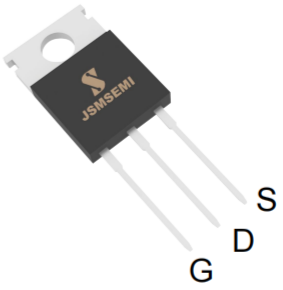
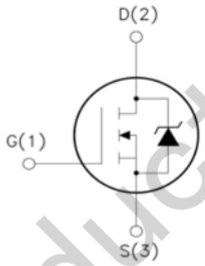
FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



APPLICATIONS

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



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

Device Marking and Package Information		
Device	**Package**	**Marking**
MTP60N06HD	TO-220	MTP60N06HD

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Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted			
Parameter	**Symbol**	**Value**	**Unit**
		TO-220	
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	60	V
Continuous Drain Current	I_D	110	A
Pulsed Drain Current (note1)	I_{DM}	440	A
Gate-Source Voltage	V_{GSS}	±20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	653	mJ
Avalanche Current (note1)	I_{AS}	40	A
Repetitive Avalanche Energy (note1)	E_{AR}	391.8	mJ
Power Dissipation (T_C = 25ºC)	P_D	358	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	ºC

Thermal Resistance			
Parameter	**Symbol**	**Value**	**Unit**
Thermal Resistance, Junction-to-Case	R_{thJC}	0.65	ºC/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	

Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V，V_{DS} = 0V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D =60A	--	0.005	0.006	Ω
Forward Transconductance	gfs	V_{DS} = 25V, I_D = 60A	--	17	--	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	2699	--	pF
Output Capacitance	C_{oss}		--	1016	--	
Reverse Transfer Capacitance	C_{rss}		--	487	--	
Total Gate Charge	Q_g	VDS=28V，V_{GS} = 15V, ID=42A	--	115	--	nC
Gate-Source Charge	Q_{gs}		--	13	--	
Gate-Drain Charge	Q_{gd}		--	55	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 28V, I_D = 42A, VGS =15V.RG = 25Ω	--	52	--	ns
Turn-on Rise Time	t_r		--	142	--	
Turn-off Delay Time	$t_{d(off)}$		--	355	--	
Turn-off Fall Time	t_f		--	230	--	
Drain-Source Body Diode Characteristics						
Continuous Source Current	I_{SD}	T_J = 25ºC, I_{SD} = 60A, V_{GS} = 0V	--	--	110	A
Pulsed Source Current	I_{SM}		--	--	440	
Body Forward Voltage	V_{SD}	I_S = 40A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_F = 180A, di_F/dt =100A /μs	--	100	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.33	--	μC

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Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=1mH, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25° C
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J= 25ºC)

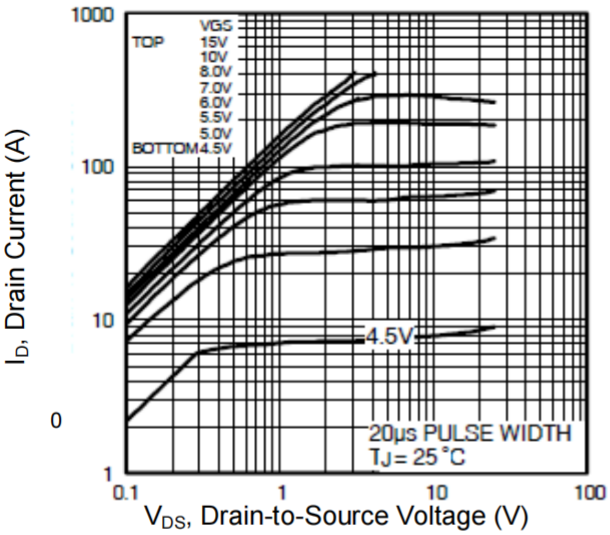


Figure 2. Body Diode Forward Voltage

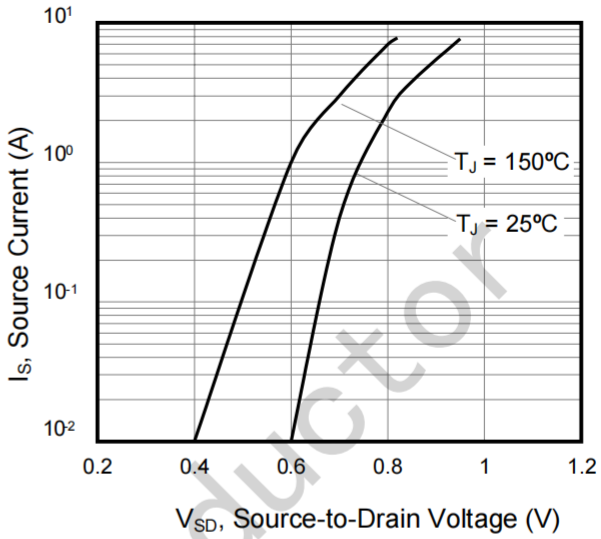


Figure 3. Drain Current vs. Temperature

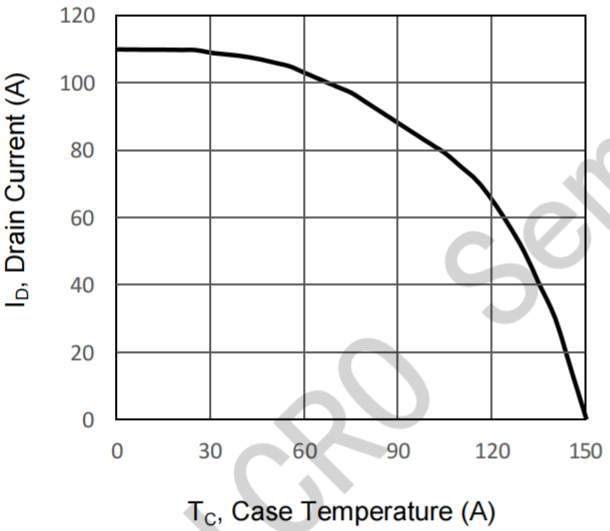


Figure 4. BV_{DSS} Variation vs. Temperature

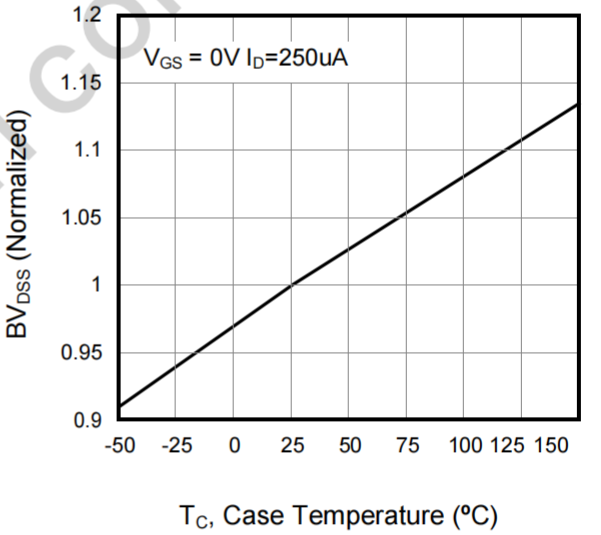


Figure 5. Transfer Characteristics

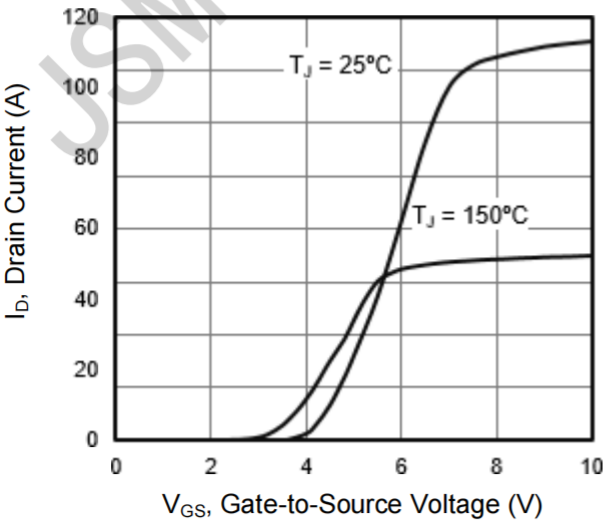
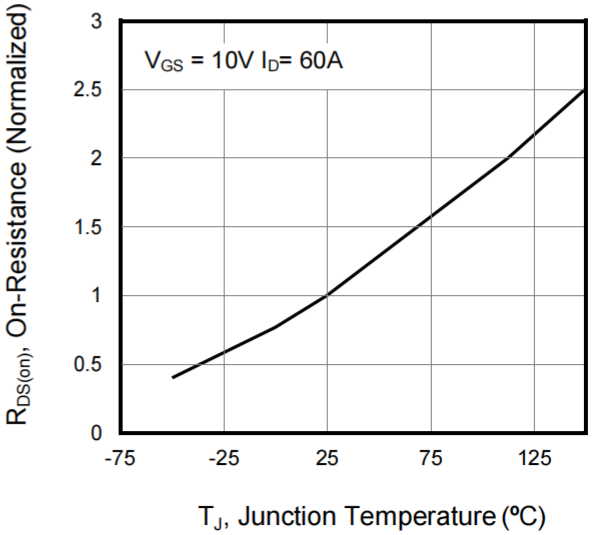


Figure 6. On-Resistance vs. Temperature



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Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

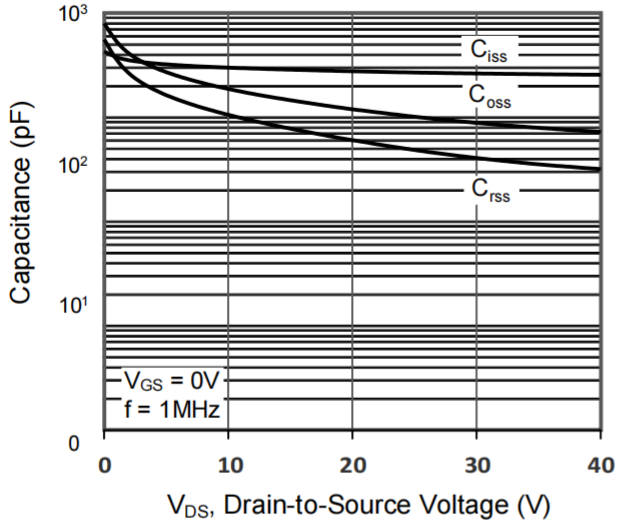

Figure 8. Gate Charge

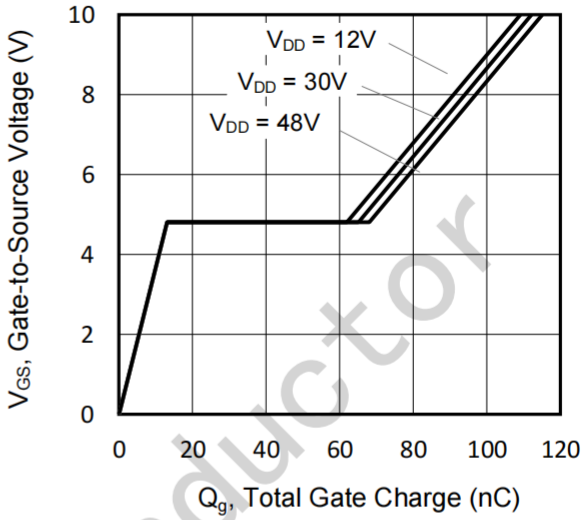

Figure 9. Transient Thermal Impedance
TO-220

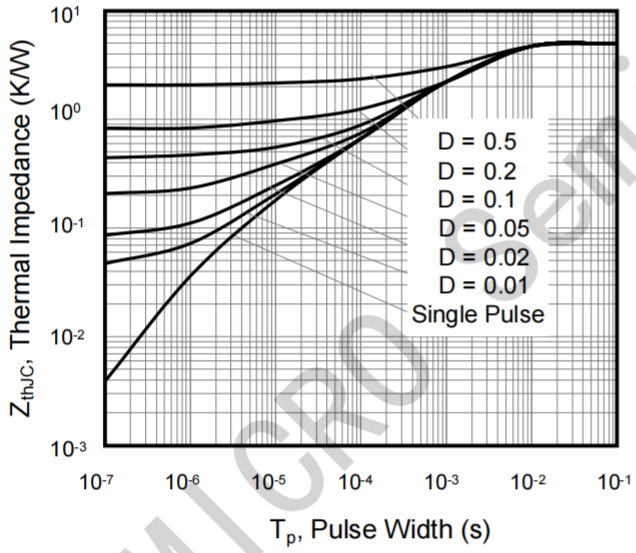

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Figure A：Gate Charge Test Circuit and Waveform

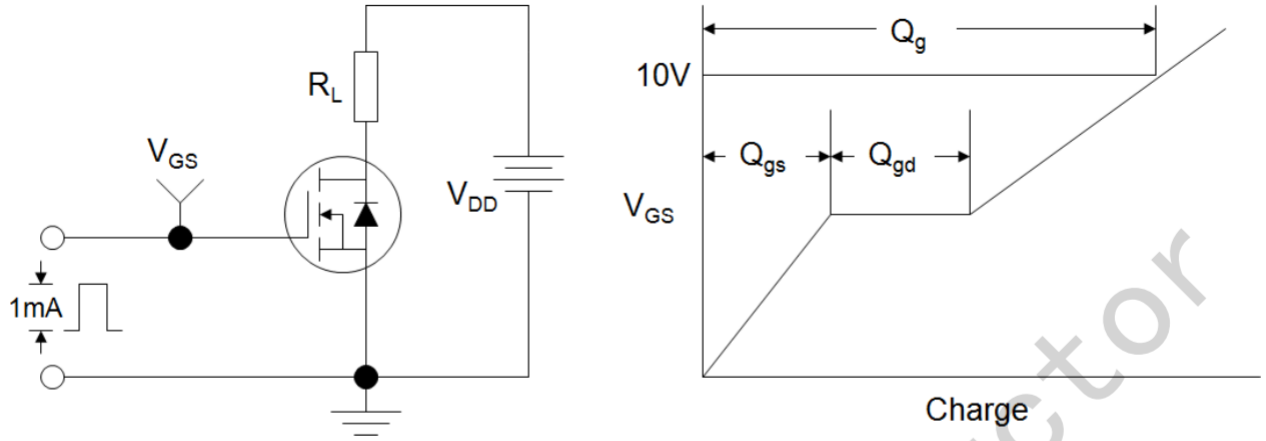


Figure B：Resistive Switching Test Circuit and Waveform

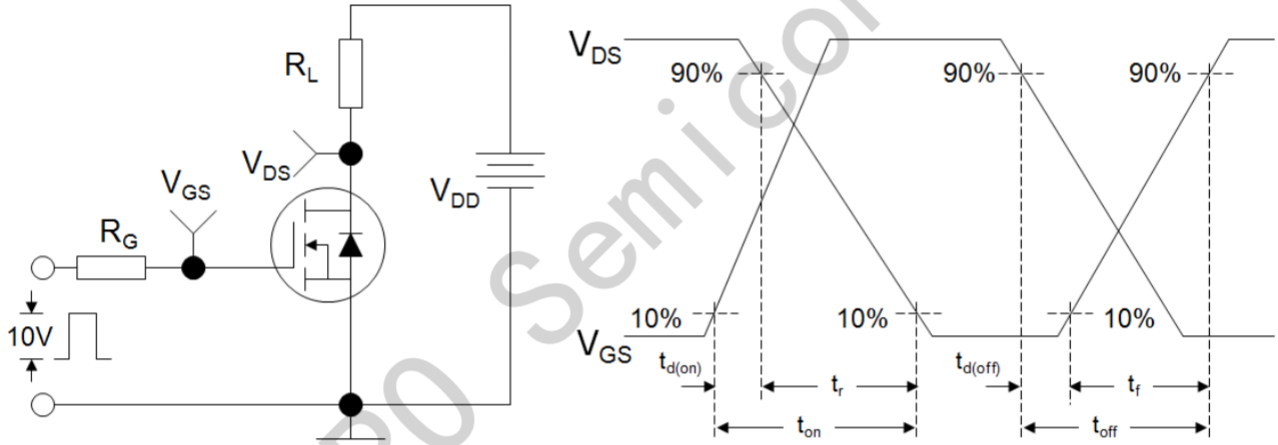
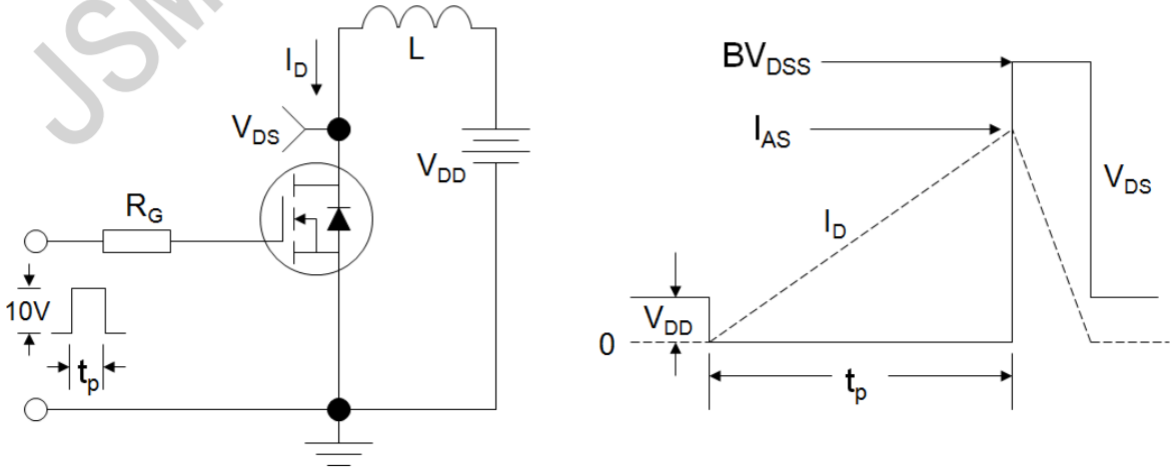


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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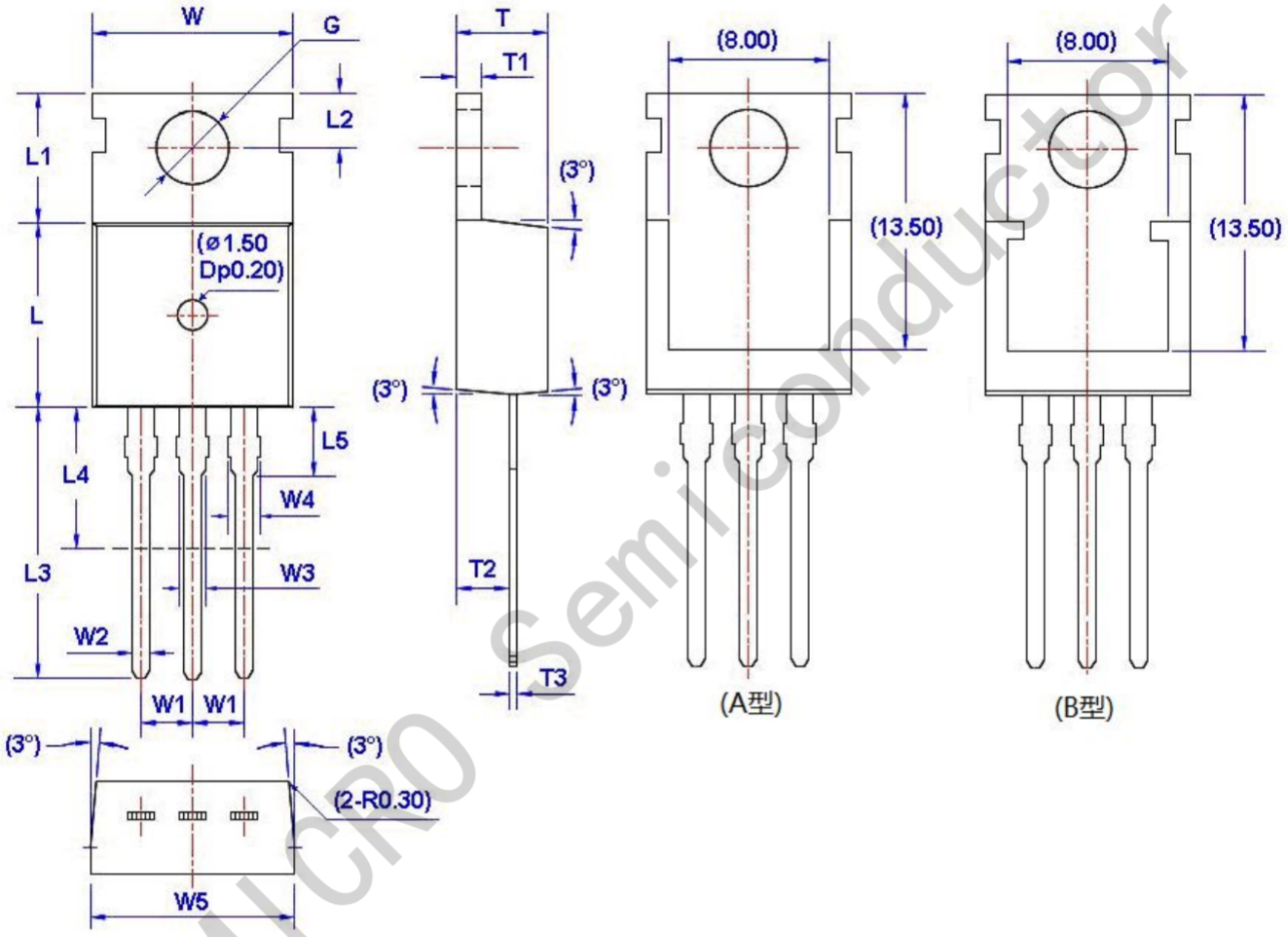
Package Information

TO-220



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Unit: mm

Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.66	10.28	W5	9.80	10.20	L4**	6.20	6.60	T3	0.45	0.60
W1	2.54（TYP）		L	9.00	9.40	L5	2.79	3.30	G(Φ)	3.50	3.70
W2	0.70	0.95	L1	6.40	6.80	T	4.30	4.70			
W3	1.17	1.37	L2	2.70	2.90	T1	1.15	1.40			
W4*	1.32	1.72	L3	12.70	14.27	T2	2.20	2.60			