



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

### PRODUCT SUMMARY

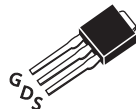
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Max
30V	25A	25 @ V <sub>GS</sub> =10V
		35 @ V <sub>GS</sub> =4.5V

### FEATURES

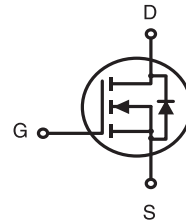
- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- TO-252 and TO-251 Package.



STU SERIES  
TO-252AA(D-PAK)



STD SERIES  
TO-251(I-PAK)



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</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 <sup>a</sup>	T <sub>C</sub> =25°C	25
		T <sub>C</sub> =70°C	20
I <sub>DM</sub>	-Pulsed <sup>b</sup>	63	A
P <sub>D</sub>	Maximum Power Dissipation <sup>a</sup>	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>θJC</sub>	Thermal Resistance, Junction-to-Case <sup>a</sup>	3	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient <sup>a</sup>	50	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
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
ON CHARACTERISTICS						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	0.7	1.5	2.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =20A		15	25	m ohm
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =20A		25	35	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V , I <sub>D</sub> =20A		10		S
DYNAMIC CHARACTERISTICS <sup>c</sup>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V,V <sub>GS</sub> =0V f=1.0MHz		570	720	pF
C <sub>OSS</sub>	Output Capacitance			93	117	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			74	92	pF
SWITCHING CHARACTERISTICS <sup>c</sup>						
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> = 11 ohm		10.5	12.9	ns
t <sub>r</sub>	Rise Time			14.3	17.8	ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			20	25	ns
t <sub>f</sub>	Fall Time			22.1	27.6	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V,I <sub>D</sub> =20A,V <sub>GS</sub> =10V		11	13.7	nC
		V <sub>DS</sub> =15V,I <sub>D</sub> =20A,V <sub>GS</sub> =4.5V		5.5	6.8	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V,I <sub>D</sub> =20A, V <sub>GS</sub> =10V		1.2	1.5	nC
Q <sub>gd</sub>	Gate-Drain Charge			3.4	4	nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V <sub>SD</sub>	Diode Forward Voltage <sup>b</sup>	V <sub>GS</sub> =0V,I <sub>S</sub> =15A		1	1.3	V
Notes						
a.Surface Mounted on FR4 Board,t ≤ 10sec.						
b.Pulse Test:Pulse Width ≤ 300us, Duty Cycle ≤ 2%.						
c.Guaranteed by design, not subject to production testing.						

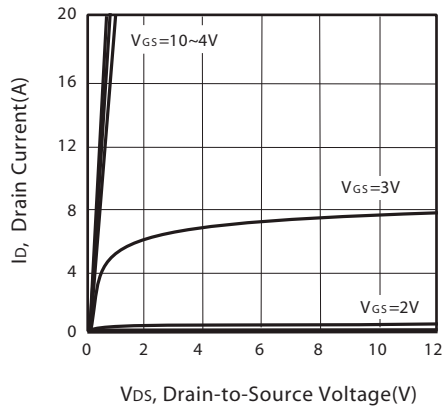


Figure 1. Output Characteristics

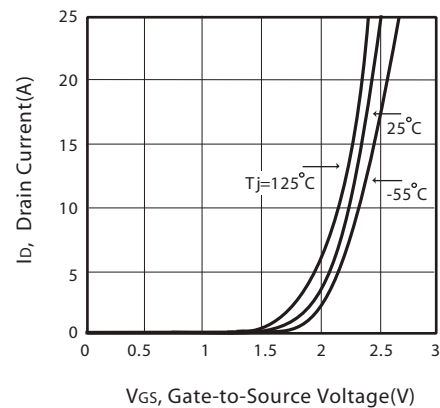


Figure 2. Transfer Characteristics

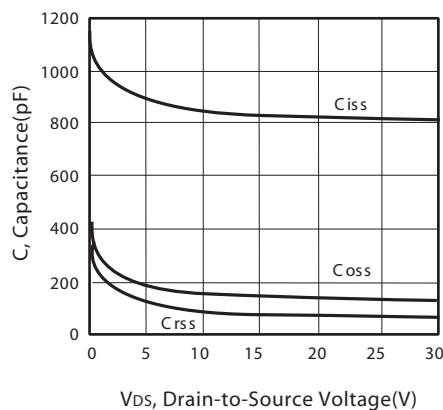


Figure 3. Capacitance

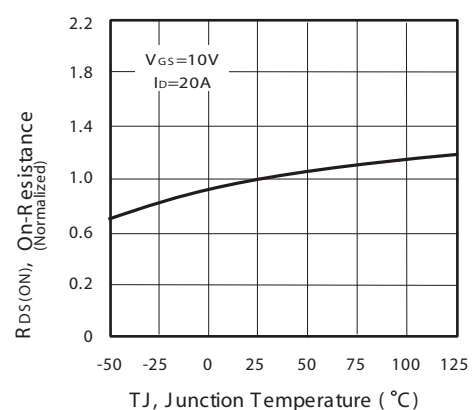


Figure 4. On-Resistance Variation with Temperature

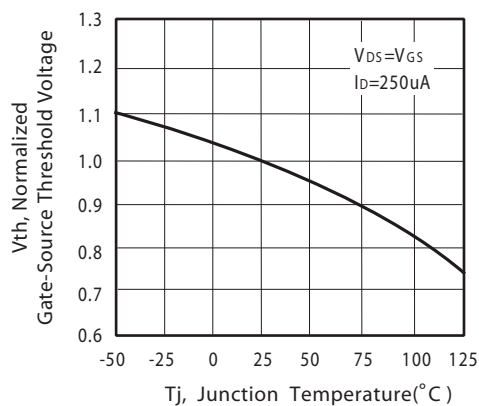


Figure 5. Gate Threshold Variation with Temperature

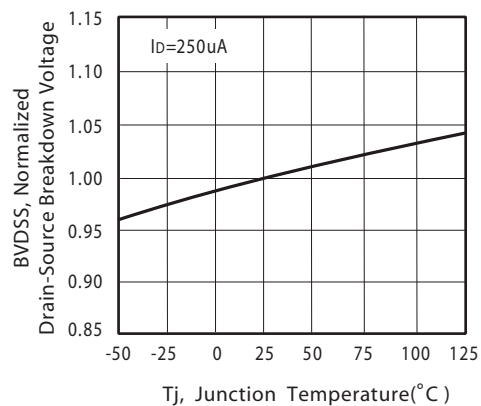


Figure 6. Breakdown Voltage Variation with Temperature

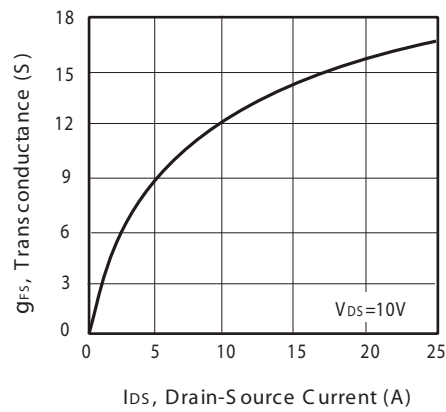


Figure 7. Transconductance Variation with Drain Current

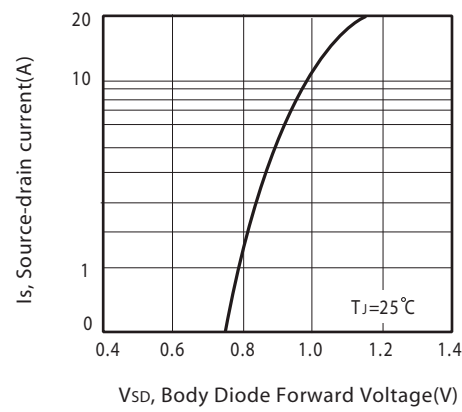


Figure 8. Body Diode Forward Voltage Variation with Source Current

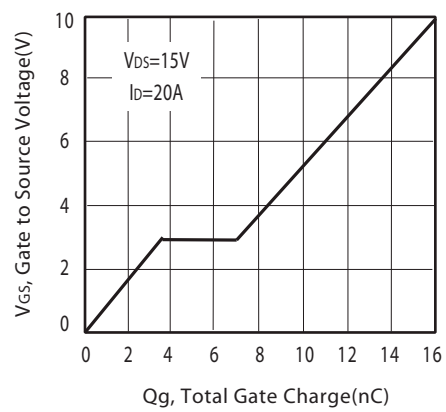


Figure 9. Gate Charge

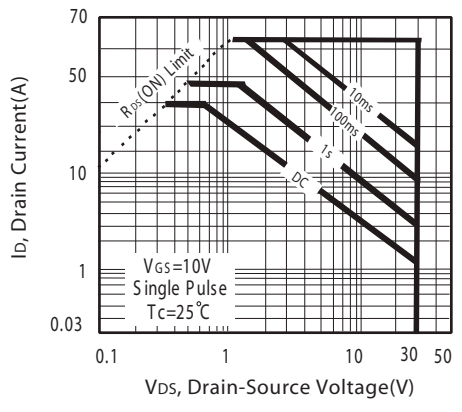


Figure 10. Maximum Safe Operating Area

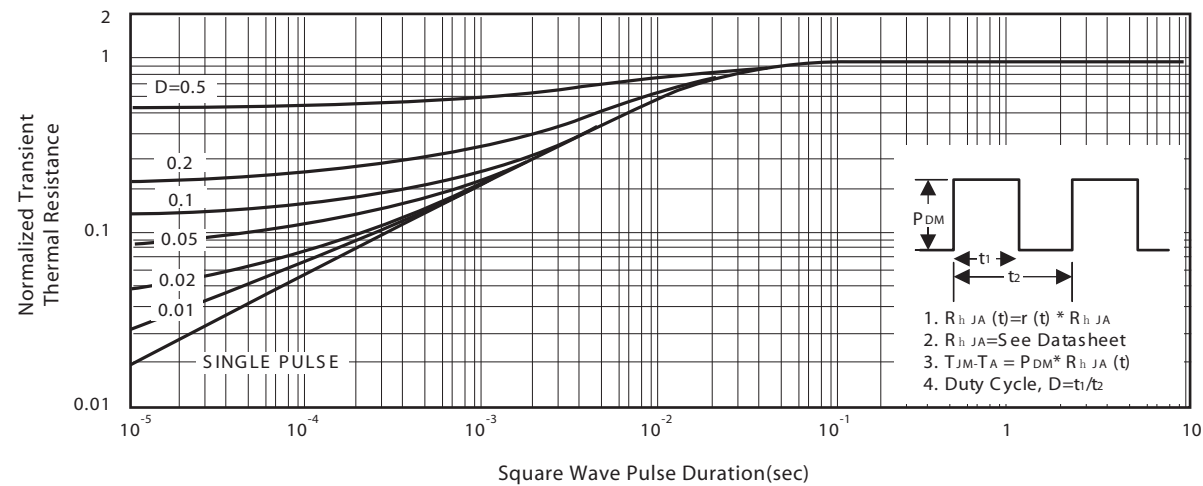
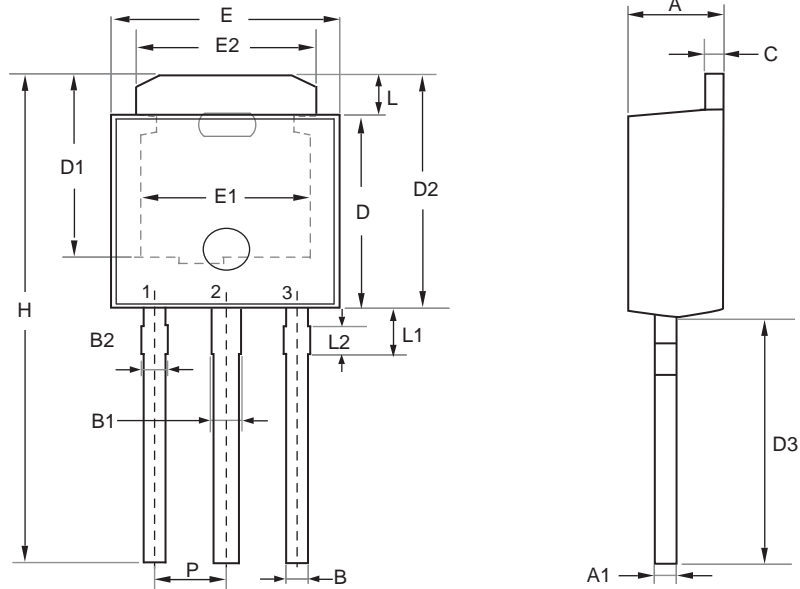


Figure 11. Normalized Thermal Transient Impedance Curve

## PACKAGE OUTLINE DIMENSIONS

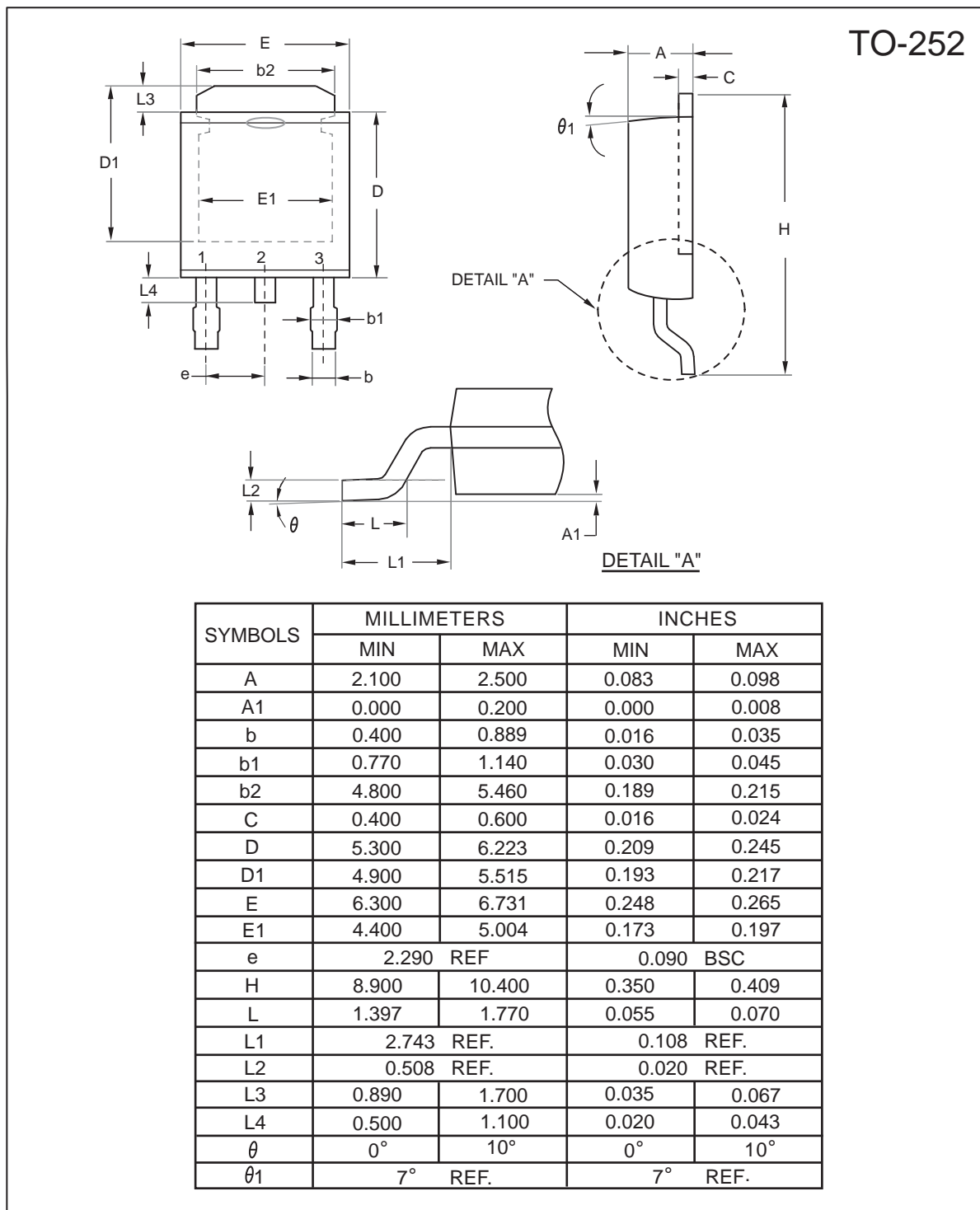
TO-251



SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.100	2.500	0.083	0.098
A1	0.350	0.650	0.014	0.026
B	0.400	0.800	0.016	0.031
B1	0.650	1.050	0.026	0.041
B2	0.500	0.900	0.020	0.035
C	0.400	0.600	0.016	0.024
D	5.300	5.700	0.209	0.224
D1	4.900	5.300	0.193	0.209
D2	6.700	7.300	0.264	0.287
D3	7.000	8.000	0.276	0.315
H	10.830	11.430	0.426	0.450
E	6.300	6.700	0.248	0.264
E1	4.600	4.900	0.181	0.193
E2	4.800	5.200	0.189	0.205
L	1.300	1.700	0.051	0.067
L1	1.400	1.800	0.055	0.071
L2	0.500	0.900	0.020	0.035
P	2.300 BSC		0.091 BSC	

# STU/D9916L

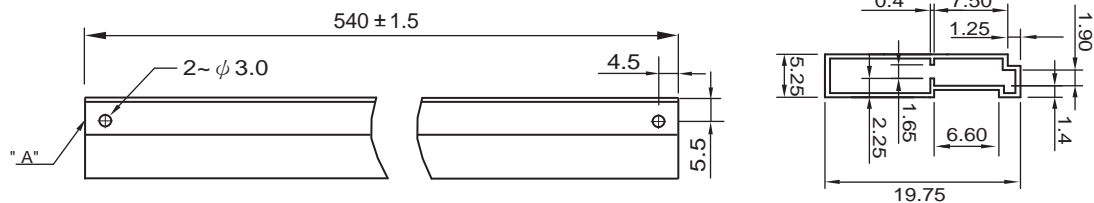
Ver 1.2



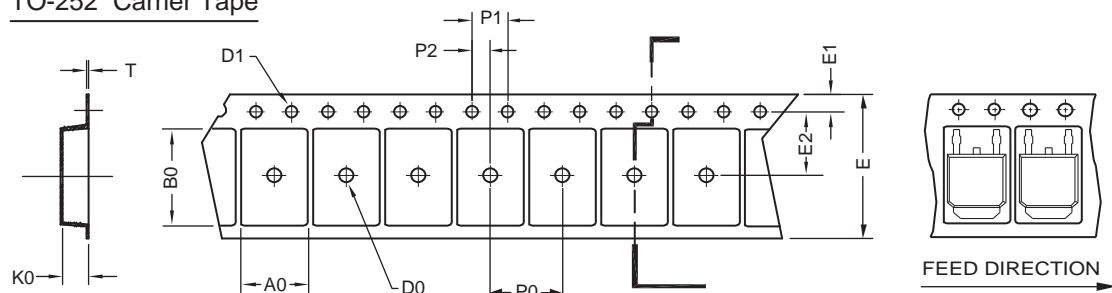
Apr,07,2010

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

### TO-251 Tube



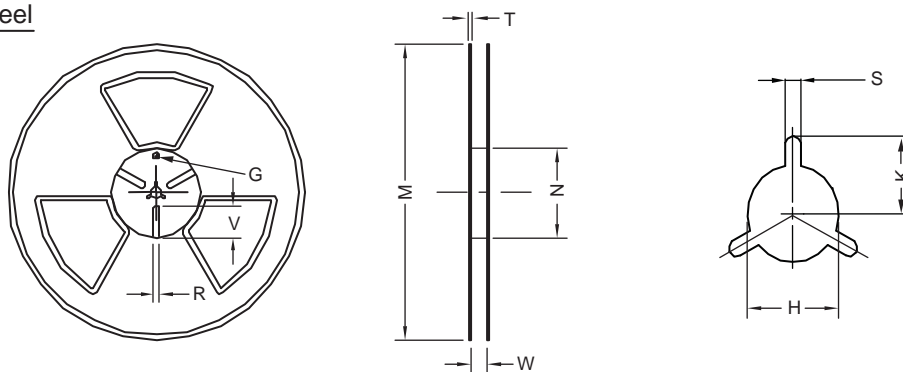
### TO-252 Carrier Tape



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	---	---	---