



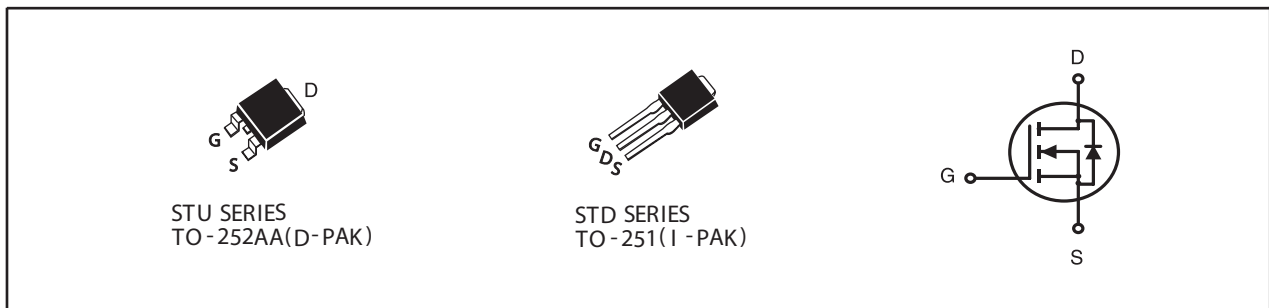
N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (Ω) Max
250V	7.5A	0.4 @ V _{GS} =10V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- TO-252 and TO-251 Package.



ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Limit	Units
V _{DS}	Drain-Source Voltage	250	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current-Continuous ^{a d}	T _C =25°C	7.5
		T _C =100°C	4.74
I _{DM}	-Pulsed ^b	25	A
P _D	Maximum Power Dissipation	T _C =25°C	52
		T _C =100°C	21
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case	2.4	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	50	°C/W

STU09N25

STD09N25

Ver 1.0

ELECTRICAL CHARACTERISTICS (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =10mA	250			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =200V , V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V , V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1	1.9	3	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V , I _D =3.75A		0.31	0.4	ohm
g _{FS}	Forward Transconductance	V _{DS} =10V , I _D =3.75A		6.5		S
DYNAMIC CHARACTERISTICS ^c						
C _{ISS}	Input Capacitance	V _{DS} =25V, V _{GS} =0V f=1.0MHz		940		pF
C _{OSS}	Output Capacitance			58		pF
C _{RSS}	Reverse Transfer Capacitance			39		pF
SWITCHING CHARACTERISTICS ^c						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =125V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		19.2		ns
t _r	Rise Time			21		ns
t _{D(OFF)}	Turn-Off Delay Time			29.2		ns
t _f	Fall Time			14.3		ns
Q _g	Total Gate Charge		V _{DS} =125V, I _D =1A, V _{GS} =10V		12.8	
Q _{gs}	Gate-Source Charge	V _{DS} =125V, I _D =1A, V _{GS} =10V		1.7		nC
Q _{gd}	Gate-Drain Charge			4.3		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =4A		0.81	1.3	V
Notes						
<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

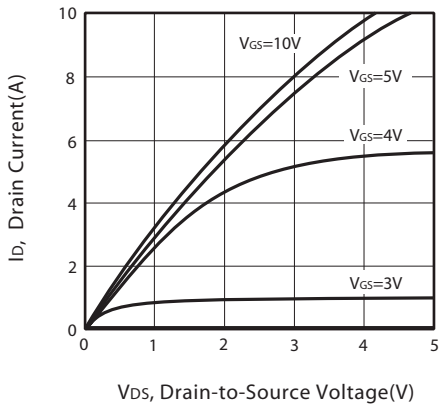


Figure 1. Output Characteristics

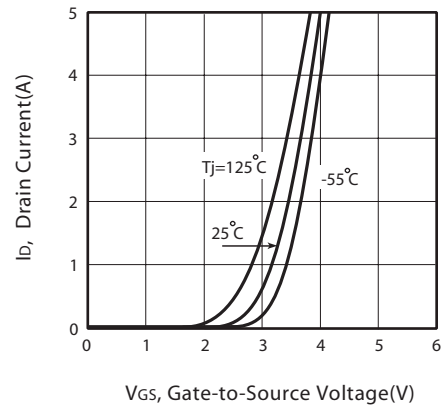


Figure 2. Transfer Characteristics

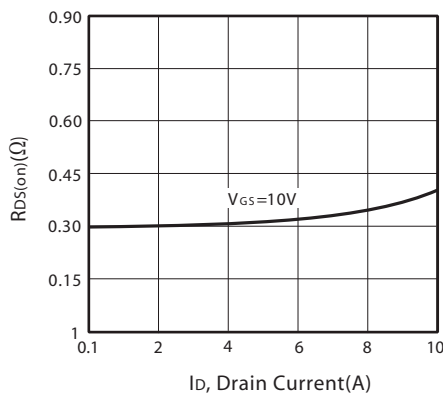


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

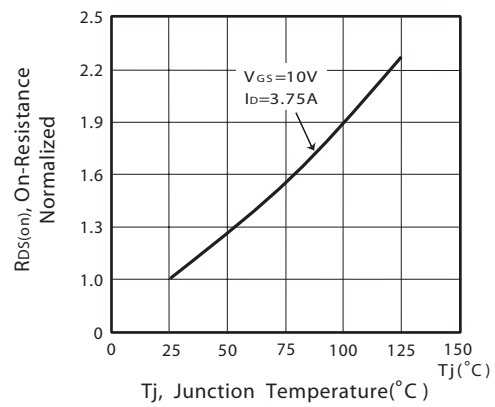


Figure 4. On-Resistance Variation with Drain Current and Temperature

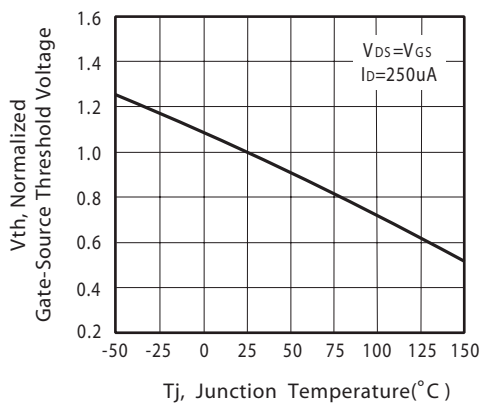


Figure 5. Gate Threshold Variation with Temperature

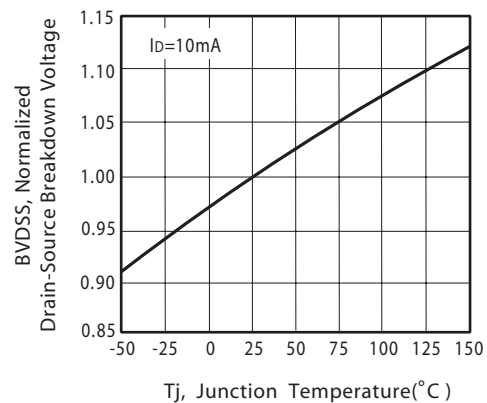


Figure 6. Breakdown Voltage Variation with Temperature

Sep,09,2013

STU09N25 STD09N25

Ver 1.0

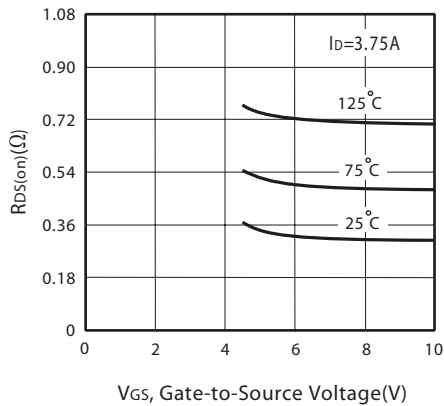


Figure 7. On-Resistance vs. Gate-Source Voltage

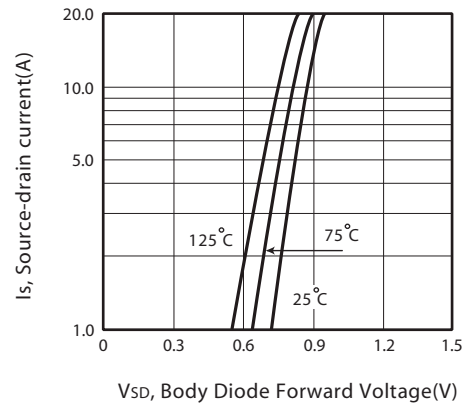


Figure 8. Body Diode Forward Voltage Variation with Source Current

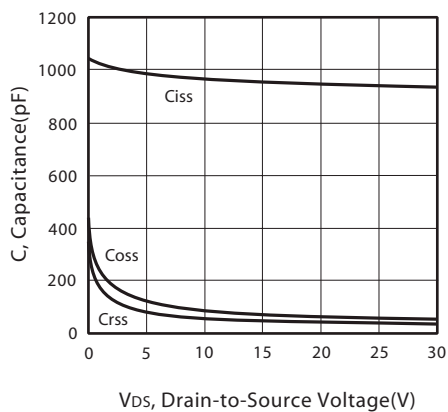


Figure 9. Capacitance

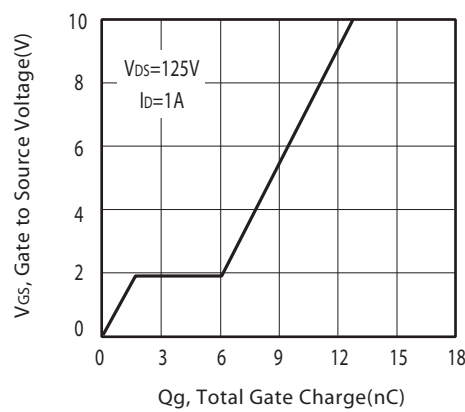


Figure 10. Gate Charge

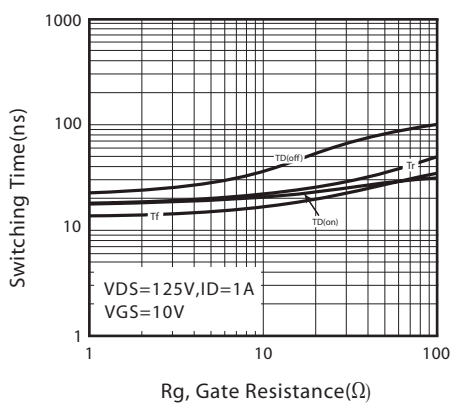


Figure 11. switching characteristics

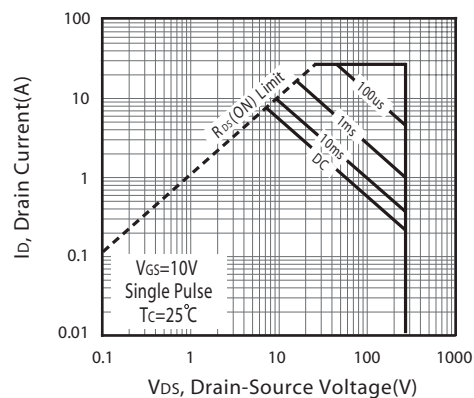
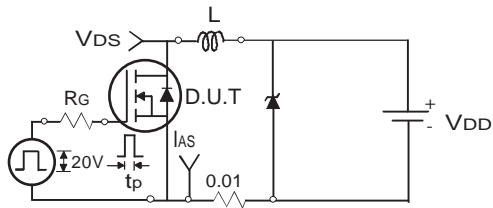


Figure 12. Maximum Safe Operating Area

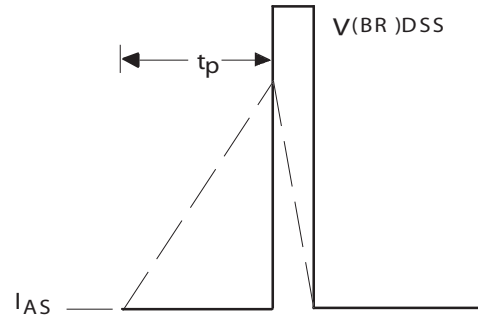
Sep,09,2013

STU09N25 STD09N25



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

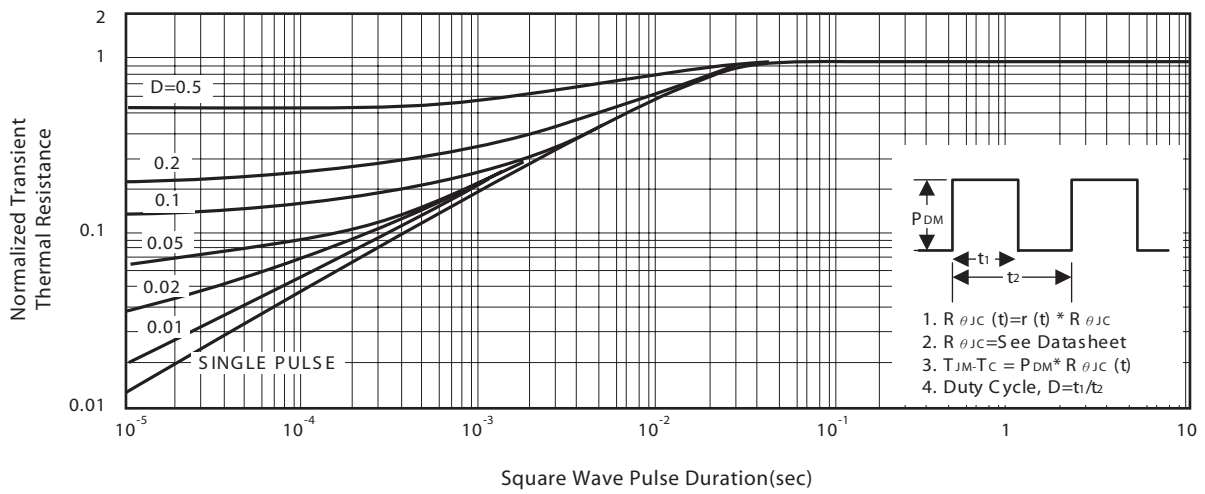
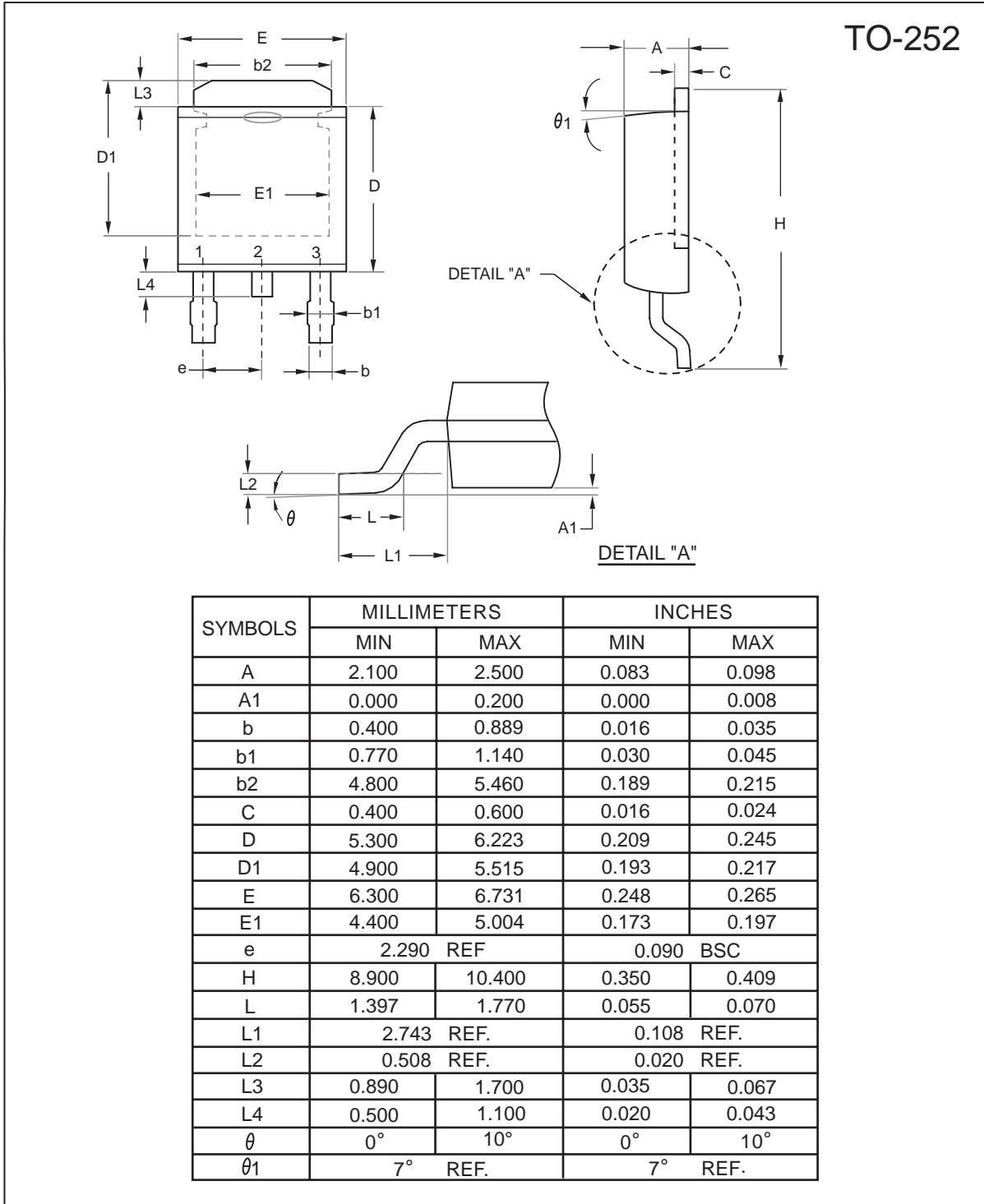


Figure 14. Normalized Thermal Transient Impedance Curve

STU09N25 STD09N25

Ver 1.0



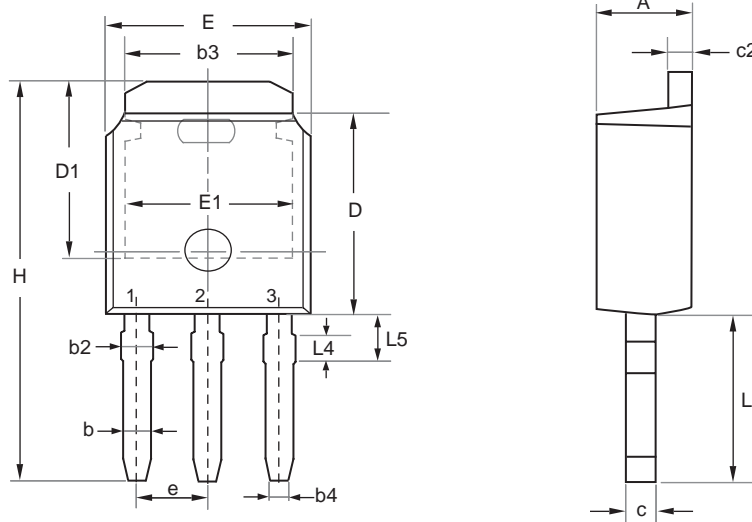
Sep,09,2013

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	---

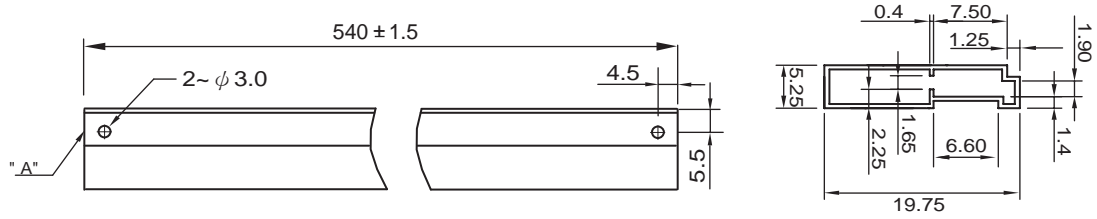
Sep,09,2013

STU09N25 STD09N25

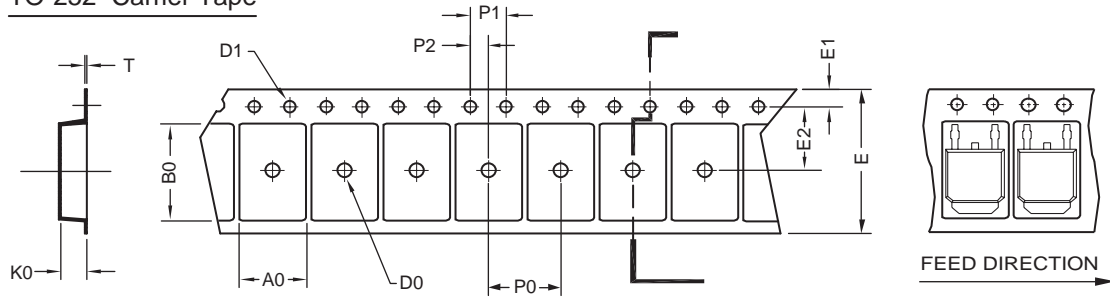
Ver 1.0

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

TO-251 Tube



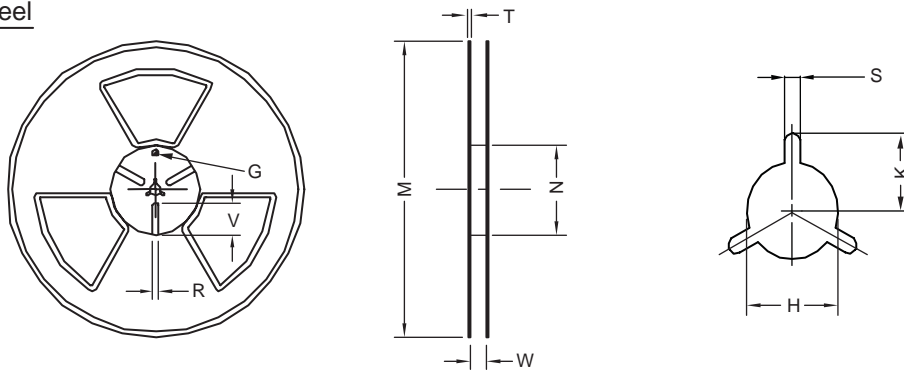
TO-252 Carrier Tape



UNIT:mm

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

TO-252 Reel



UNIT:mm

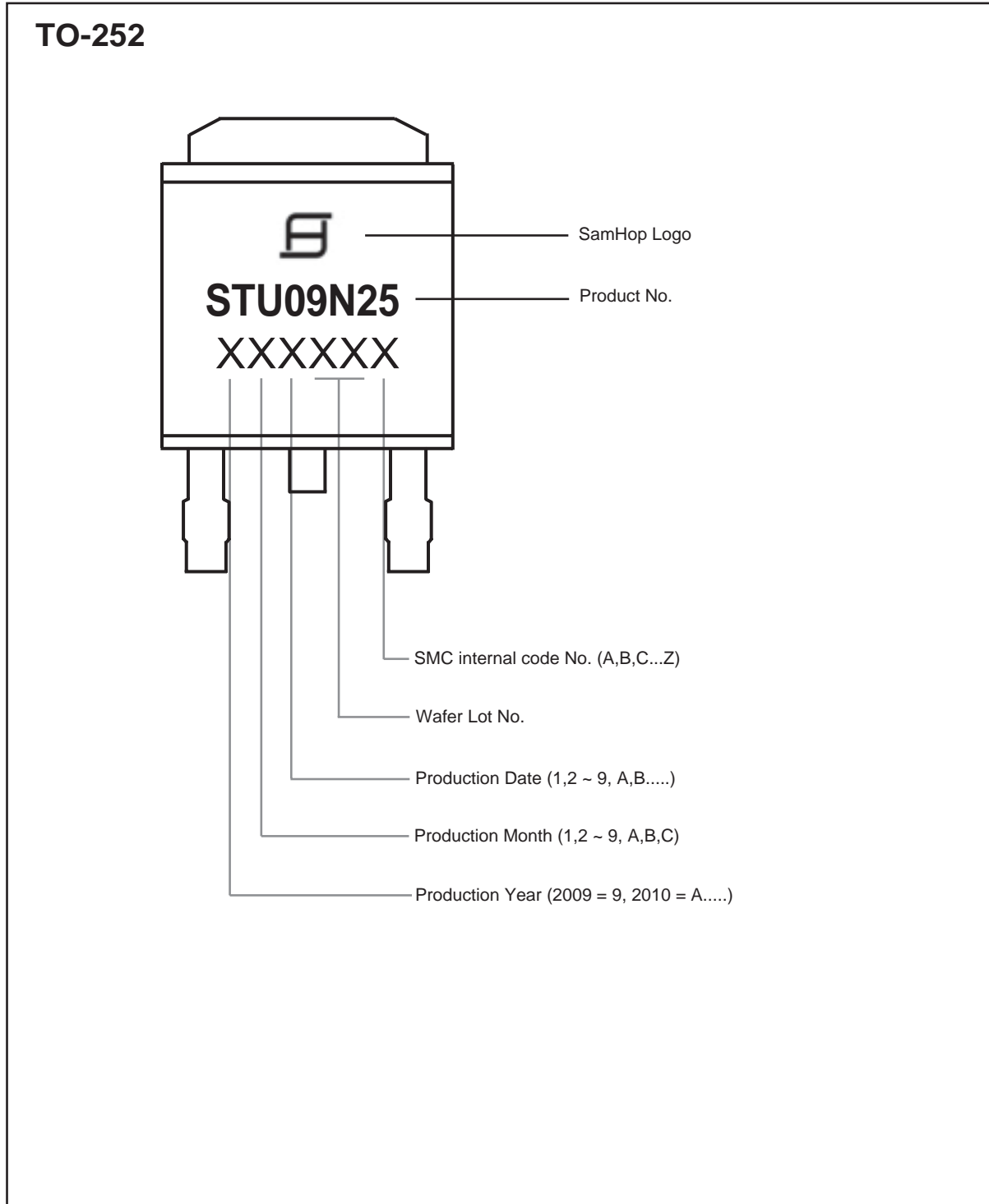
TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 mm	φ 330	φ 330 ± 0.5	φ 97 ± 1.0	17.0 + 1.5 - 0	2.2	φ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---

Sep,09,2013

STU09N25 STD09N25

Ver 1.0

TOP MARKING DEFINITION

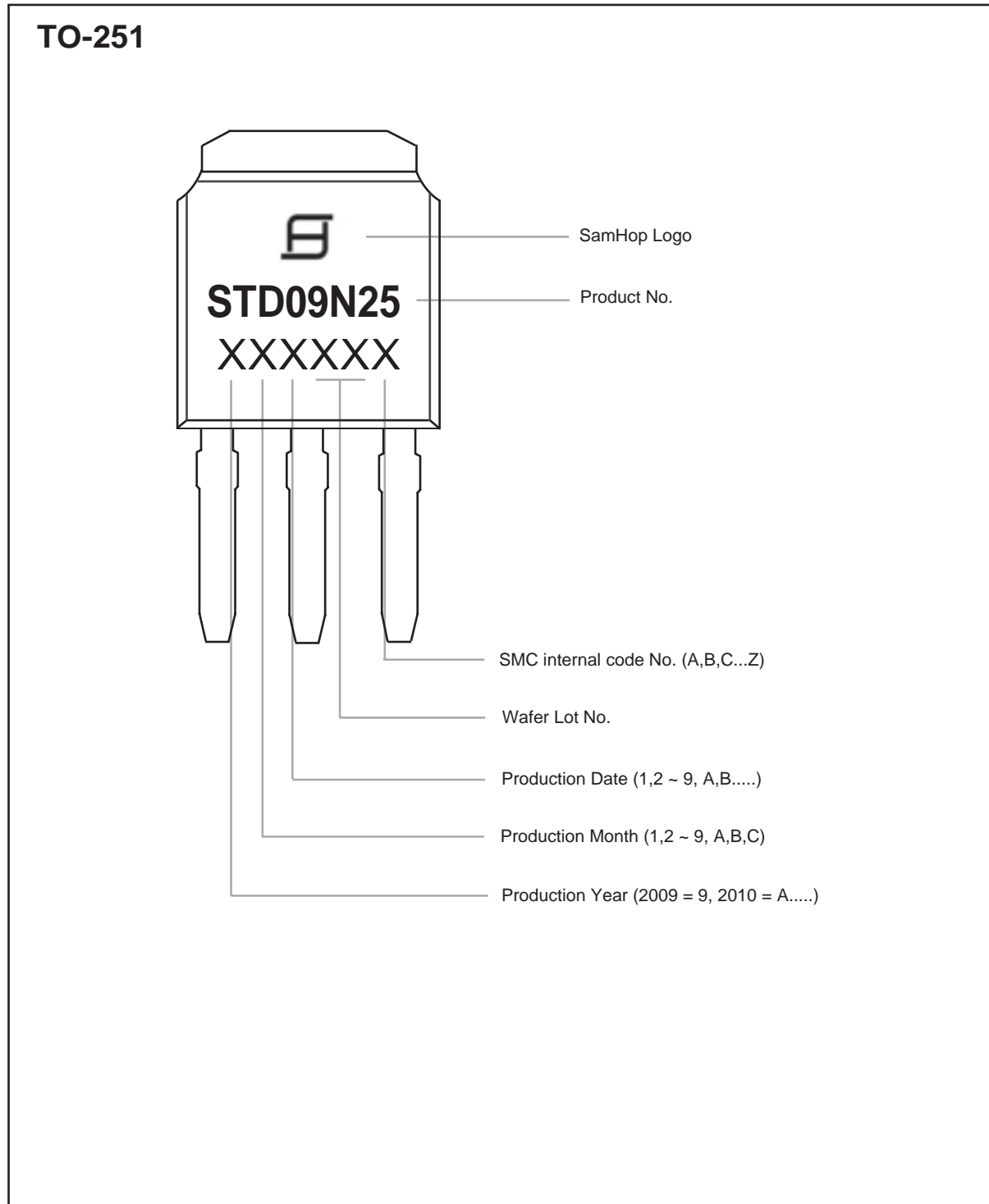


Sep,09,2013

STU09N25 STD09N25

Ver 1.0

TOP MARKING DEFINITION



Sep,09,2013