



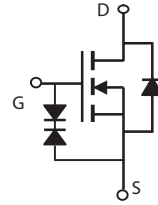
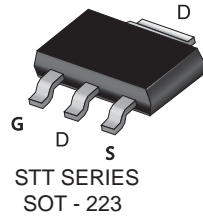
## N-Channel Logic Level Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

VDSS	ID	RDS(ON) (mΩ) Max
30V	3A	104 @ VGS=10V
		149 @ VGS=4.5V

### FEATURES

- Super high dense cell design for low RDS(ON).
- Rugged and reliable.
- Surface Mount Package.
- ESD Protected.



### ABSOLUTE MAXIMUM RATINGS (TA=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 e</sup>	T <sub>A</sub> =25°C	3
		T <sub>A</sub> =70°C	2.4
I <sub>DM</sub>	-Pulsed <sup>b</sup>	20	A
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>d</sup>	3.75	mJ
P <sub>D</sub>	Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> =25°C	3
		T <sub>A</sub> =70°C	1.9
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	°C

### THERMAL CHARACTERISTICS

R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient <sup>a</sup>	42	°C/W
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## ELECTRICAL CHARACTERISTICS (T<sub>A</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			±10	uA
<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	1.9	3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =1.5A		83	104	m ohm
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =1.3A		110	149	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =10V , I <sub>D</sub> =1.5A		5.8		S
<b>DYNAMIC CHARACTERISTICS <sup>c</sup></b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1.0MHz		154		pF
C <sub>OSS</sub>	Output Capacitance			23		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			14		pF
<b>SWITCHING CHARACTERISTICS <sup>c</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		16		ns
t <sub>r</sub>	Rise Time			13		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			137		ns
t <sub>f</sub>	Fall Time			43		ns
Q <sub>g</sub>	Total Gate Charge		V <sub>DS</sub> =15V, I <sub>D</sub> =1.5A, V <sub>GS</sub> =10V		3	
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =1.5A, V <sub>GS</sub> =10V		0.73		nC
Q <sub>gd</sub>	Gate-Drain Charge			1.3		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> =0.5A		0.8	1.2	V

### Notes

- Surface Mounted on FR4 Board, t ≤ 10sec.
- Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.
- Starting T<sub>J</sub>=25°C, L=0.3mH, V<sub>DD</sub> = 20V. (See Figure13)
- Drain current limited by maximum junction temperature.

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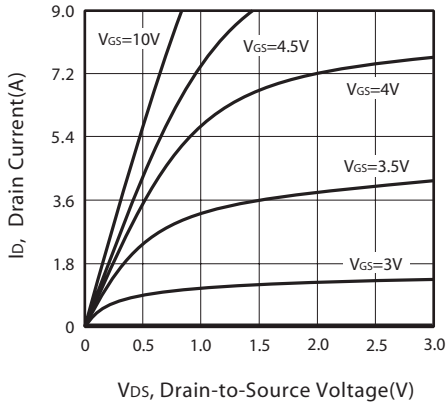


Figure 1. Output Characteristics

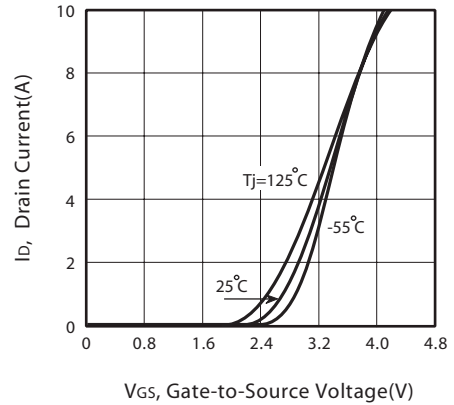


Figure 2. Transfer Characteristics

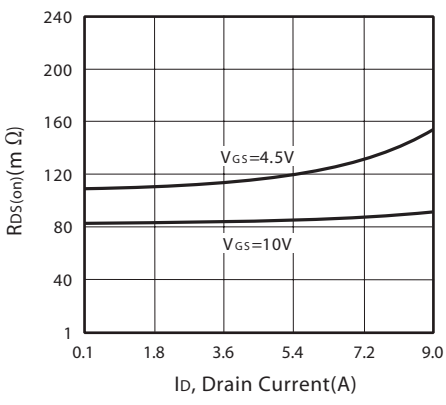


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

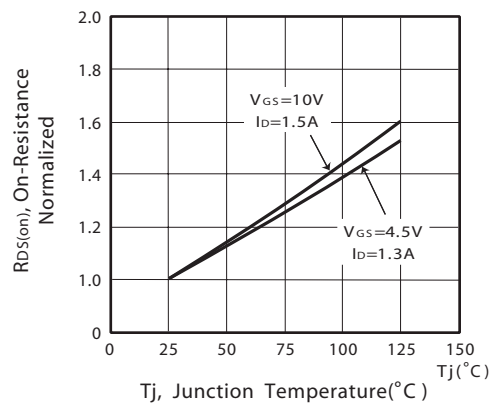


Figure 4. On-Resistance Variation with Drain Current and Temperature

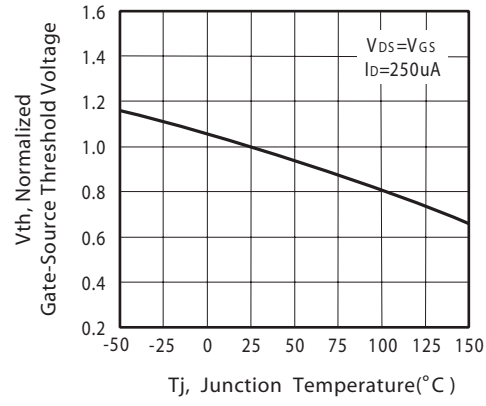


Figure 5. Gate Threshold Variation with Temperature

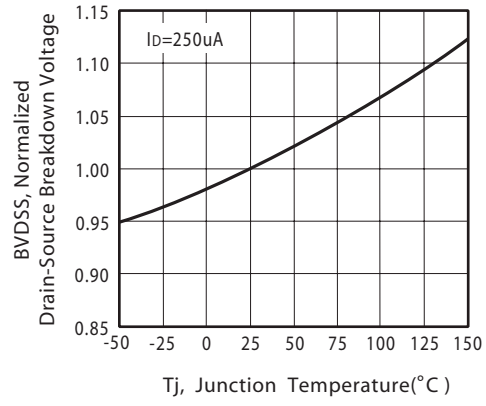


Figure 6. Breakdown Voltage Variation with Temperature

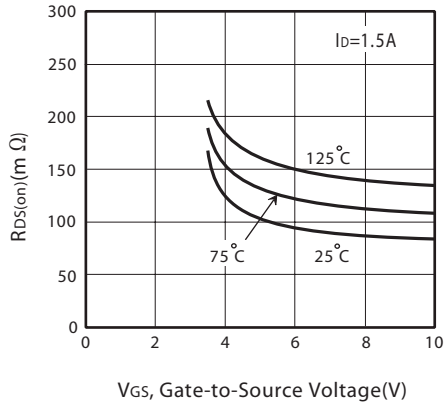


Figure 7. On-Resistance vs. Gate-Source Voltage

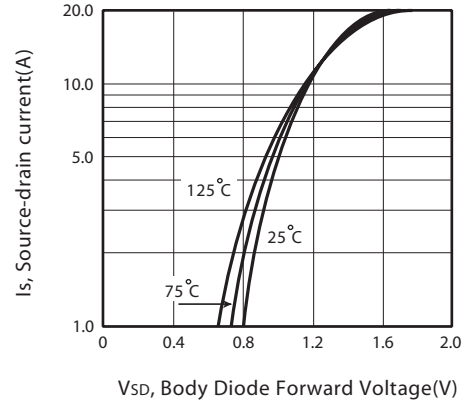


Figure 8. Body Diode Forward Voltage Variation with Source Current

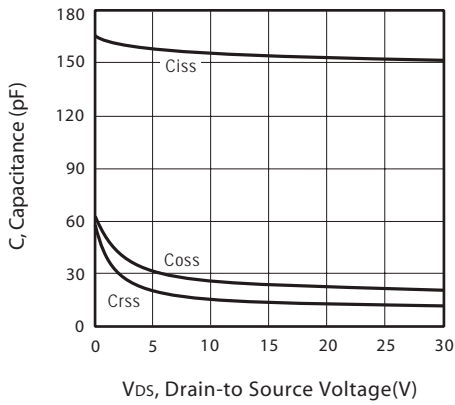


Figure 9. Capacitance

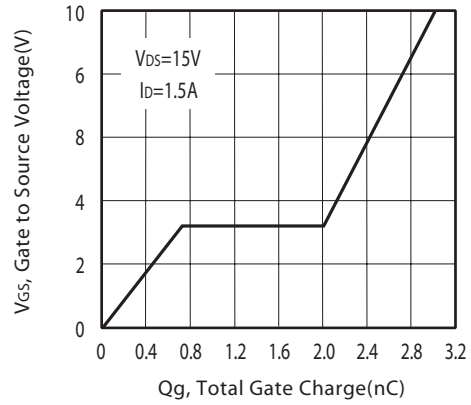


Figure 10. Gate Charge

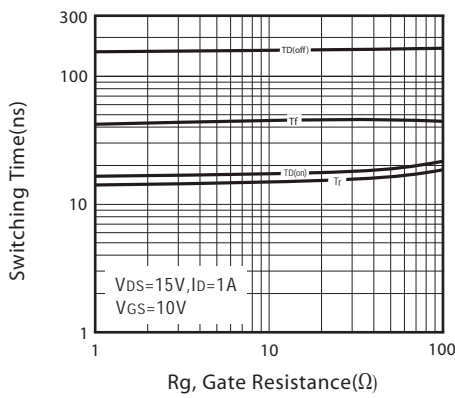


Figure 11. switching characteristics

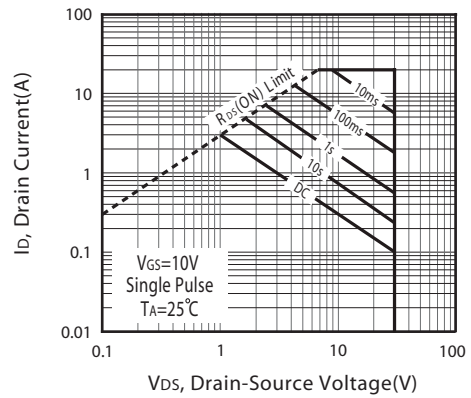
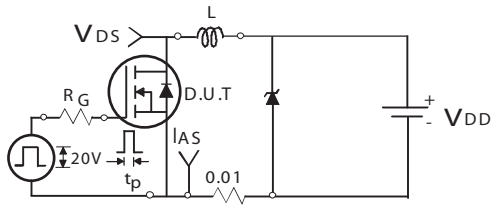
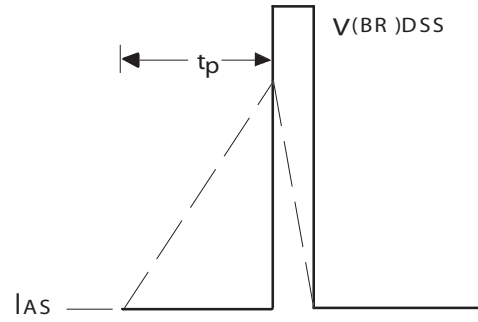


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

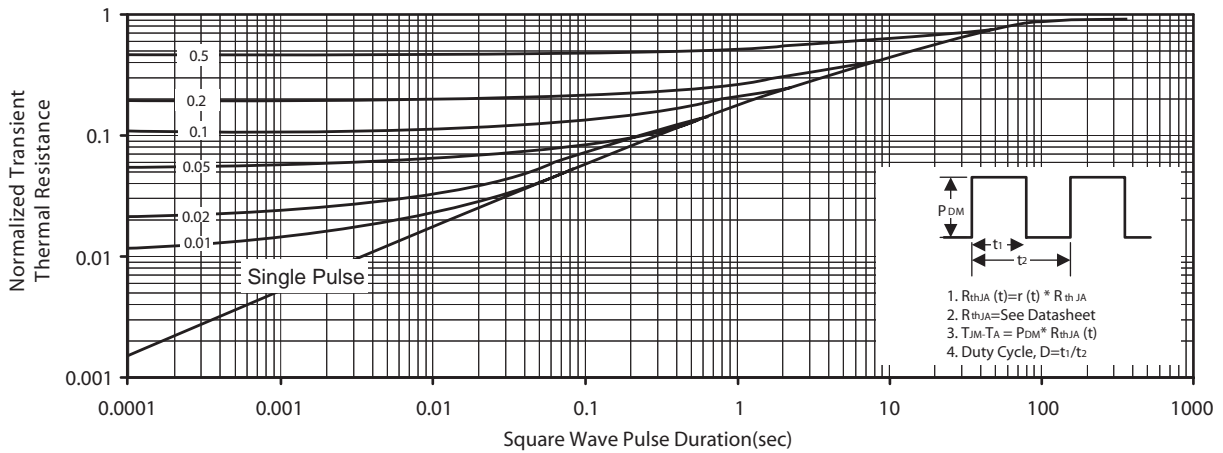
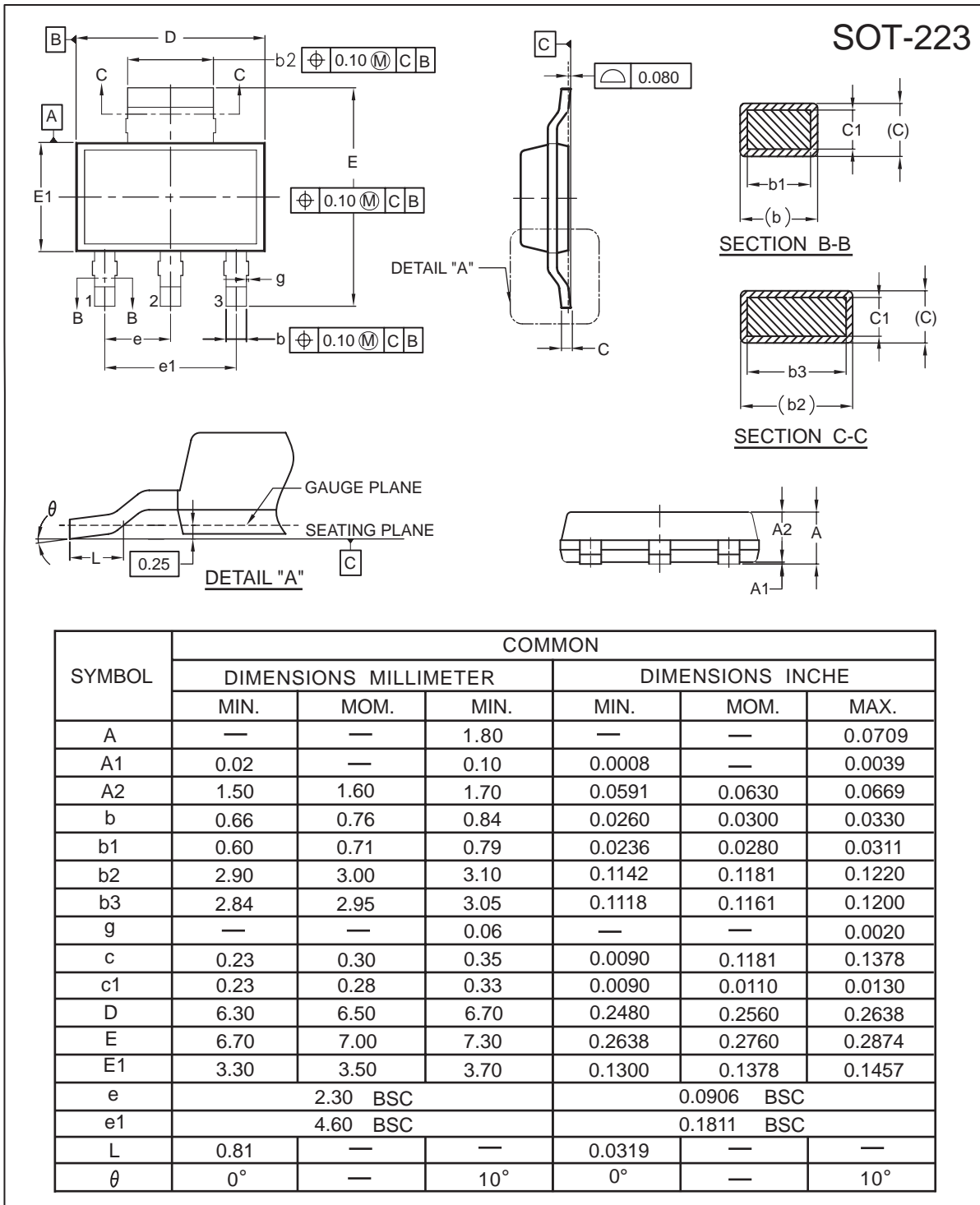


Figure 14. Normalized Thermal Transient Impedance Curve

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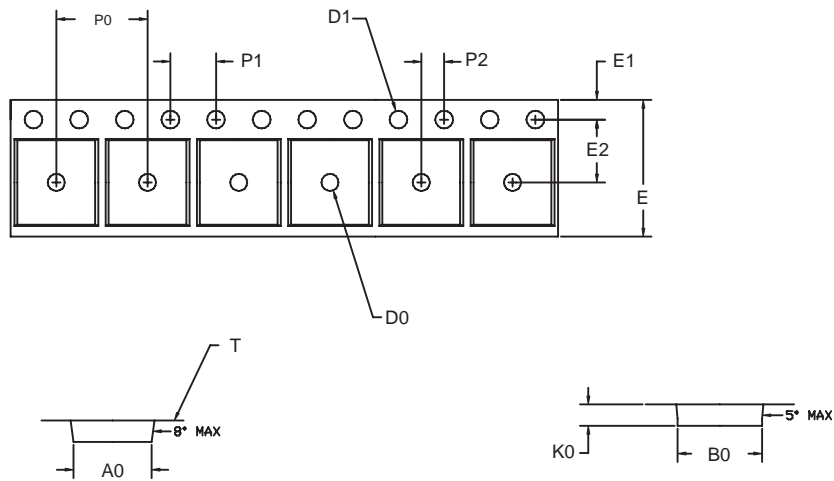
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## SOT-223 Tape and Reel Data

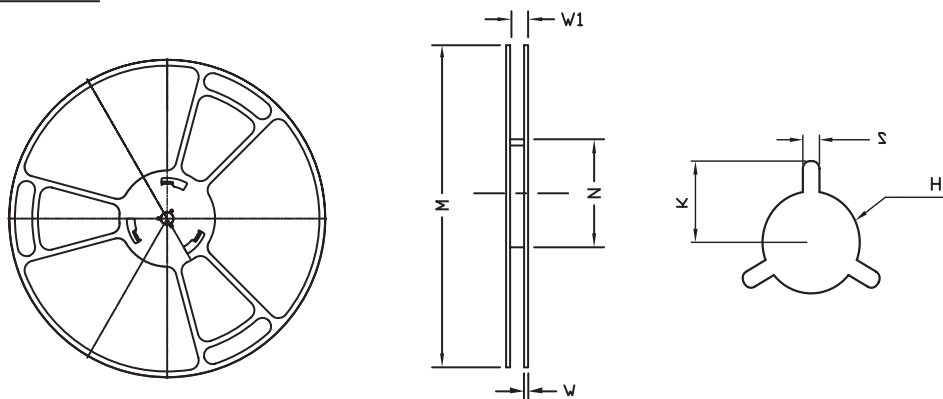
### SOT-223 Carrier Tape



unit: mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
---	6.83 ±0.1	7.42 ±0.1	1.88 ±0.1	1.50 +0.25	1.60 +0.1	12.0 +0.3 -0.1	1.75 ±0.1	5.50 ±0.5	8.0 ±0.1	4.00 ±0.1	2.00 ±0.05	0.292 ±0.02

### SOT-223 Reel



UNIT: mm

REEL SIZE	M	N	W	W1	H	K	S	G	R	V
φ 330 ± 0.5	---	φ 97.0 ± 1.0	2.2	13.0 + 1.5	φ 13.0 + 0.5 - 0.2	10.6	2.0 ± 0.5	---	---	---

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## TOP MARKING DEFINITION

