



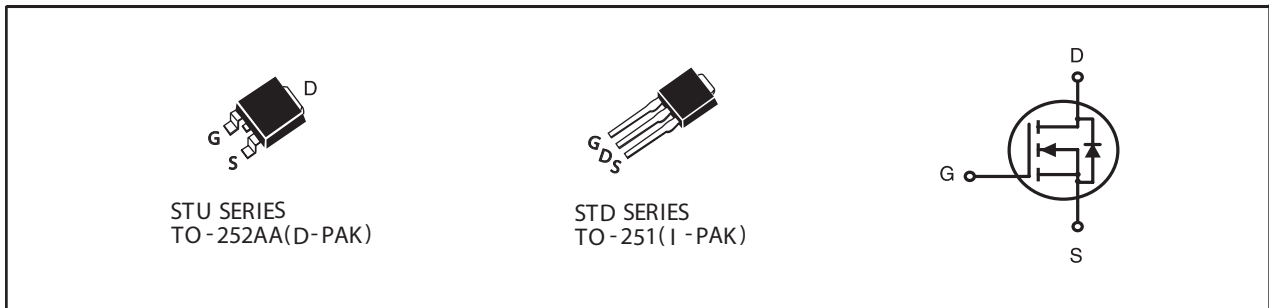
## N-Channel Logic Level Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

VDSS	ID	RDS(ON) (mΩ) Max
30V	52A	6.3 @ VGS=10V
		9.5 @ VGS=4.5V

### FEATURES

- Super high dense cell design for low RDS(ON).
- 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	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current-Continuous	T <sub>C</sub> =25°C	52
		T <sub>C</sub> =70°C	42
I <sub>DM</sub>	-Pulsed <sup>a</sup>	152	A
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>c</sup>	156	mJ
P <sub>D</sub>	Maximum Power Dissipation	T <sub>C</sub> =25°C	42
		T <sub>C</sub> =70°C	27
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	°C

### THERMAL CHARACTERISTICS

R <sub>θ JC</sub>	Thermal Resistance, Junction-to-Case	3	°C/W
R <sub>θ JA</sub>	Thermal Resistance, Junction-to-Ambient	50	°C/W

# STU/D326S

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> =250uA	30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V			1	uA
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> =250uA	1.0	1.5	3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =26A		5	6.3	m ohm
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =21A		7.5	9.5	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =26A		30		S
<b>DYNAMIC CHARACTERISTICS<sup>b</sup></b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1.0MHz		1195		pF
C <sub>OSS</sub>	Output Capacitance			245		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			205		pF
<b>SWITCHING CHARACTERISTICS<sup>b</sup></b>						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>GEN</sub> = 6 ohm		19		ns
t <sub>r</sub>	Rise Time			26		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			69		ns
t <sub>f</sub>	Fall Time			14		ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =26A, V <sub>GS</sub> =10V		19.5		nC
		V <sub>DS</sub> =15V, I <sub>D</sub> =26A, V <sub>GS</sub> =4.5V		10		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =26A, V <sub>GS</sub> =10V		2		nC
Q <sub>gd</sub>	Gate-Drain Charge			6.5		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> =5A		0.79	1.3	V

### Notes

- Pulse Test: Pulse Width < 300us, Duty Cycle < 2%.
- Guaranteed by design, not subject to production testing.
- Starting T<sub>J</sub>=25°C, L=0.5mH, V<sub>DD</sub> = 20V. (See Figure13)

Apr,23,2012

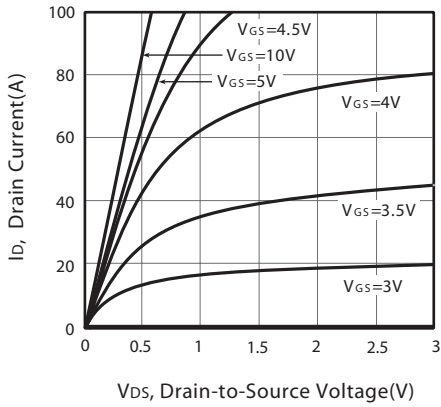


Figure 1. Output Characteristics

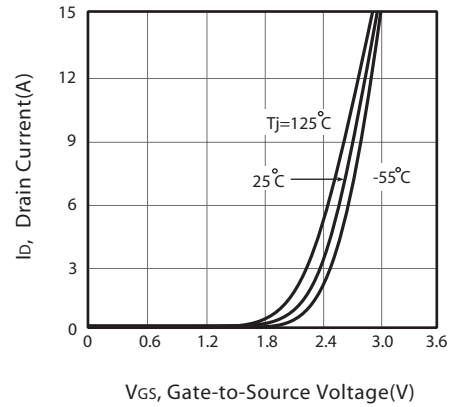


Figure 2. Transfer Characteristics

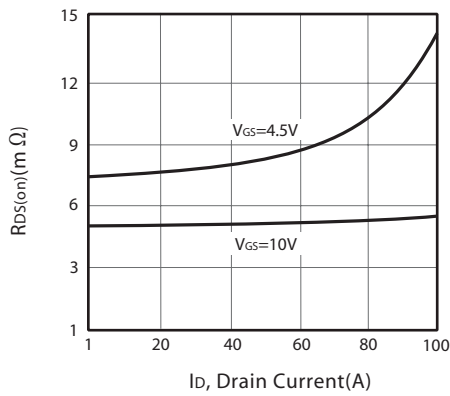


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

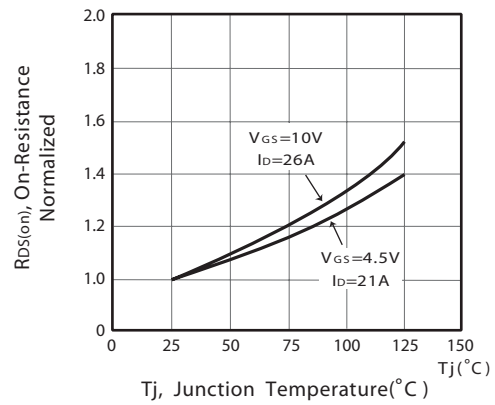


Figure 4. On-Resistance Variation with Drain Current and Temperature

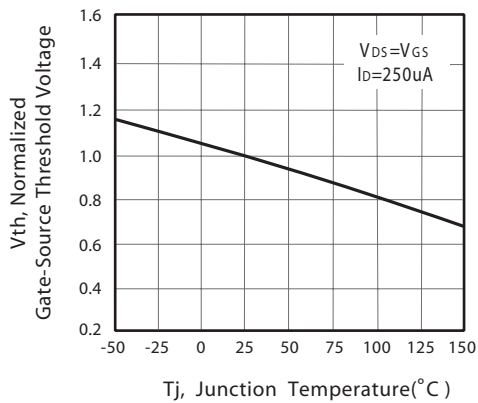


Figure 5. Gate Threshold Variation with Temperature

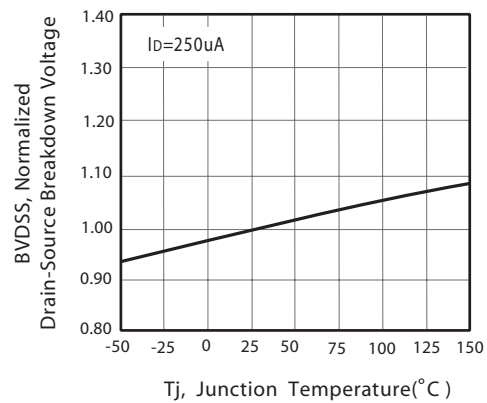


Figure 6. Breakdown Voltage Variation with Temperature

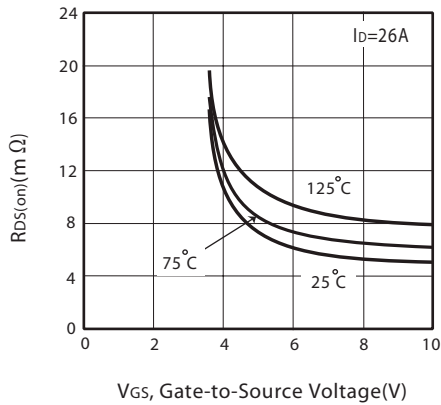


Figure 7. On-Resistance vs. Gate-Source Voltage

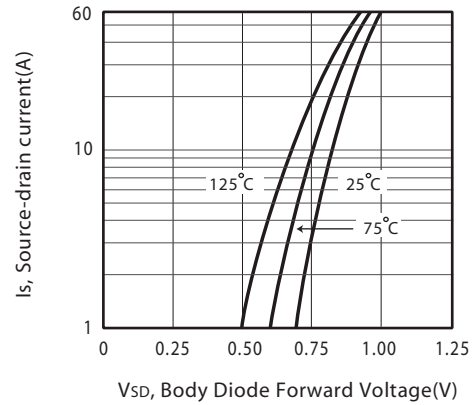


Figure 8. Body Diode Forward Voltage Variation with Source Current

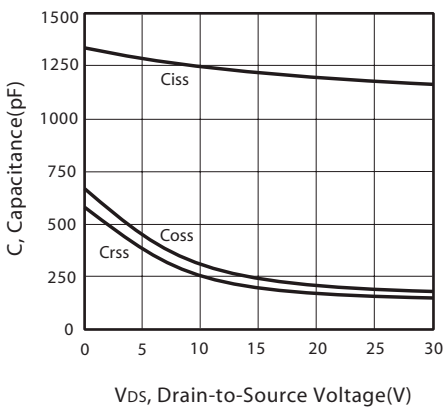


Figure 9. Capacitance

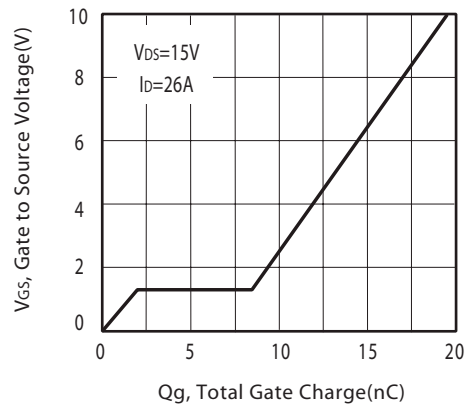


Figure 10. Gate Charge

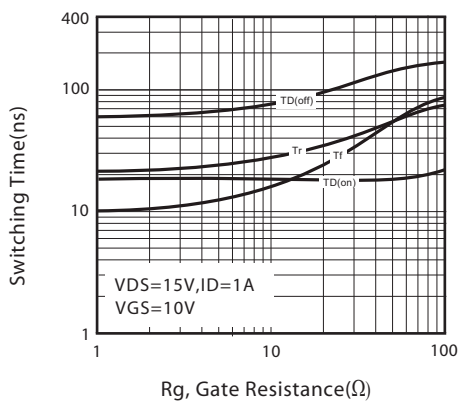


Figure 11. switching characteristics

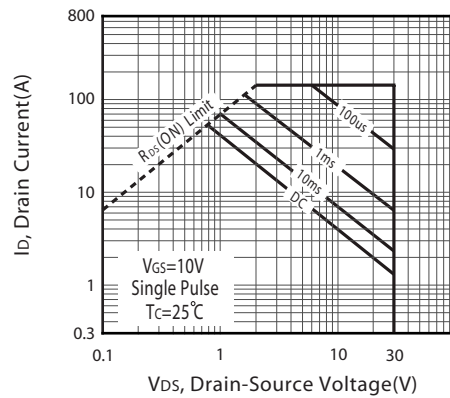
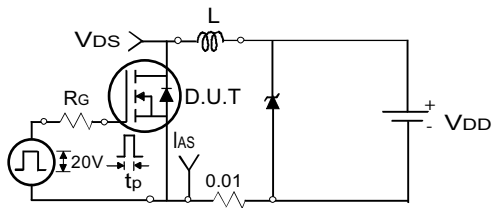
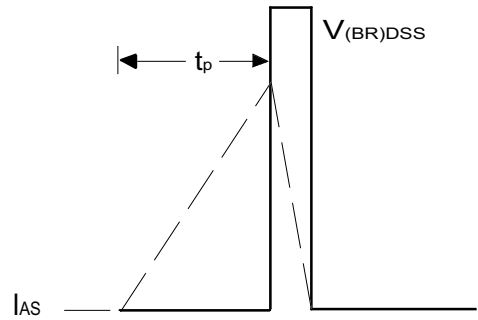


Figure 12. Maximum Safe Operating Area



Uncamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

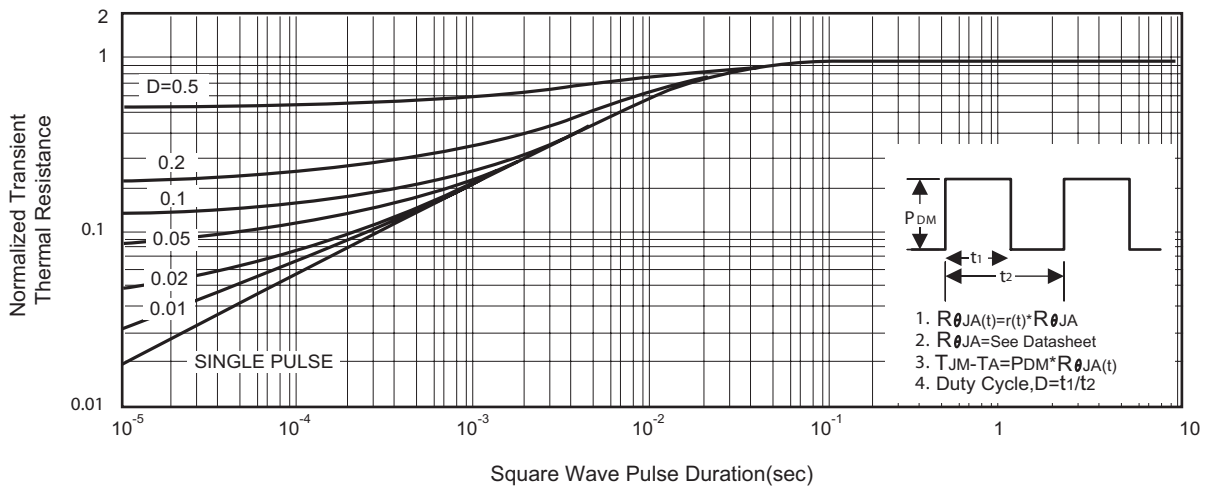
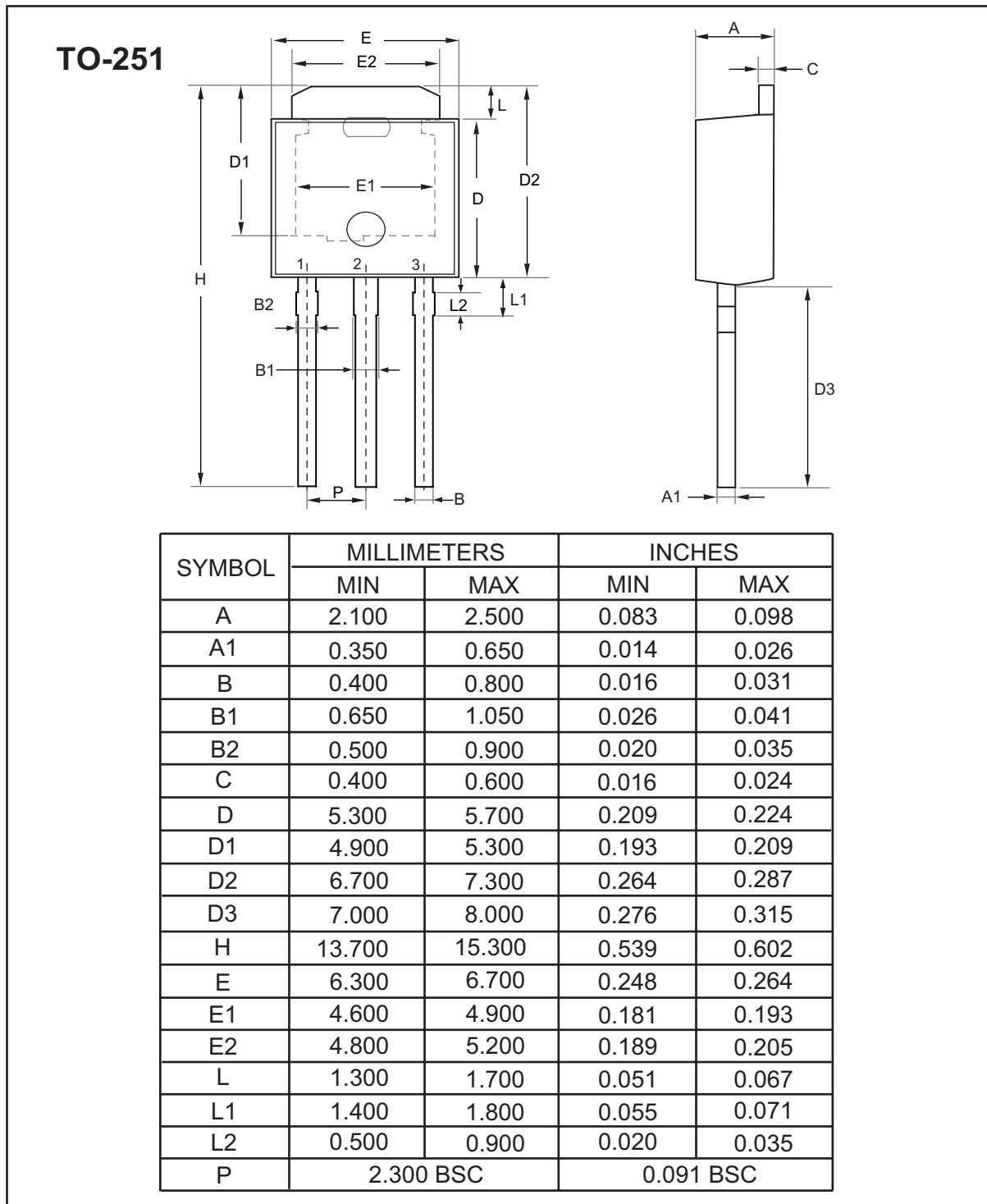
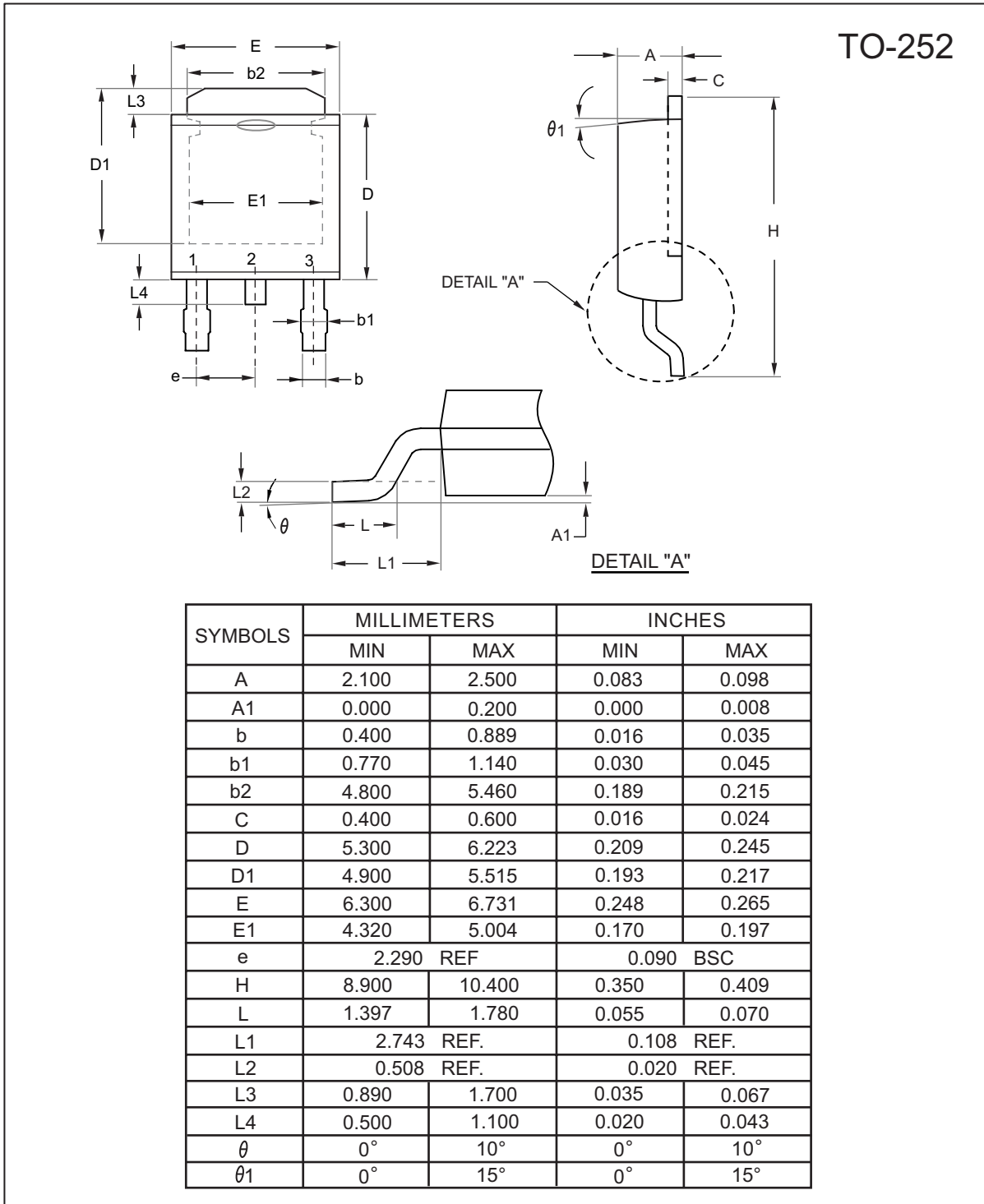


Figure 14. Normalized Thermal Transient Impedance Curve

## PACKAGE OUTLINE DIMENSIONS





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

### TO-251 Tube



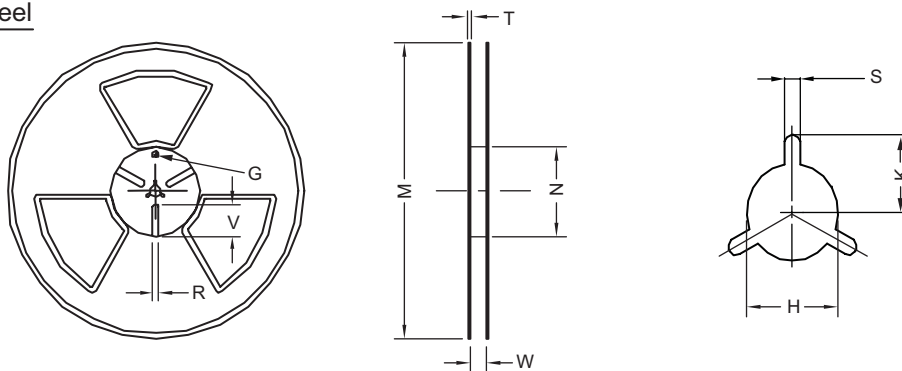
### TO-252 Carrier Tape



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	---	---	---