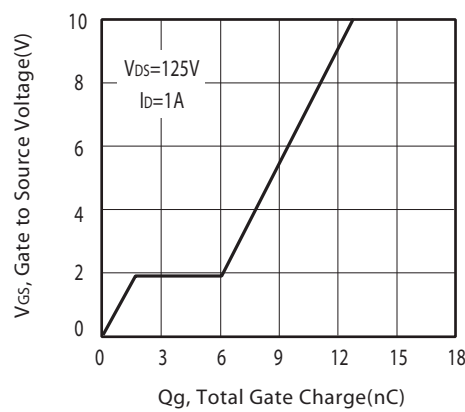


Figure 10. Gate Charge

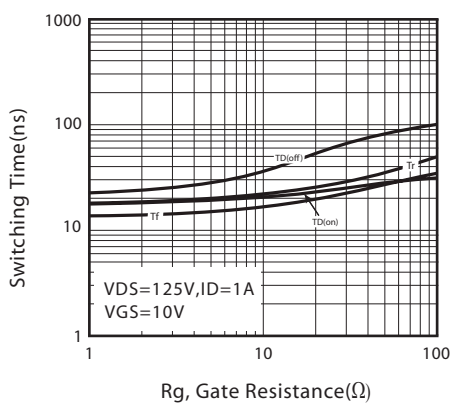


Figure 11. switching characteristics

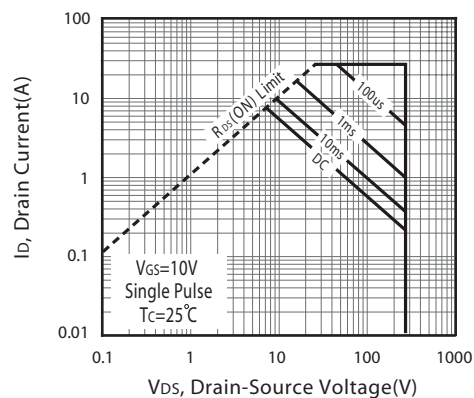
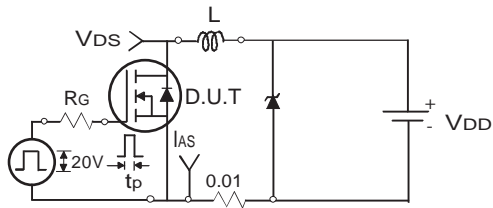


Figure 12. Maximum Safe Operating Area

Sep,09,2013

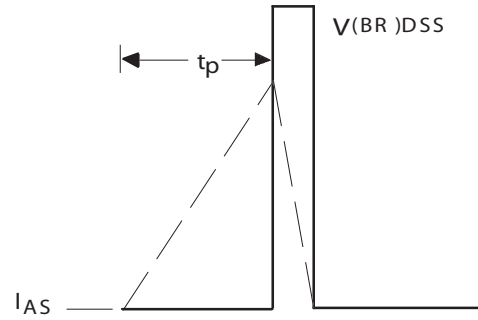
# STU09N25 STD09N25

Ver 1.0



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

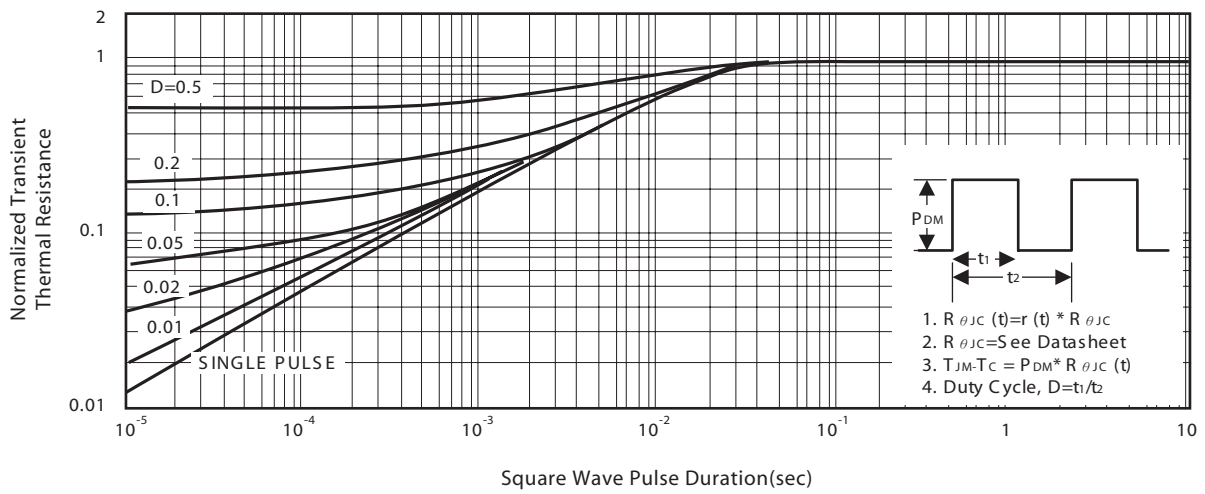


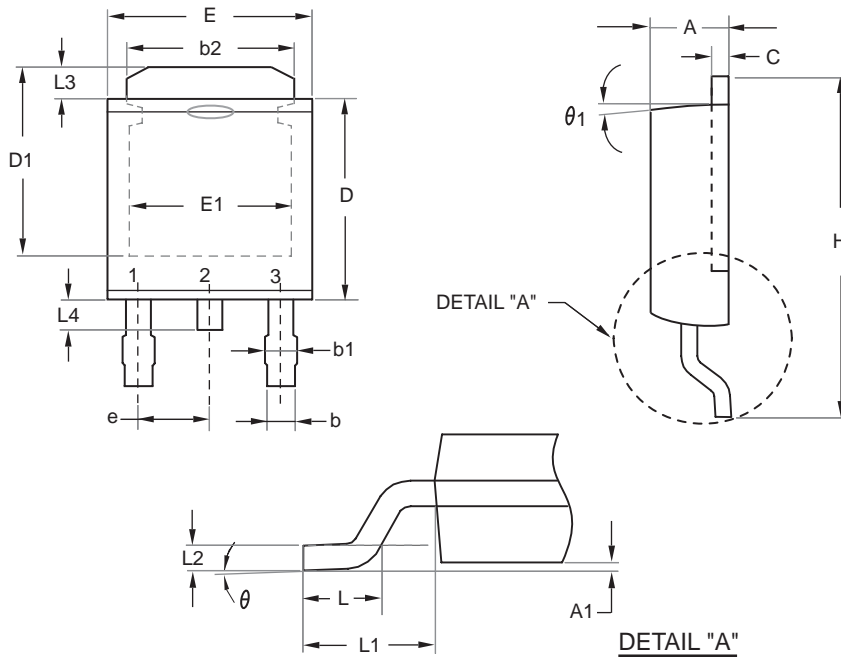
Figure 14. Normalized Thermal Transient Impedance Curve

Sep,09,2013

# STU09N25 STD09N25

Ver 1.0

TO-252



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.100	2.500	0.083	0.098
A1	0.000	0.200	0.000	0.008
b	0.400	0.889	0.016	0.035
b1	0.770	1.140	0.030	0.045
b2	4.800	5.460	0.189	0.215
C	0.400	0.600	0.016	0.024
D	5.300	6.223	0.209	0.245
D1	4.900	5.515	0.193	0.217
E	6.300	6.731	0.248	0.265
E1	4.400	5.004	0.173	0.197
e	2.290 REF		0.090 BSC	
H	8.900	10.400	0.350	0.409
L	1.397	1.770	0.055	0.070
L1	2.743 REF.		0.108 REF.	
L2	0.508 REF.		0.020 REF.	
L3	0.890	1.700	0.035	0.067
L4	0.500	1.100	0.020	0.043
theta	0°	10°	0°	10°
theta1	7° REF.		7° REF.	

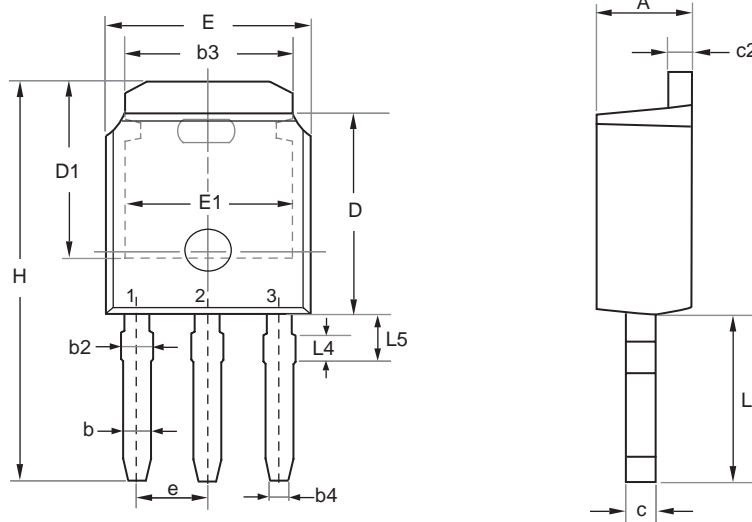
Sep,09,2013

# STU09N25 STD09N25

Ver 1.0

## PACKAGE OUTLINE DIMENSIONS

TO-251



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
E	6.400	6.731	0.252	0.265
L	3.980	4.280	0.157	0.169
L4	0.698 REF		0.027 REF	
L5	0.972	1.226	0.038	0.048
D	6.000	6.223	0.236	0.245
H	11.050	11.450	0.435	0.450
b	0.640	0.880	0.025	0.035
b2	0.770	1.140	0.030	0.045
b3	5.210	5.460	0.205	0.215
b4	0.450	0.550	0.018	0.022
e	2.286 BSC		0.090 BSC	
A	2.200	2.380	0.087	0.094
c	0.400	0.600	0.016	0.024
c2	0.400	0.600	0.016	0.024
D1	5.100	---	0.201	---
E1	4.400	---	0.173	---

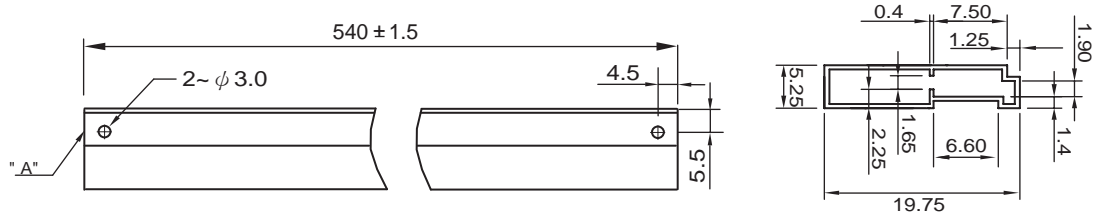
Sep,09,2013

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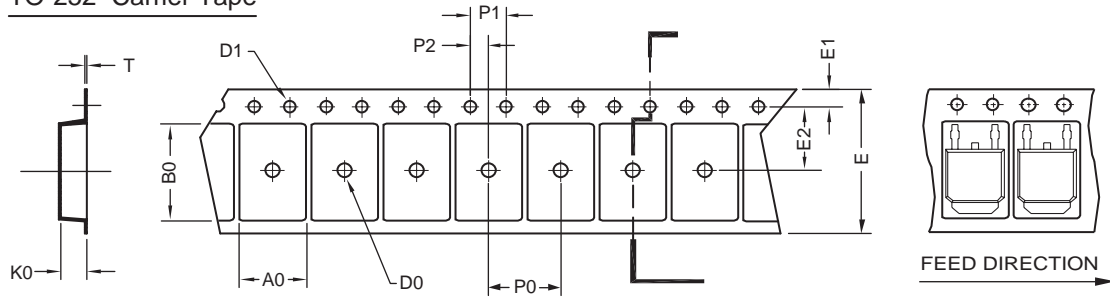
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## TO-251 Tube/TO-252 Tape and Reel Data

### TO-251 Tube



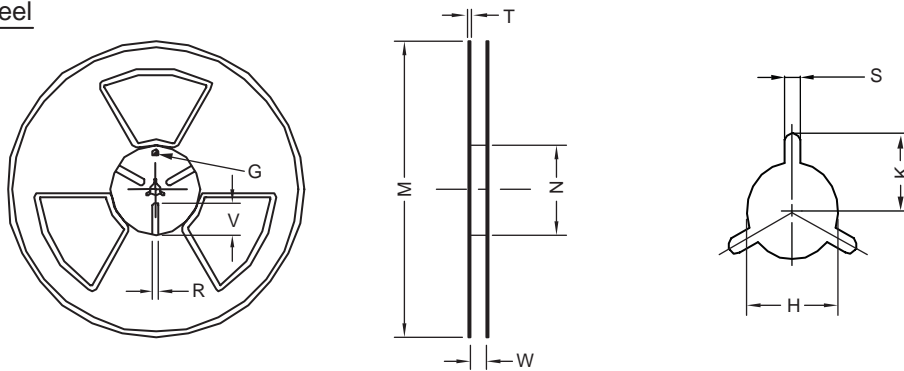
### TO-252 Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 mm)	6.96 $\pm 0.1$	10.49 $\pm 0.1$	2.79 $\pm 0.1$	$\phi 2$	$\phi 1.5$ $+0.1$ $-0$	16.0 $\pm 0.3$	1.75 $\pm 0.1$	7.5 $\pm 0.15$	8.0 $\pm 0.1$	4.0 $\pm 0.1$	2.0 $\pm 0.15$	0.3 $\pm 0.05$

### TO-252 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 mm	$\phi 330$	$\phi 330$ $\pm 0.5$	$\phi 97$ $\pm 1.0$	17.0 $+1.5$ $-0$	2.2	$\phi 13.0$ $+0.5$ $-0.2$	10.6	2.0 $\pm 0.5$	---	---	---

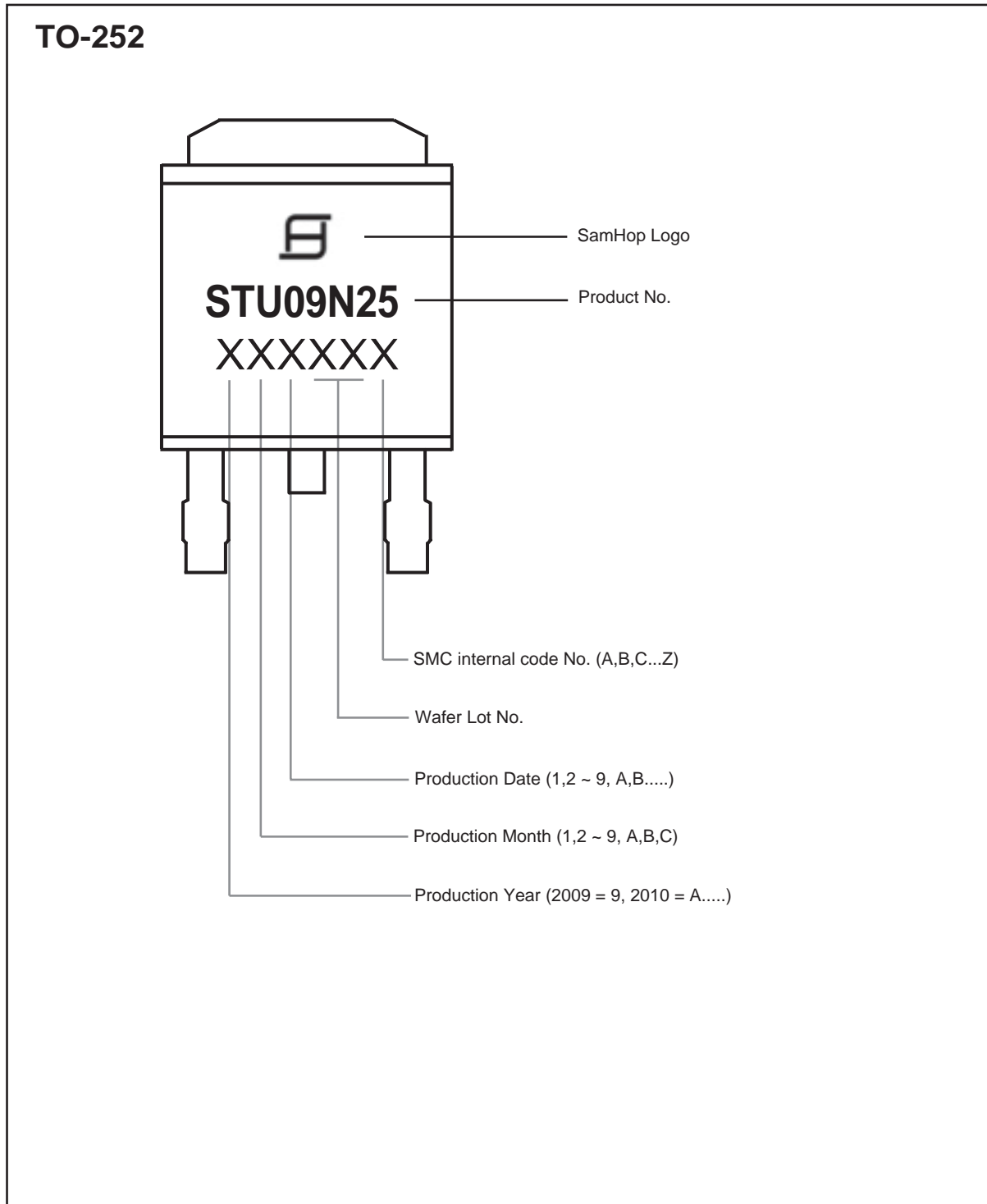
Sep,09,2013



# STU09N25 STD09N25

Ver 1.0

## TOP MARKING DEFINITION



Sep,09,2013

# STU09N25 STD09N25

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