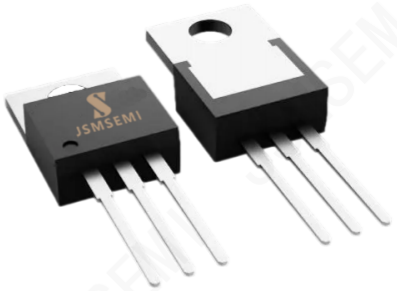
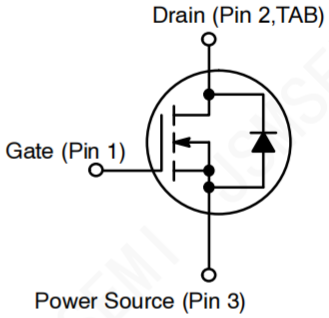
Product Summary

- V_{DS} 250V
- I_D 45A
- $R_{DS(ON)}$(at V_{GS}=10V) ＜75mΩ
- 100% EAS Tested
- 100% ▽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 = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	250	V
Continuous Drain Current		I_D	45	A
Pulsed Drain Current	(note2)	I_{DM}	180	A
Gate-Source Voltage		V_{GSS}	±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 = 25ºC)		P_D	350	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to175	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	0.5	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	250	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 250V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
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 = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	63	75	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	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 to 10V	--	124	--	nC
Gate-Source Charge	Q_{gs}		--	16	--	
Gate-Drain Charge	Q_{gd}		--	64	--	
Turn-on Delay Time	$t_{d(on)}$	VDD = 100V, ID =40A V,GS= 10V R_G = 3Ω	--	19	--	ns
Turn-on Rise Time	t_r		--	65	--	
Turn-off Delay Time	$t_{d(off)}$		--	689	--	
Turn-off Fall Time	t_f		--	230	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	45	A
Pulsed Diode Forward Current	I_{SM}		--	--	180	
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 25A, V_{GS} = 0V	--	--	1.8	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_S = 25A, di_F/dt =100A /μs	--	180	--	ns
Reverse Recovery Charge	Q_{rr}		--	2.04	--	μC

Notes
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} = 30A, V_{DD} = 30V, R_G = 25 Ω, Starting T_J = 25 ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
STP46NF30-JSM	TO-220-3	P46NF30	-55 to 175°C	1	TUBE,1000	Rohs

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics (T_J = 25ºC)

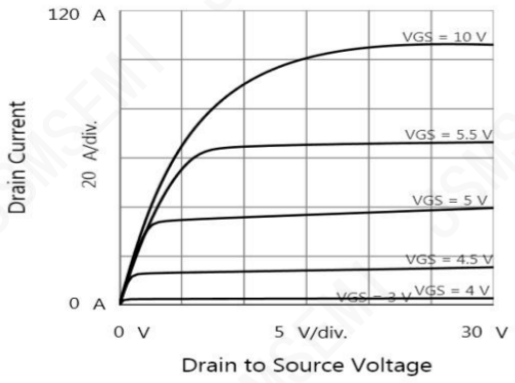


Figure 2. Transfer Characteristics

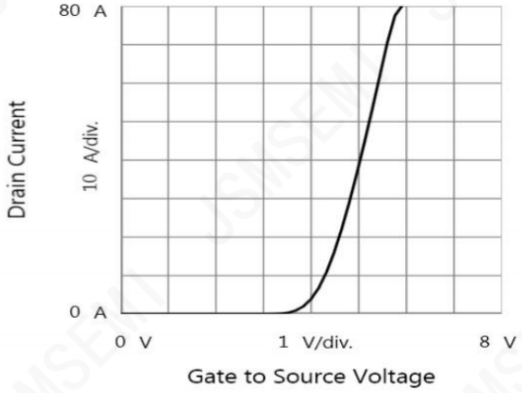


Figure3. Maximum Continuous Drain Current vs Case Temperature

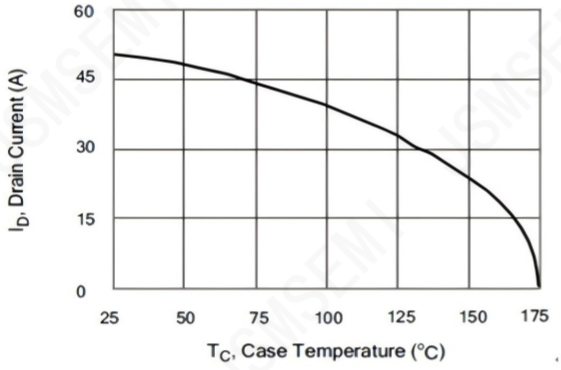


Figure 4. Drain to Source Voltage vs. Gate to Source Voltage

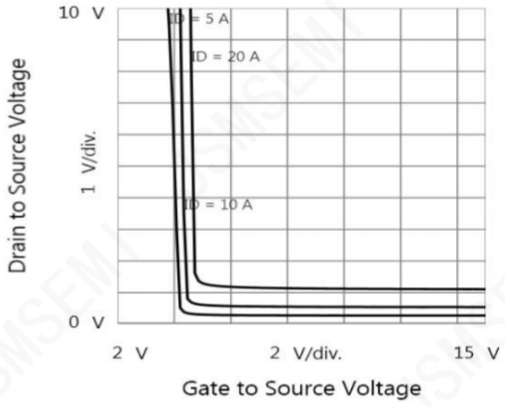


Figure 5. Typical Breakdown Voltage vs Junction Temperature

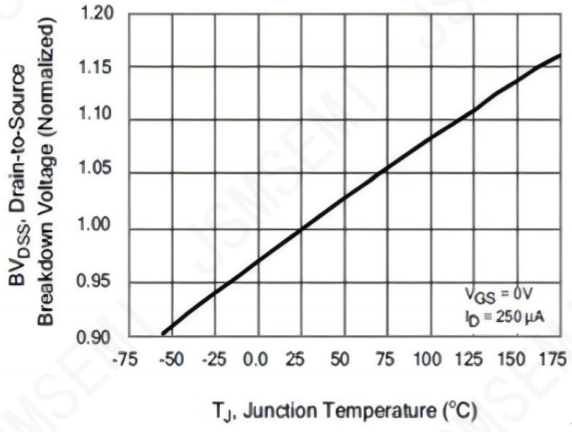
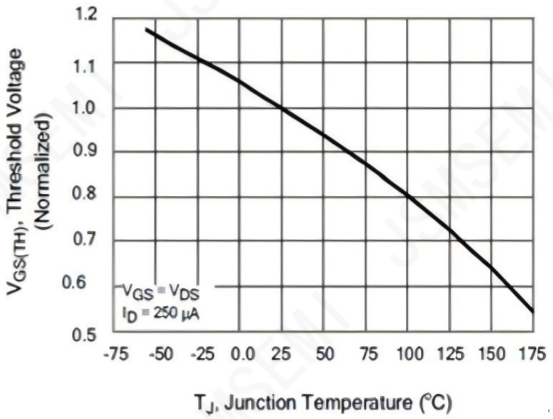


Figure 6. Typical Threshold Voltage vs Junction Temperature



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

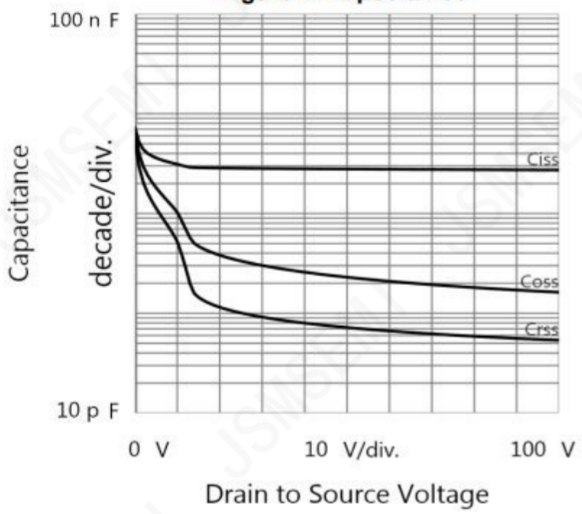


Figure 8. Gate Charge

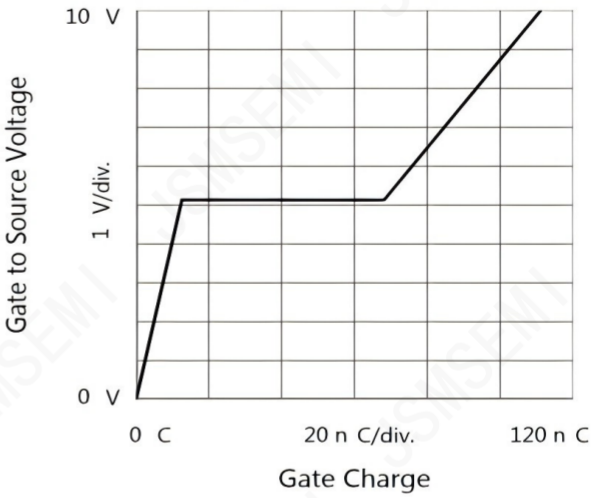


Figure 9. Transient Thermal Impedance TO-247,TO-3P

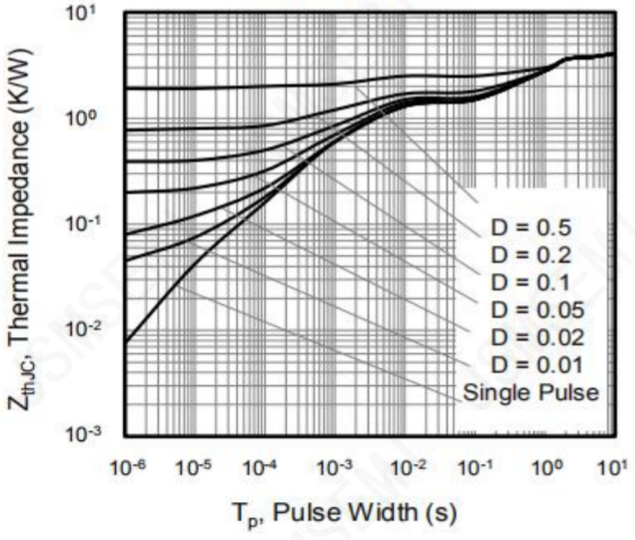


Figure 10. Maximum Forward Bias Safe Operating Area

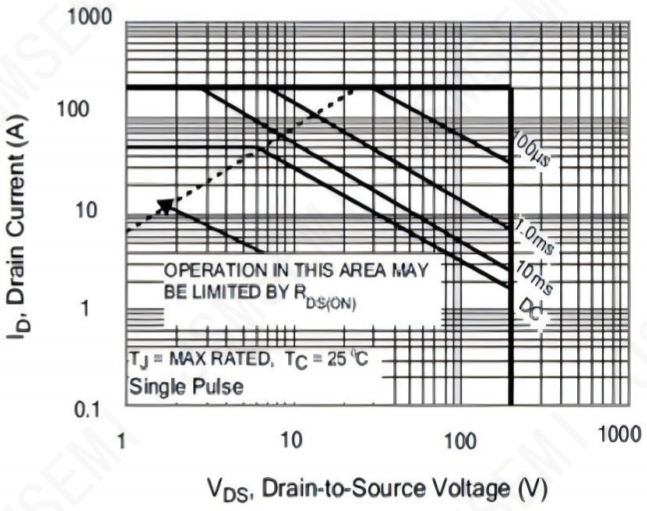


Figure A：Gate Charge Test Circuit and Waveform

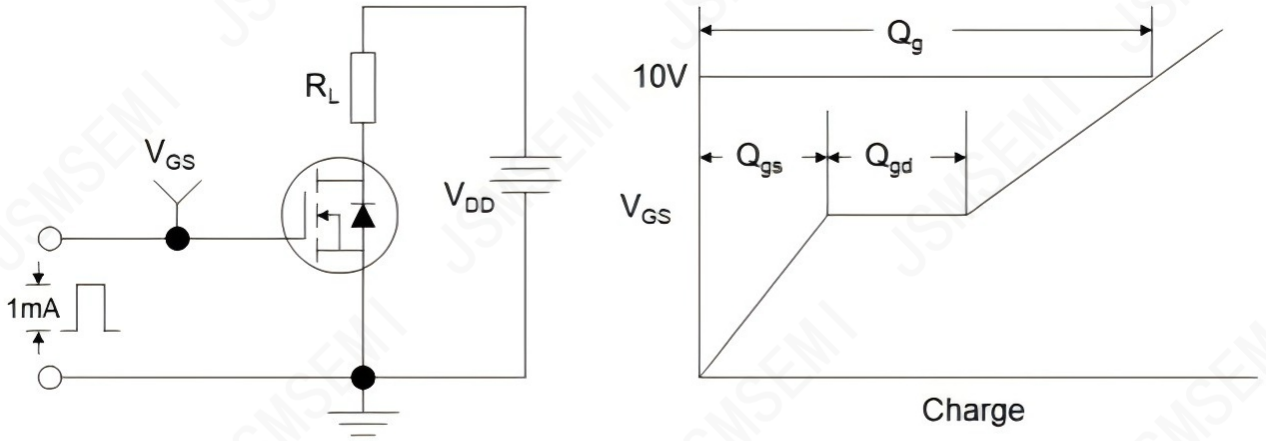


Figure B：Resistive Switching Test Circuit and Waveform

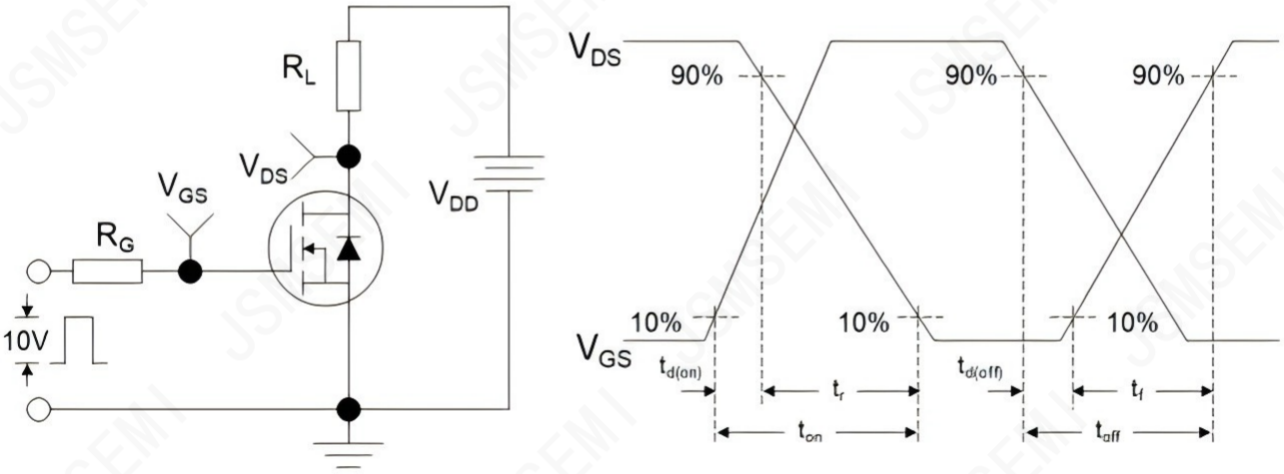
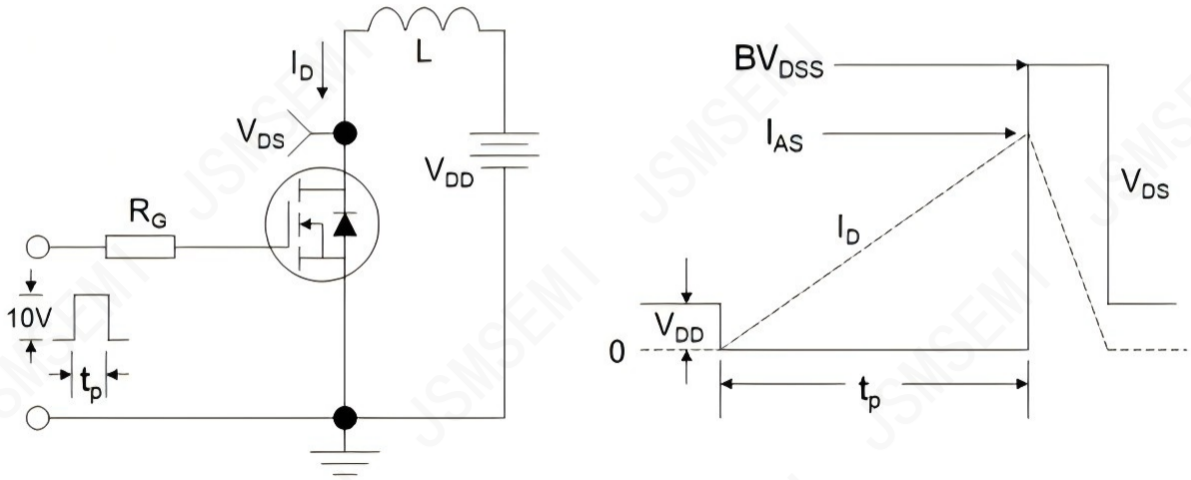
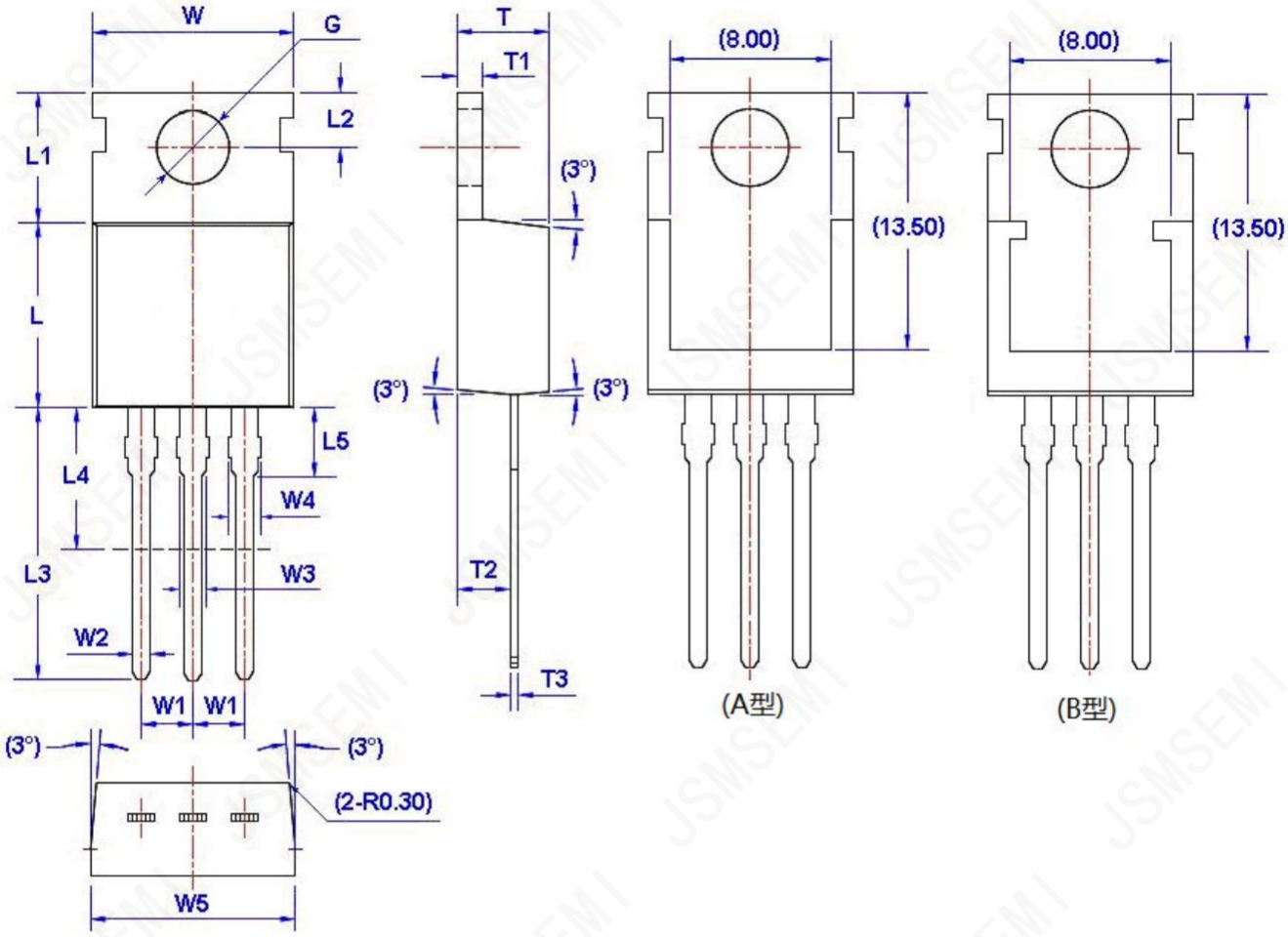


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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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