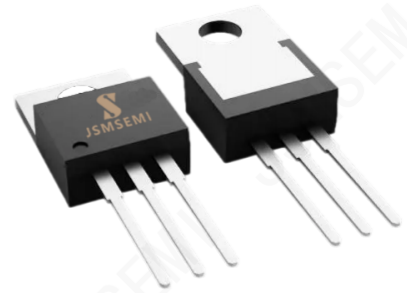


## Product Summary

- $V_{DS}$  250V
- $I_D$  38A
- $R_{DS(ON)}$  ( at  $V_{GS}=10V$ ) < 69m $\Omega$
- 100% EAS Tested
- 100%  $\nabla V_{DS}$  Tested

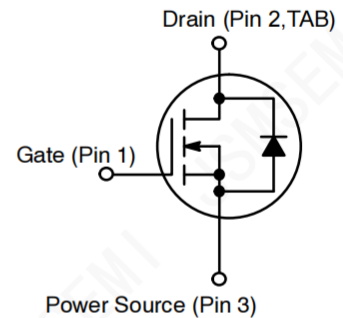


## General Description

- Vertical Double-diffused MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

## Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- Motor drivers



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	250	V
Continuous Drain Current	$I_D$	38	A
Pulsed Drain Current (note2)	$I_{DM}$	152	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	580	mJ
Avalanche Current (note1)	$I_{AR}$	39.5	V/ns
Repetitive Avalanche Energy (note1)	$E_{AR}$	368	mJ
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	350	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62	

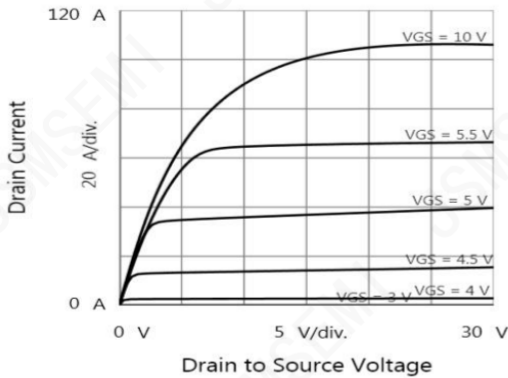
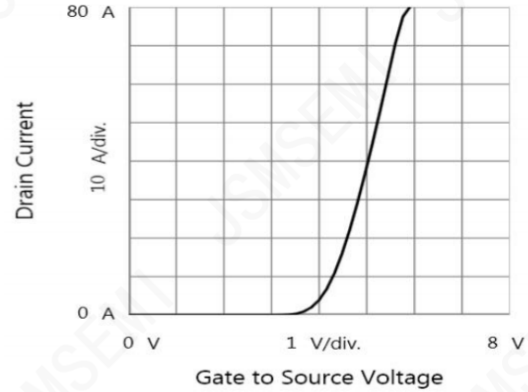
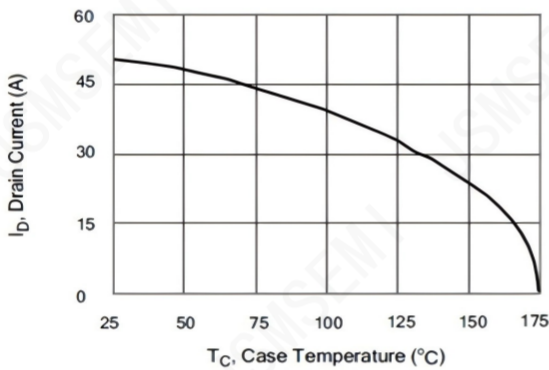
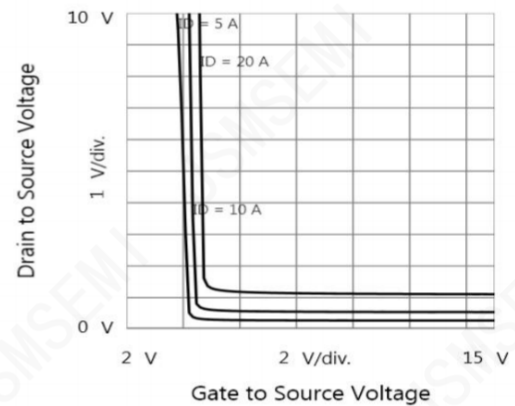
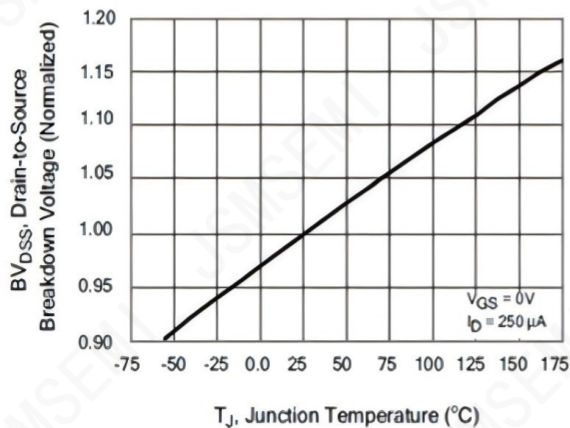
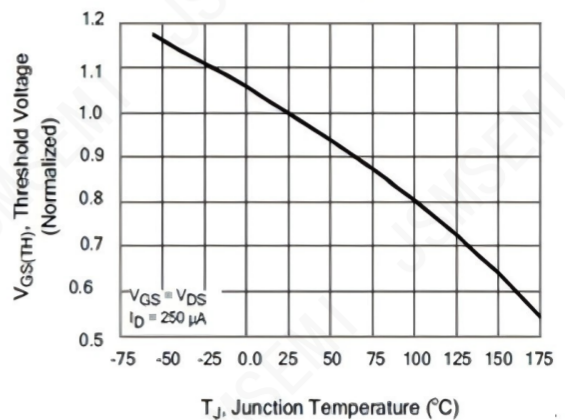
Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	250	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 250V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = +20V, V_{DS} = 0V$	--	--	100	nA
		$V_{GS} = -20V, V_{DS} = 0V$	--	--	-100	
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	--	56	69	m $\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	3238	--	pF
Output Capacitance	$C_{oss}$		--	557	--	
Reverse Transfer Capacitance	$C_{rss}$		--	190	--	
Total Gate Charge	$Q_g$	$V_{DD} = 150V, I_D = 30A,$ $V_{GS} = 0 \text{ to } 10V$	--	124	--	nC
Gate-Source Charge	$Q_{gs}$		--	16	--	
Gate-Drain Charge	$Q_{gd}$		--	64	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 100V, I_D = 40A$ $V_{GS} = 10V, R_G = 3\Omega$	--	19	--	ns
Turn-on Rise Time	$t_r$		--	65	--	
Turn-off Delay Time	$t_{d(off)}$		--	689	--	
Turn-off Fall Time	$t_f$		--	230	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	38	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	152	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 25A, V_{GS} = 0V$	--	--	1.8	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_S = 25A,$ $di_F/dt = 100A/\mu s$	--	180	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	2.04	--	$\mu C$

- Notes**
1. Repetitive Rating: Pulse width limited by maximum junction temperature
  2.  $I_{AS} = 30A, V_{DD} = 30V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
  3. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$

## Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
IRFB4137PBF-JSM	TO-220-3	FB4137	-55 to 175 $^\circ\text{C}$	1	TUBE, 1000	Rohs

**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**

**Figure 2. Transfer Characteristics**

**Figure 3. Maximum Continuous Drain Current vs Case Temperature**

**Figure 4. Drain to Source Voltage vs. Gate to Source Voltage**

**Figure 5 . Typical Breakdown Voltage vs Junction Temperature**

**Figure 6 . Typical Threshold Voltage vs Junction Temperature**


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. Capacitance

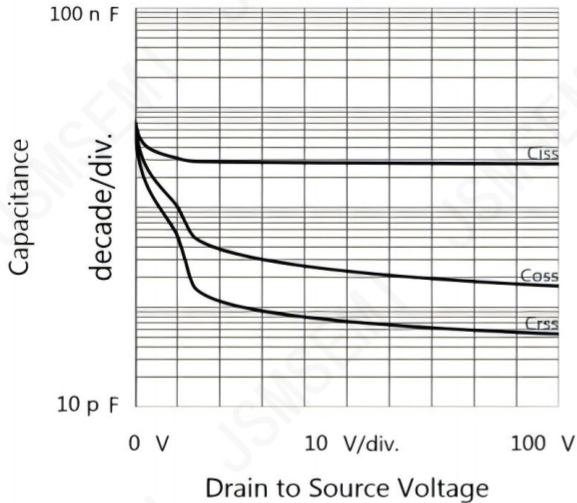


Figure 8. Gate Charge

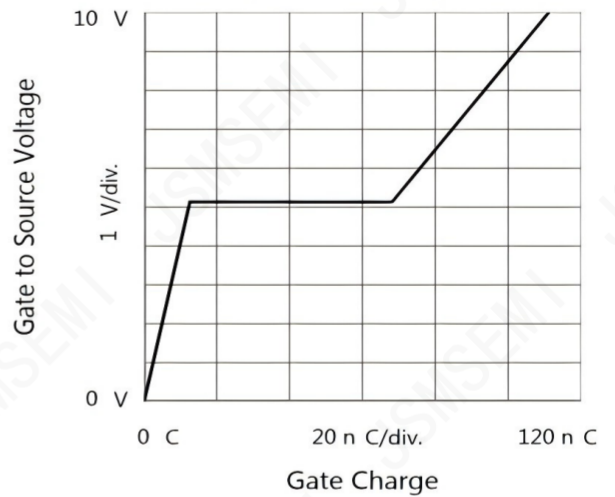


Figure 9. Transient Thermal Impedance  
TO-247, TO-3P

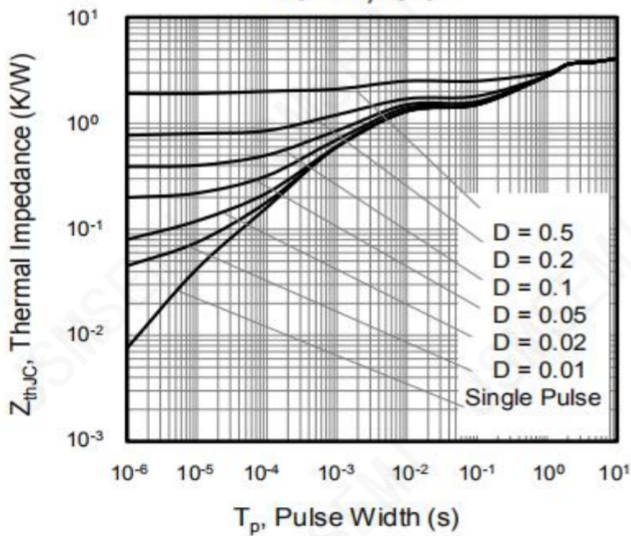


Figure 10. Maximum Forward Bias Safe  
Operating Area

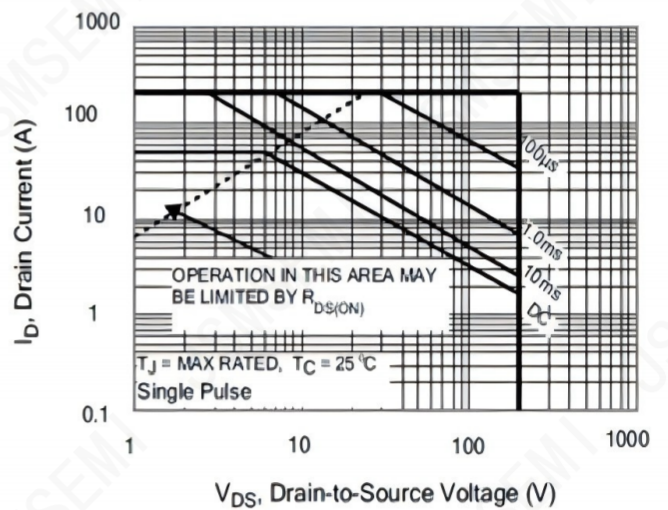


Figure A: Gate Charge Test Circuit and Waveform

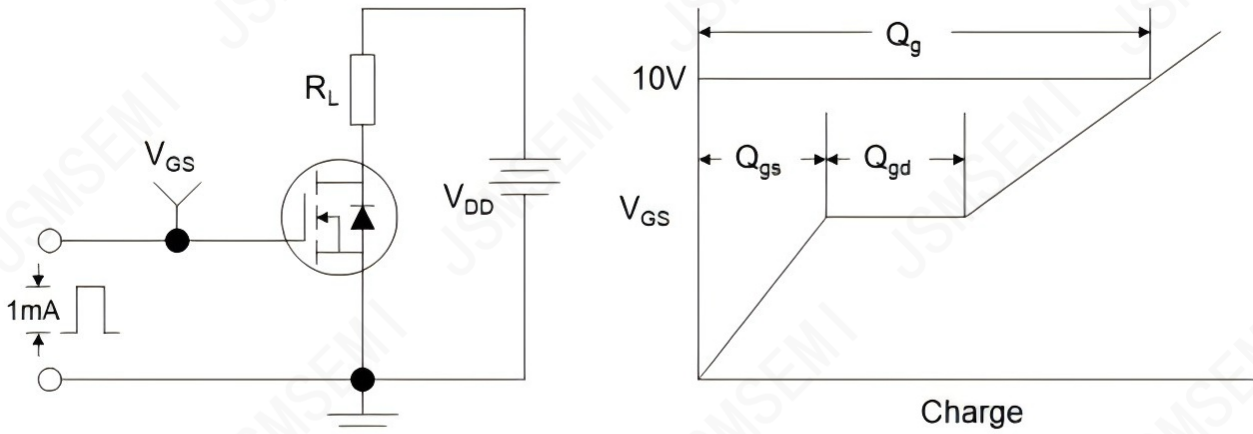


Figure B: Resistive Switching Test Circuit and Waveform

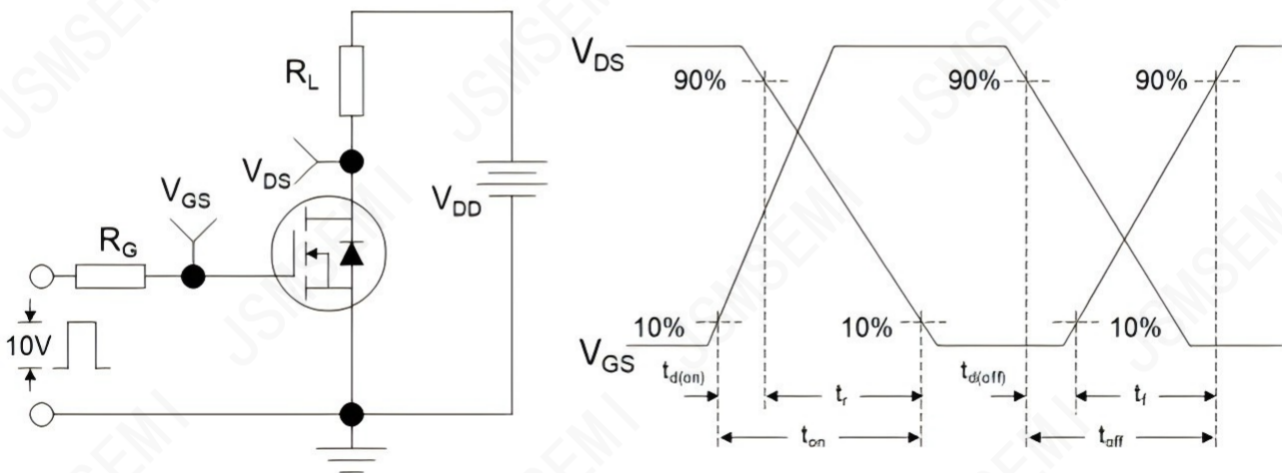
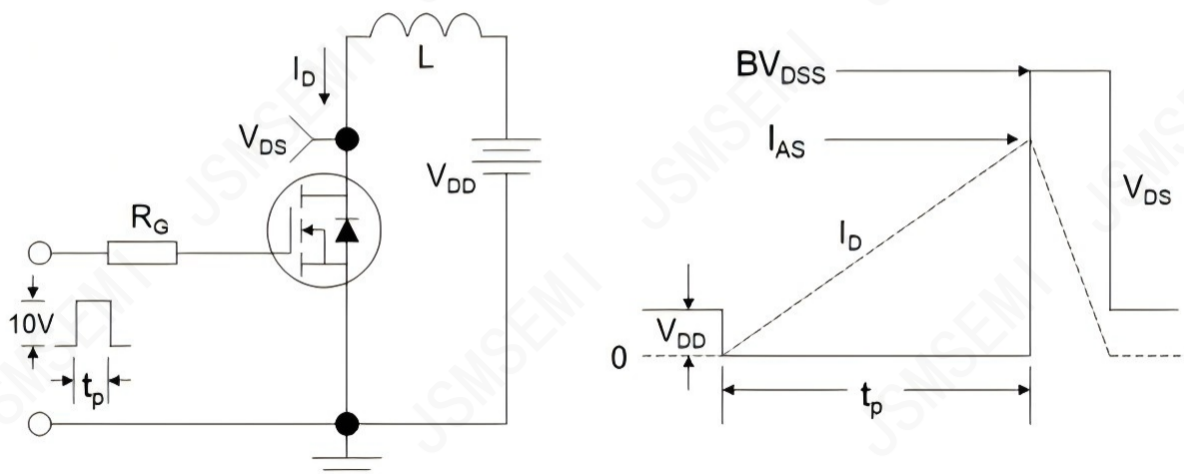
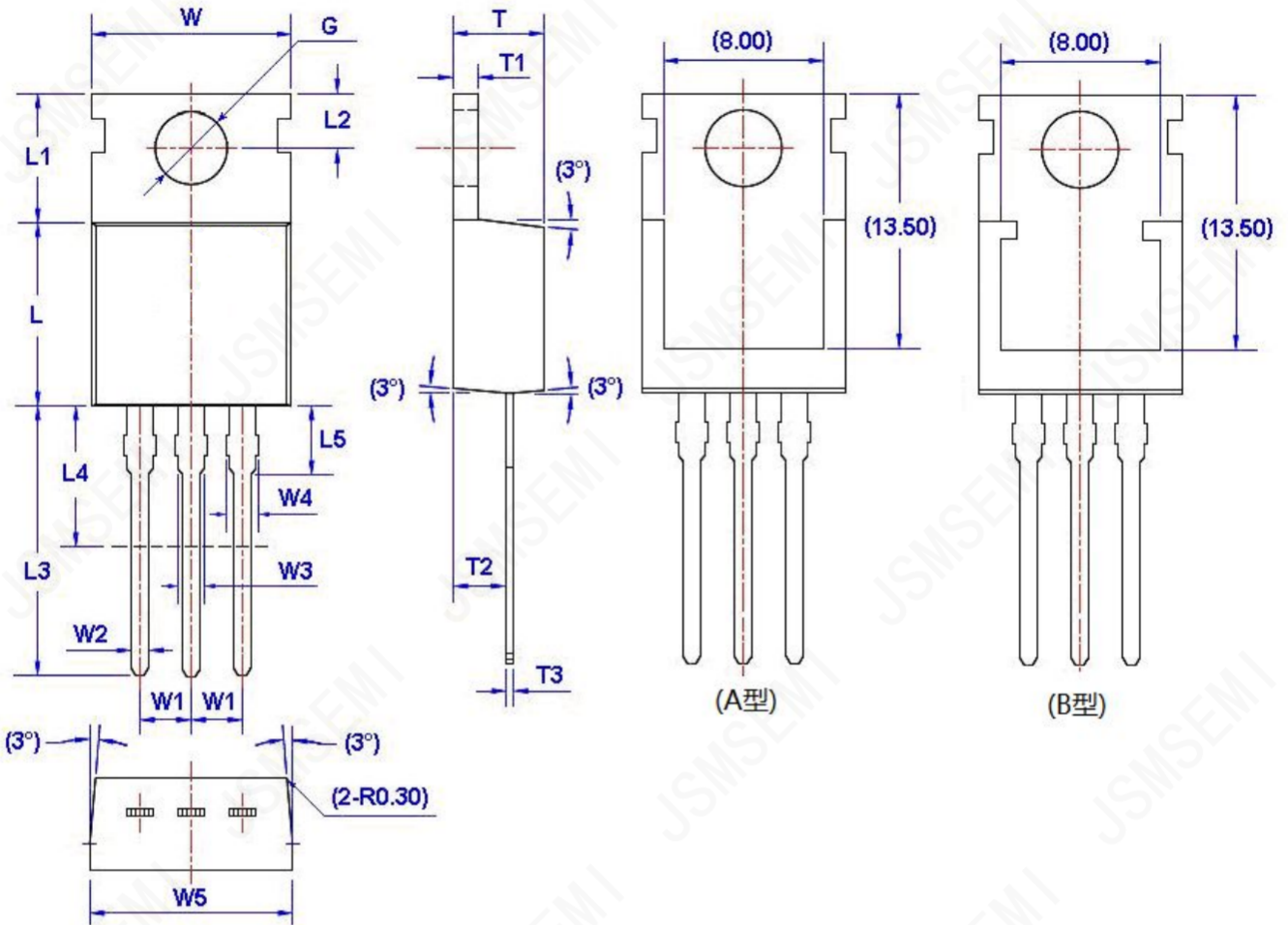


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package Information

TO-220-3



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			

## Revision History

Rev.	Change	Date
V1.0	Initial version	3/11/2019

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