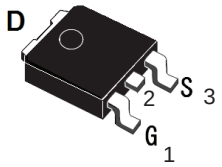
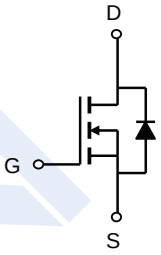
N-Channel MOSFET

2KK5113

TO-252





1. Gate (G)
2. Drain (D)
3. Source (S)

■ Features

- $V_{DS\ (V)}$ = 650 V
- I_D = 11 A
- $R_{DS(ON)}$ < 360mΩ @ V_{GS} = 10V
- Low FOM $R_{DS(ON)}$ X Q_G
- Better EMI
- 100% UIS tested

■ Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

■ Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	
Drain Current - Continuous (Note 1)	T_C=25℃	I_D	11	A
	T_C=100℃		7	
Drain Current - Pulsed (Note 2)		I_{DM}	33	
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	80	mJ
MOSFET dv/dt ruggedness		dv/dt	130	V/ns
Reverse diode dv/dt			33	
Power Dissipation	T_C=25℃	P_D	23	W
Thermal Resistance, Junction- to-Ambient (Note 4)		$R_{\theta JA}$	62.5	℃/W
Thermal Resistance, Junction- to-Case		$R_{\theta JC}$	5.4	
Operating and Storage Temperature Range		T_J, T_{stg}	-55 to 150	℃

Notes:

1. The max drain current limited by maximum junction temperature
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 10 mH, V_{DD} = 150V, I_{AS} = 4A, R_G = 25 Ω, Starting T_J = 25 °C
4. Mount on minimum PCB layout

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■ Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	650			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V, V_{GS}=0V			1	μA
		V_{DS}=650V, V_{GS}=0V, T_J=150℃			100	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250μA	2.5		4.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5.5A		280	360	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=100V, f=1MHz		841		pF
Output Capacitance	C_{oss}			45.1		
Reverse Transfer Capacitance	C_{rss}			2.8		
Gate Resistance	R_G	F = 1 MHz		5		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DD} = 520V , I_D = 5.5A, V_{GS} = 10V		23.3		nC
Gate Source Charge	Q_{gs}			5.5		
Gate Drain Charge	Q_{gd}			9.7		
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 520V , I_D = 5.5A, V_{GS} = 10V, R_G = 25Ω		18.2		ns
Turn-On Rise Time	t_r			25.8		
Turn-Off DelayTime	$t_{d(off)}$			81.8		
Turn-Off Fall Time	t_f			26.8		
Drain-Source Diode Characteristics and Maximum Ratings						
Reverse Recovery Time	t_{rr}	V_{DD} = 100V, I_D = 5.5A, di/dt = 100A/μS		250		ns
Reverse Recovery Charge	Q_{rr}			2.55		μC
Peak Reverse Recovery Current	I_{RRM}			-22.3		A
Maximum Continuous Body-Diode Forward Current	I_S				11	
Maximum Pulsed Body-Diode Forward Current	I_{SM}				33	
Diode Forward Voltage	V_{SD}	I_S=11A,V_{GS}=0V		0.85		V

■ Marking

Marking	K5113 K***

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■ Typical Characterisitics

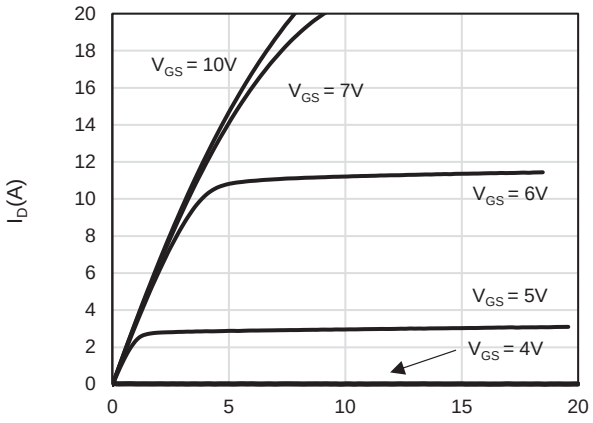

Figure 1: On-Region Characteristics

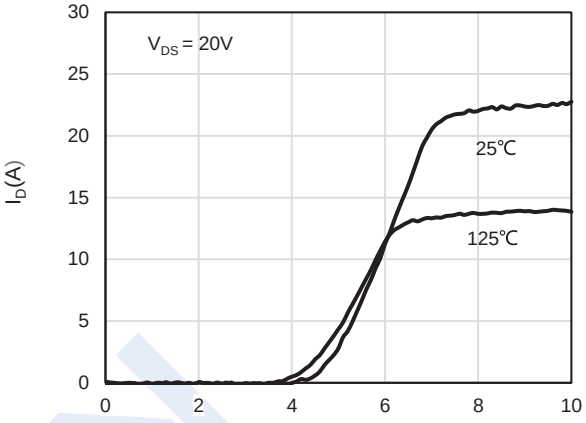

Figure 2: Transfer Characteristics

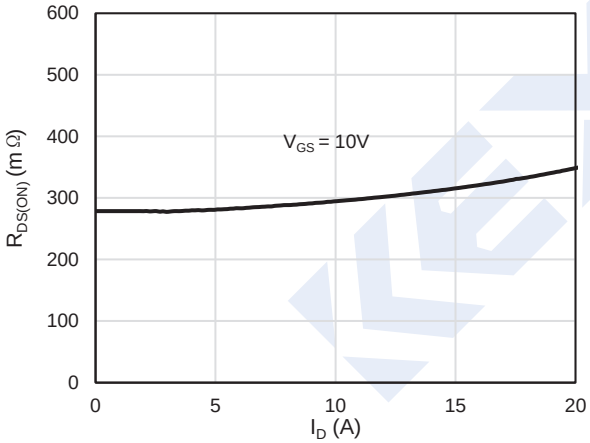

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

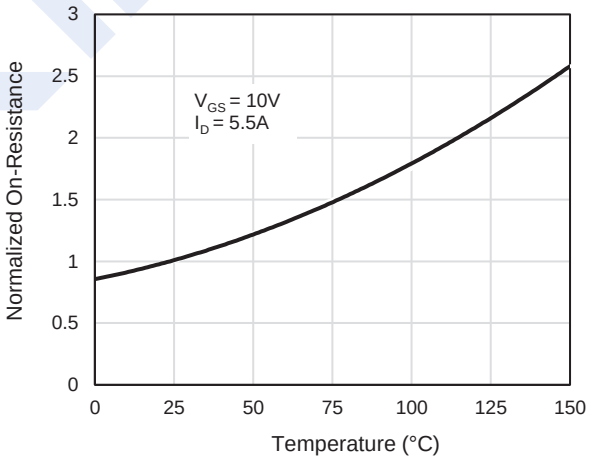

Figure 4: On-Resistance vs. Junction Temperature

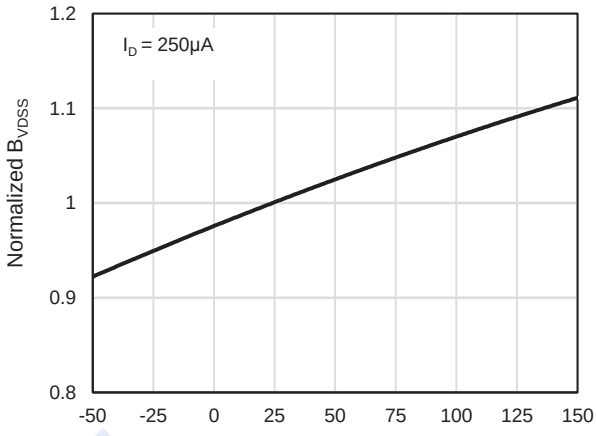

Figure 5: Breakdown Voltage vs. Junction Temperature

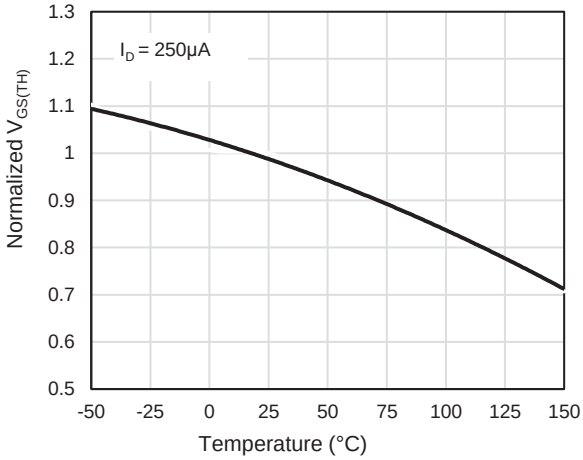

Figure 6: Threshold Voltage vs. Junction Temperature

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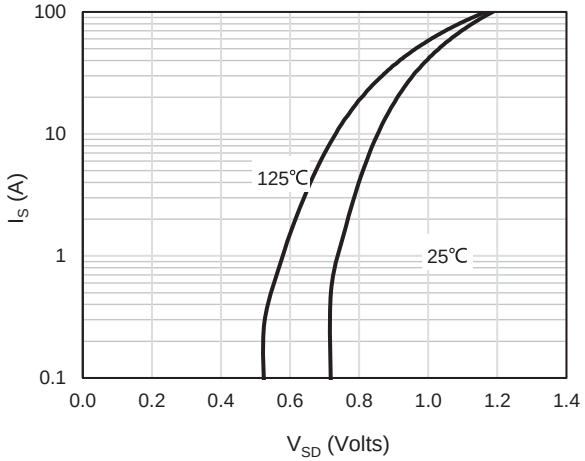

Figure 7: Body-Diode Characteristics

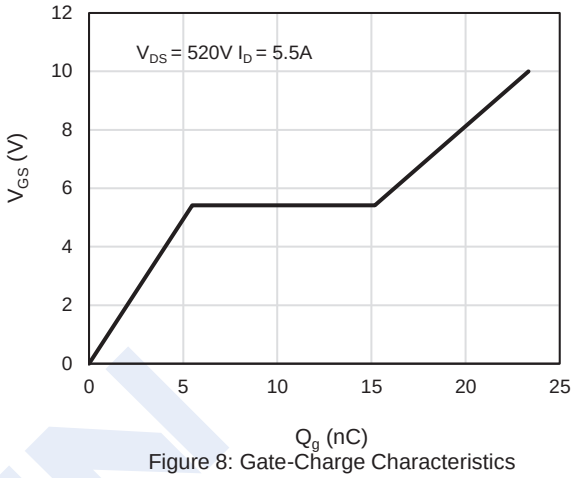

Figure 8: Gate-Charge Characteristics

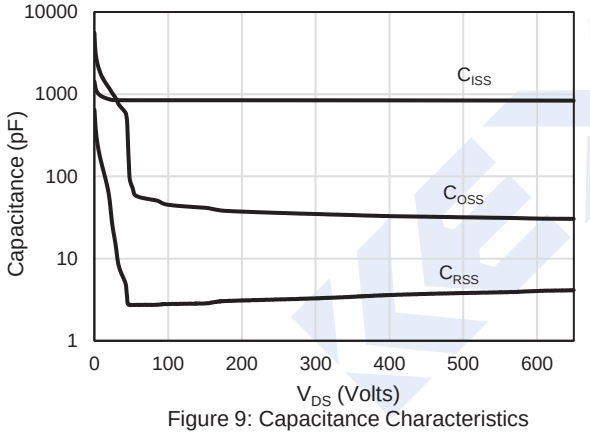

Figure 9: Capacitance Characteristics

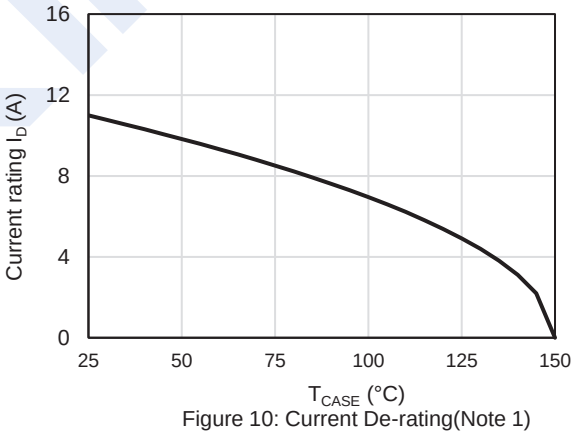

Figure 10: Current De-rating(Note 1)

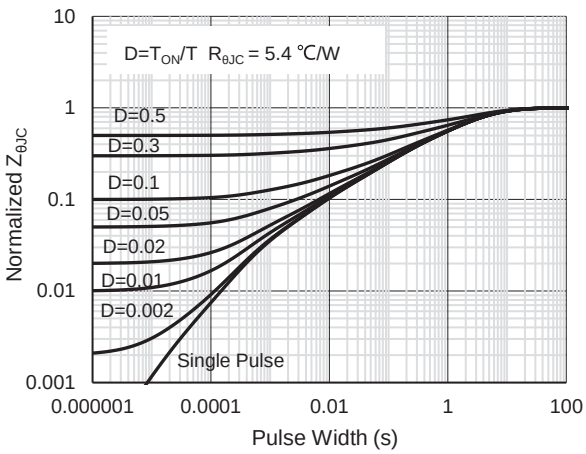

Figure 11: Normalized Maximum Transient Thermal Impedance

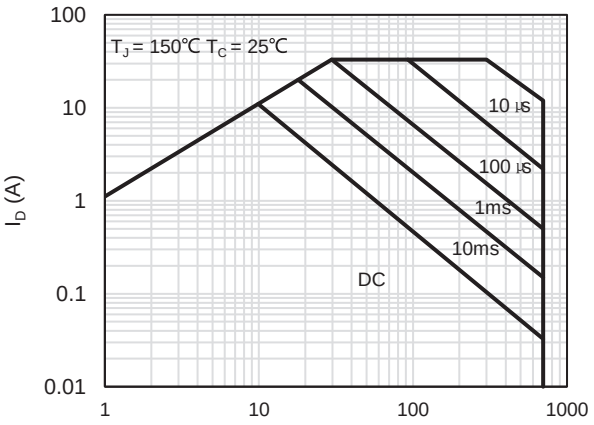

Figure 12: Maximum Forward Biased Safe Operating Area

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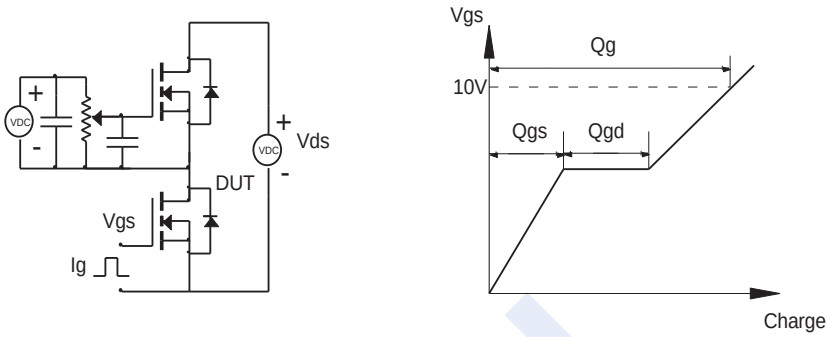
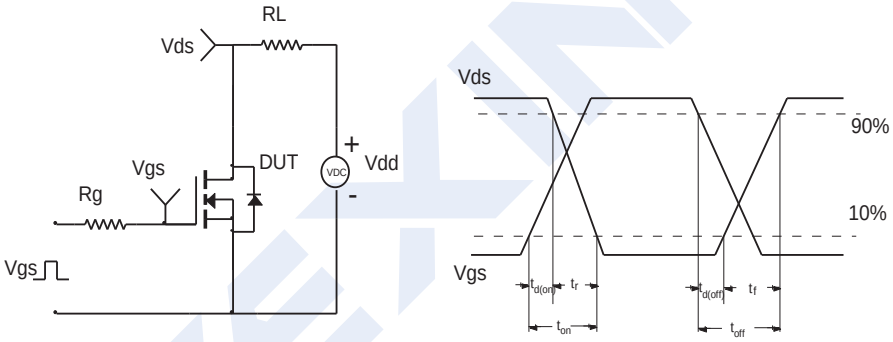
■ Test Circuit and Waveform

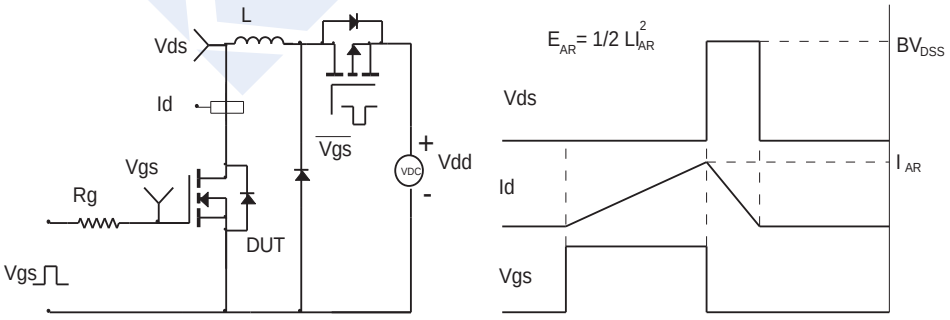
Gate Charge Test Circuit & Waveform



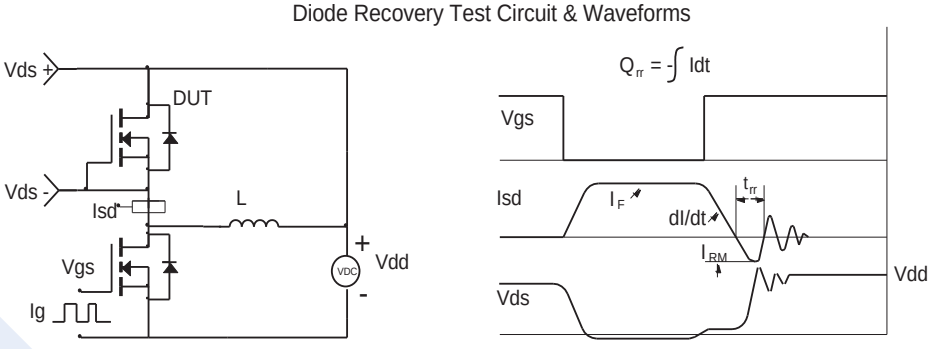
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



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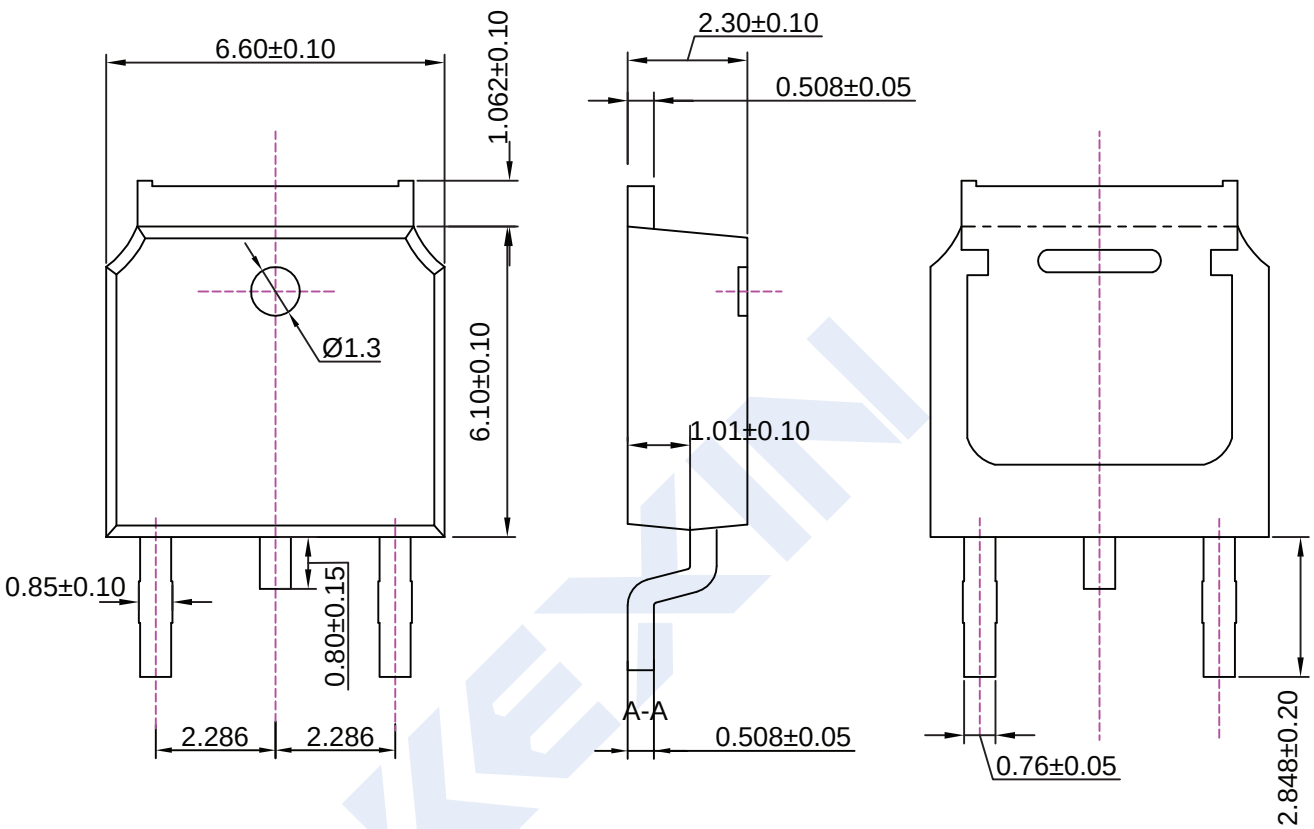
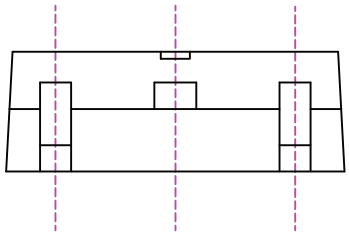
■ Package Dimension

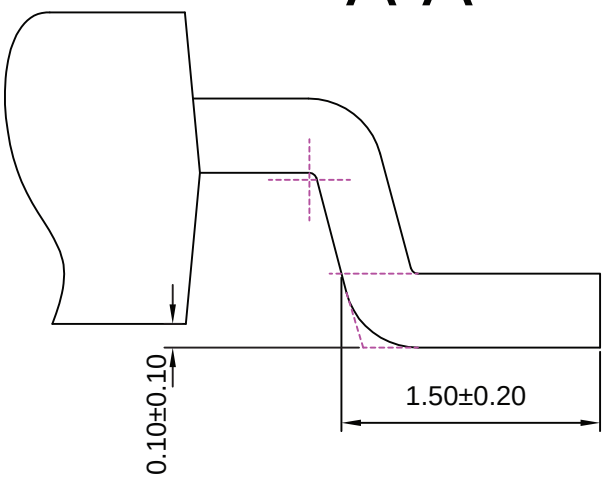
Units: mm

TO-252





A-A



Note:
1.General tolerance:±0.05mm
2.Controlling dimension: in millimeters