



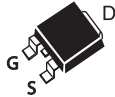
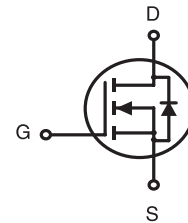
N-Channel Logic Level Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
60V	36A	15 @ V _{GS} =10V
		23 @ V _{GS} =4.5V

FEATURES

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

STU SERIES
TO-252AA(D-PAK)STD SERIES
TO-251(I-PAK)

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

Symbol	Parameter	Limit	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current-Continuous ^{a c}	T _C =25°C	36
		T _C =70°C	29
I _{DM}	-Pulsed ^c	110	A
E _{AS}	Single Pulse Avalanche Energy ^d	132	mJ
P _D	Maximum Power Dissipation ^a	T _C =25°C	42
		T _C =70°C	27
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to 150	°C

THERMAL CHARACTERISTICS

R _{θJC}	Thermal Resistance, Junction-to-Case ^a	3	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient ^a	50	°C/W

STU670S

STD670S

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 =250uA	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =48V , V _{GS} =0V			1	uA
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 =250uA	1	1.8	3	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V , I _D =18A		12	15	m ohm
		V _{GS} =4.5V , I _D =15A		17	23	m ohm
g _{FS}	Forward Transconductance	V _{DS} =10V , I _D =18A		39		S
DYNAMIC CHARACTERISTICS ^b						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V f=1.0MHz		2854		pF
C _{oss}	Output Capacitance			146		pF
C _{rSS}	Reverse Transfer Capacitance			125		pF
SWITCHING CHARACTERISTICS ^b						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =30V I _D =1A V _{GS} =10V R _{GEN} = 6 ohm		36		ns
t _r	Rise Time			31		ns
t _{D(OFF)}	Turn-Off Delay Time			109		ns
t _f	Fall Time			28		ns
Q _g	Total Gate Charge	V _{DS} =30V, I _D =18A, V _{GS} =10V		26		nC
		V _{DS} =30V, I _D =18A, V _{GS} =4.5V		13		nC
Q _{gs}	Gate-Source Charge	V _{DS} =30V, I _D =18A, V _{GS} =10V		3.2		nC
Q _{gd}	Gate-Drain Charge			8.6		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =2A		0.75	1.3	V

Notes

- Surface Mounted on FR4 Board of 1 inch², 1oz.
- Guaranteed by design, not subject to production testing.
- Drain current limited by maximum junction temperature.
- Starting T_J=25°C, L=0.5mH, V_{DD}= 30V. (See Figure13)

Apr,29,2014

STU670S STD670S

Ver 1.0

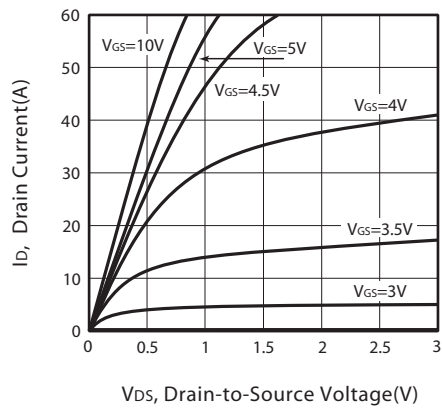


Figure 1. Output Characteristics

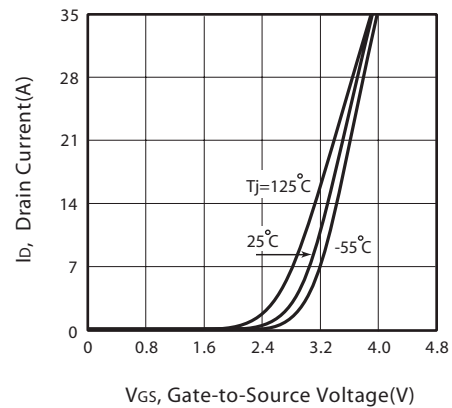


Figure 2. Transfer Characteristics

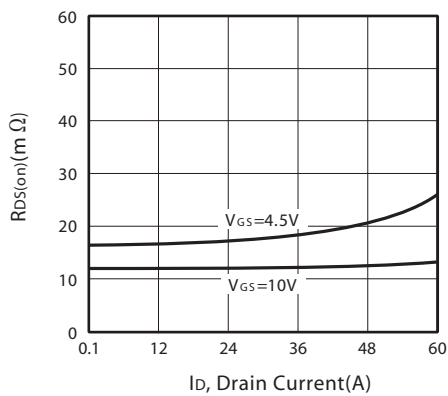


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

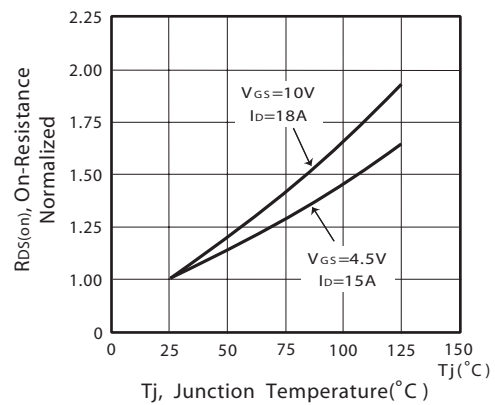


Figure 4. On-Resistance Variation with Drain Current and Temperature

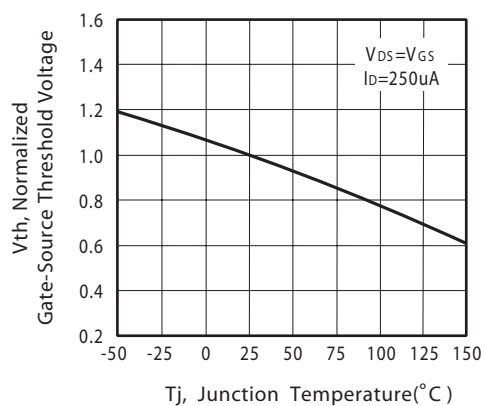


Figure 5. Gate Threshold Variation with Temperature

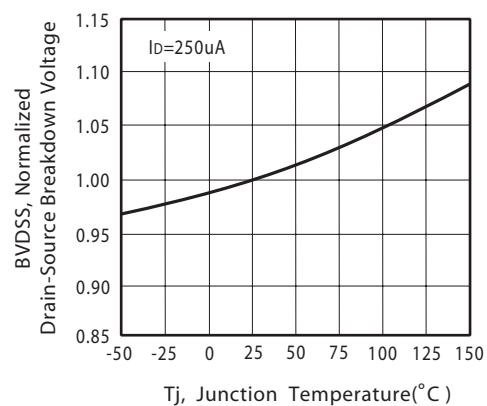


Figure 6. Breakdown Voltage Variation with Temperature

Apr,29,2014

STU670S STD670S

Ver 1.0

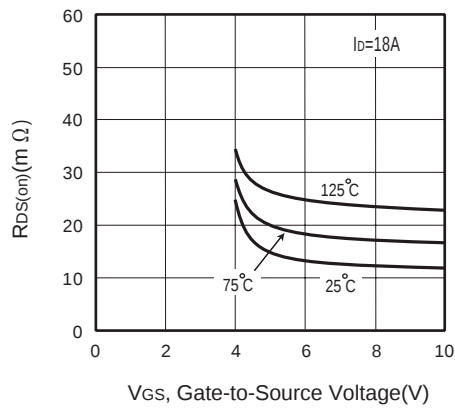


Figure 7. On-Resistance vs. Gate-Source Voltage

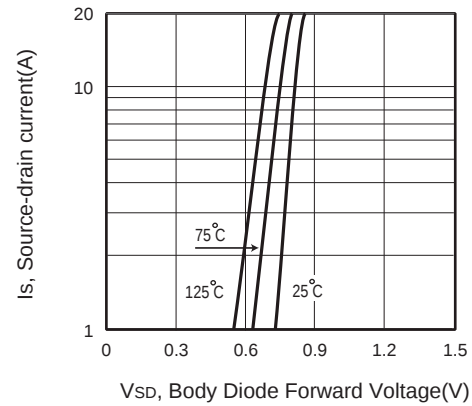


Figure 8. Body Diode Forward Voltage Variation with Source Current

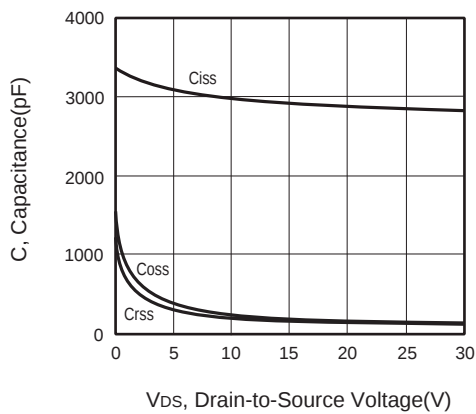


Figure 9. Capacitance

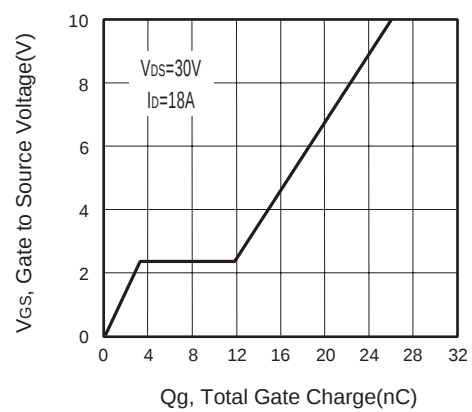


Figure 10. Gate Charge

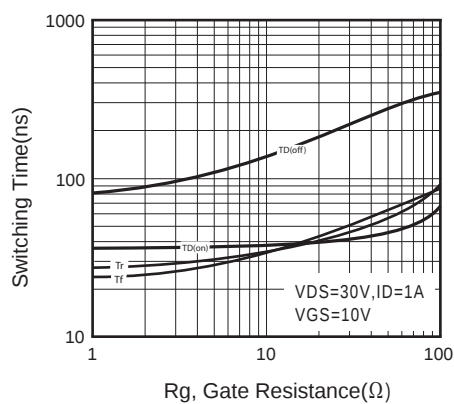


Figure 11. switching characteristics

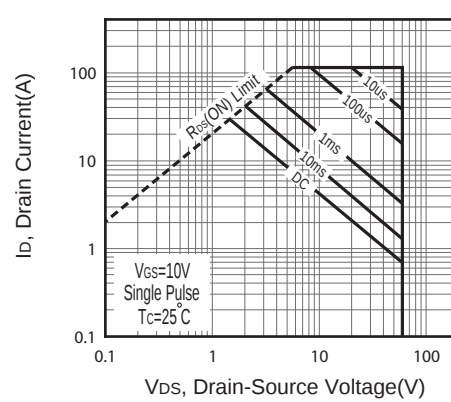
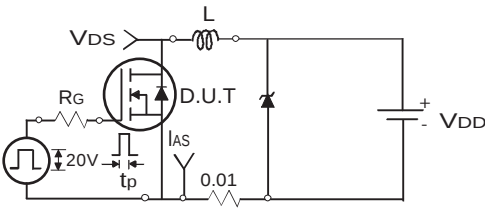


Figure 12. Maximum Safe Operating Area

Apr,29,2014

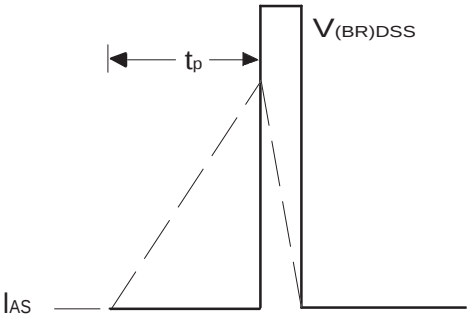
STU670S
STD670S

Ver 1.0



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

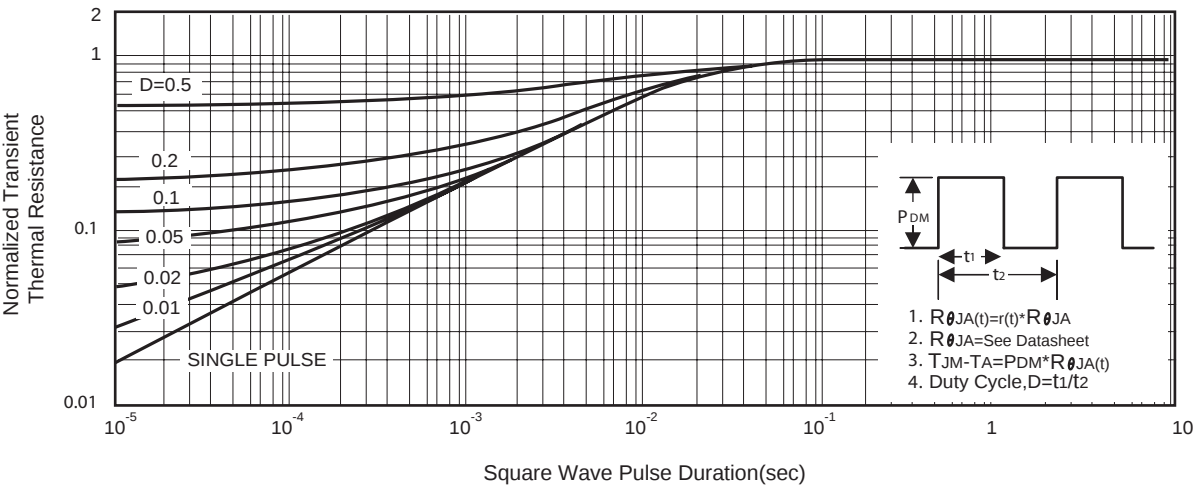


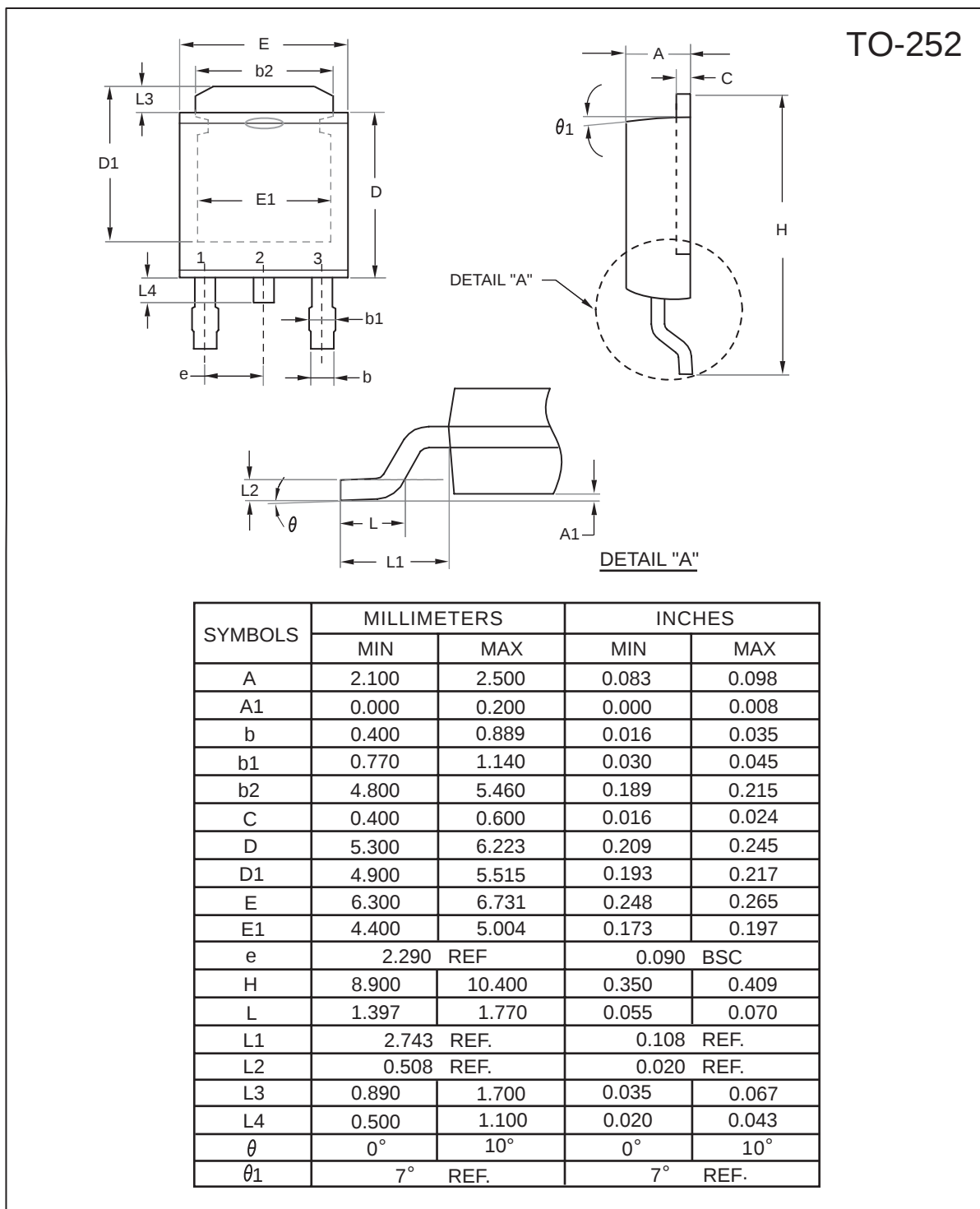
Figure 14. Normalized Thermal Transient Impedance Curve

Apr,29,2014

STU670S

STD670S

Ver 1.0



Apr,29,2014

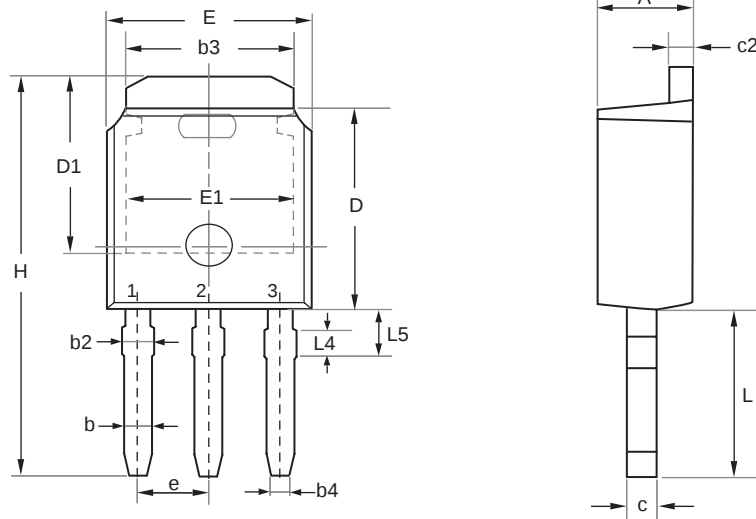
STU670S

STD670S

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	---

Apr,29,2014

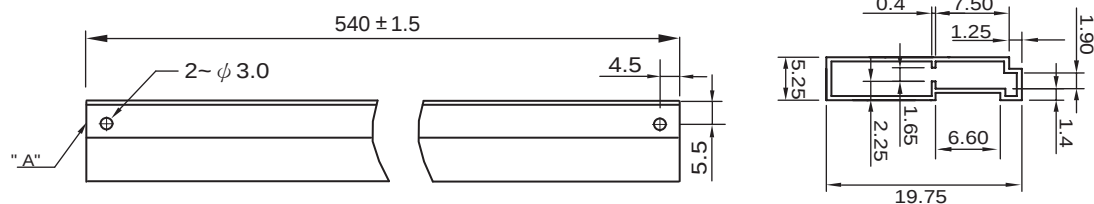
STU670S

STD670S

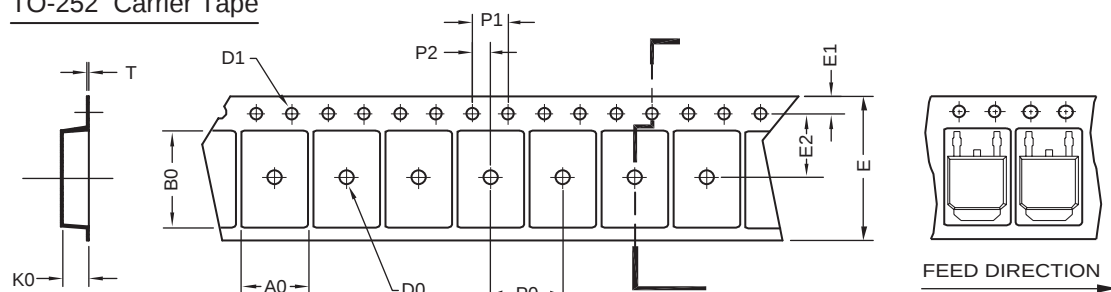
Ver 1.0

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

TO-251 Tube



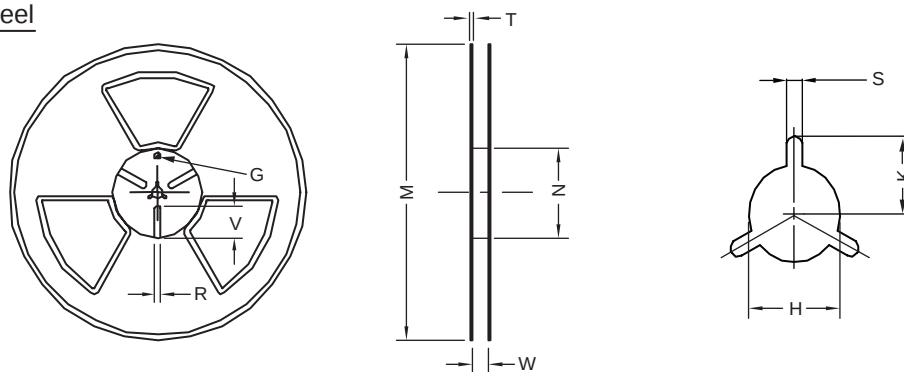
TO-252 Carrier Tape



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	---	---	---

Apr,29,2014

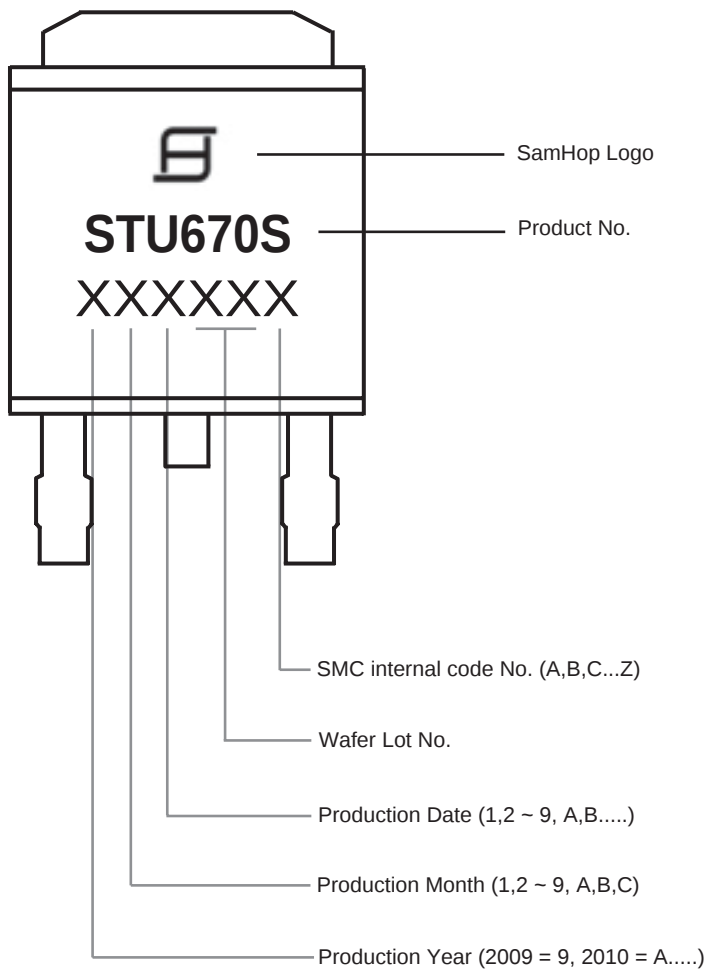
STU670S

STD670S

Ver 1.0

TOP MARKING DEFINITION

TO-252



Apr,29,2014

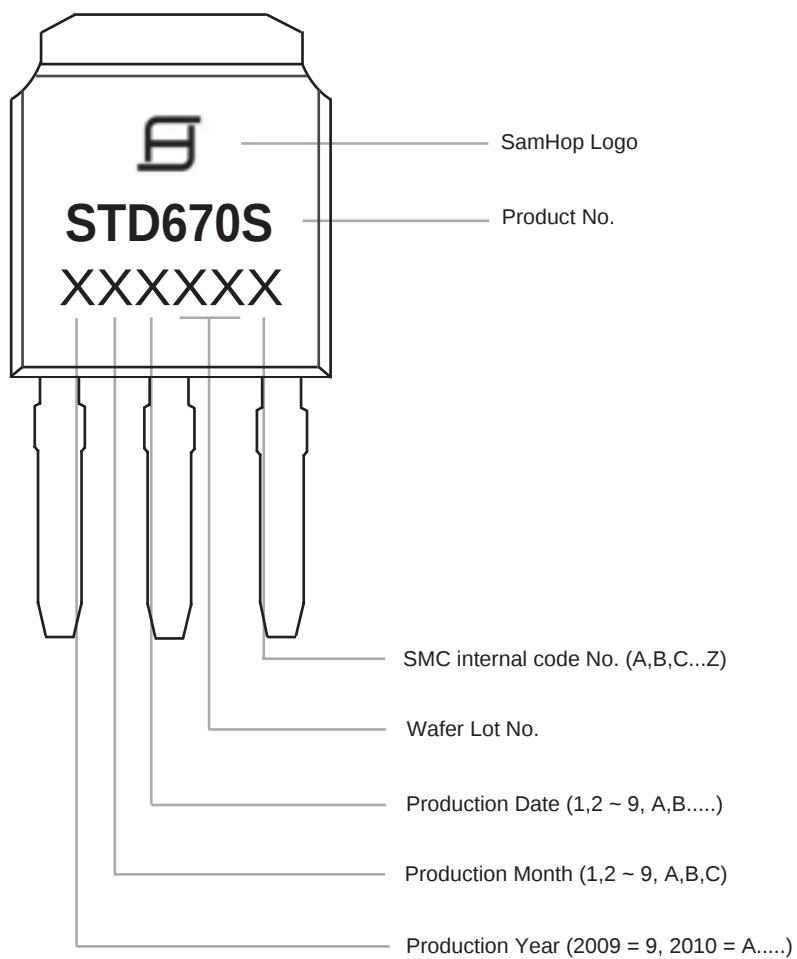
STU670S

STD670S

Ver 1.0

TOP MARKING DEFINITION

TO-251



Apr,29,2014