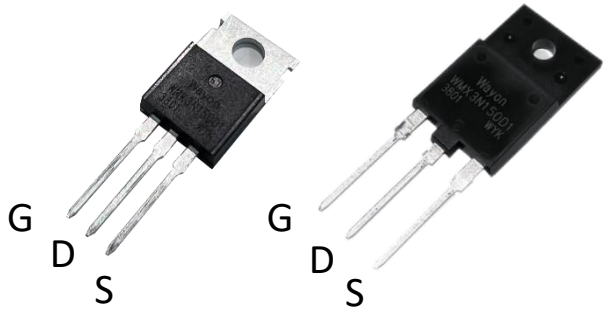
1500V 3A 5.4Ω N-chPower MOSFET

Description

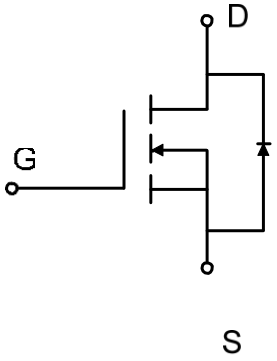
WMOS™ D1 is Wayon's 1st generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.



Features

- V_{DS} =1500V @$T_{j,max}$
- Typ. $R_{DS(on)}$=5.4Ω@VGS=10V
- 100% avalanche tested
- Pb-free, Halogen free

RoHS compliant



Applications

SMPS，Charge，DC-DC

Absolute Maximum Ratings(T_C=25°C)

Parameter	Symbol	WMX3N150D1	WMK3N150D1	Unit
Drain-source voltage	V_{DSS}	1500		V
Continuous drain current[1)]	I_D	3		A
Pulsed drain current[2)]	I_{DM}	12		A
Gate-source voltage	V_{GS}	±30		V
Avalanche energy,single pulse	E_{AS}	500		mJ
Power dissipation(T_C=25°C)	P_D	90	130	W
Derate above25°C		0.72	0.95	W/°C
Operating and storage temperature range	T_j,T_{stg}	-55to+150		°C
Continuous diode forward current	I_S	3		A
Diode pulse current	$I_{S,pulse}$	12		A

Thermal Characteristics

Parameter	Symbol	WMX3N150D1	WMK3N150D1	Unit
Thermal resistance,junction-to-case	$R_{\theta JC}$	1.38	0.95	°C/W
Thermal resistance,junction-to-ambient	$R_{\theta JA}$	50	65	°C/W

Electrical Characteristics T_c = 25°C, unless otherwisenoted

Parameter	Symbol	TestCondition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=0.25mA	1500	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I_{DSS}	VGS=0V V_{DS}=1500 V，T_j=25°C V_{DS}=1200 V，T_j=125°C	 - -	 -	 1 500	μA
Gate leakage current forward	I_{GSSF}	V_{GS}=30V,V_{DS}=0V	-	-	100	nA
Gate leakage current reverse	I_{GSSR}	V_{GS}=-30V,V_{DS}=0V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=2A，T_j=25°C	-	5.5	8.2	Ω
Forward Transconductance	G_{fs}	V_{DS}=15V,I_D=3A,	-	3.0	-	S
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}= 25V, V_{GS}=0V,	-	1800	-	pF
Output capacitance	C_{oss}	f = 1MHz	-	100	-	
Reverse transfer capacitance	C_{rss}		-	11	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} =750V, I_D =3A， R_G =4.7Ω,V_{GS}=10V	-	16.4	-	ns
Rise time	t_r		-	9.6	-	
Turn-off delay time	$t_{d(off)}$		-	36	-	
Fall time	t_f		-	31	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=750V,I_D=3A, V_{GS}=0 to10V	-	8	-	nC
Gate to drain charge	Q_{gd}		-	15	-	
Gate charge total	Q_g		-	40	-	
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V,I_F=3A	-	-	1.5	V
Reverse recovery time	t_{rr}	V_R=50V,I_F=3A, dI_F/dt=100A/μs	-	255	-	ns
Reverse recovery current	I_{rr}			11		A
Reverse recovery charge	Q_{rr}		-	1.1	-	μC

Notes:

1. Limited by $T_{j\,max}$. Maximum duty cycle D=0.5.

2. Repetitive rating: pulse width limited by maximum junction temperature.

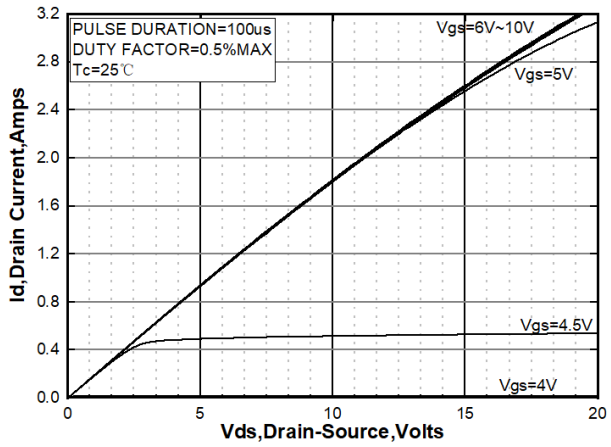


Figure 1.On-Region Characteristics

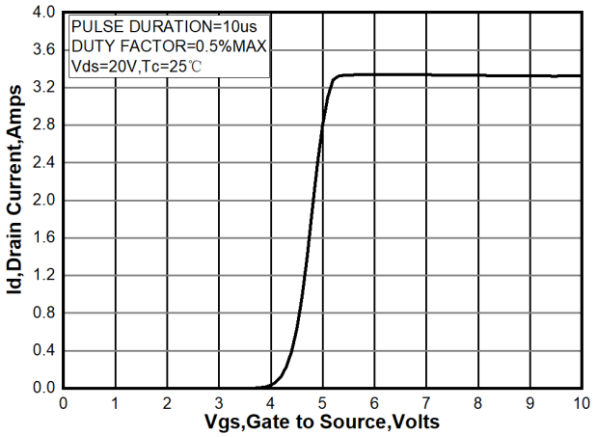


Figure 2. Transfer Characteristics

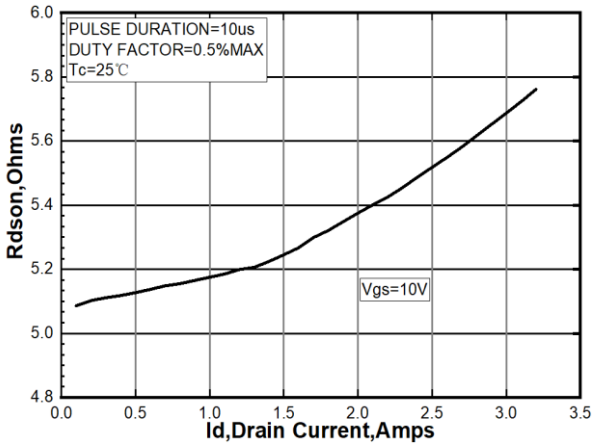


Figure 3.Static Drain-Source On Resistance

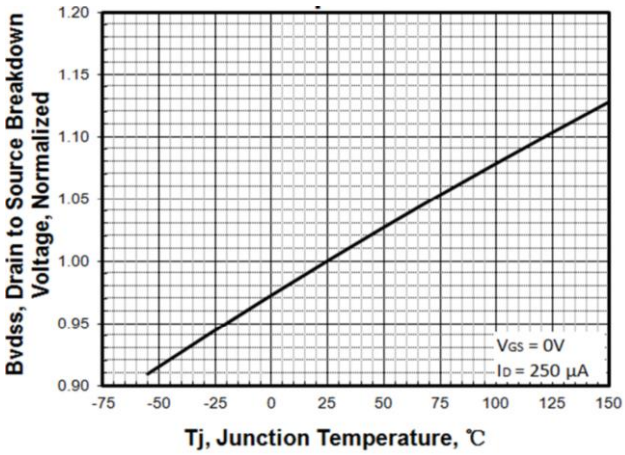


Figure 4. Normalized BV_{DSS} vs.Temperature

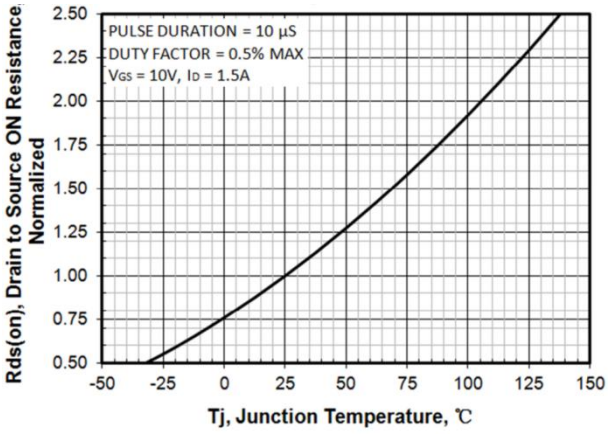


Figure 5. Normalized $R_{DS(on)}$ vs.Temperature

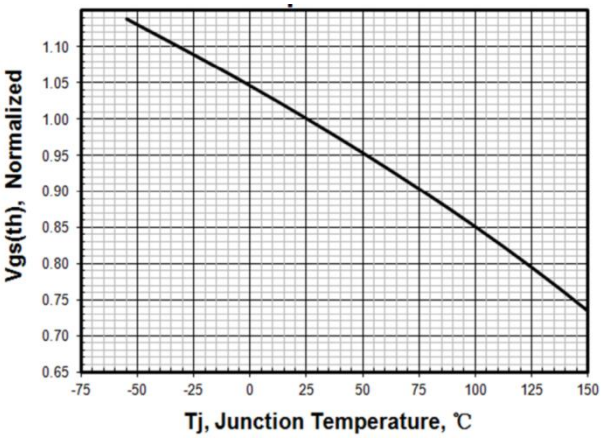


Figure 6. Normalized $V_{Gs(th)}$ vs.Temperature

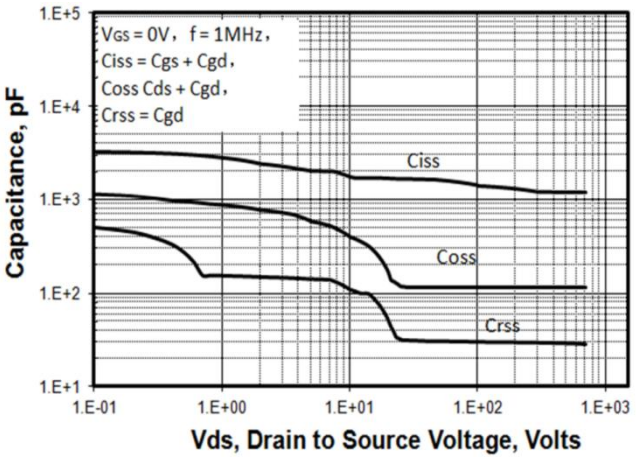


Figure 7. Capacitance Characteristics

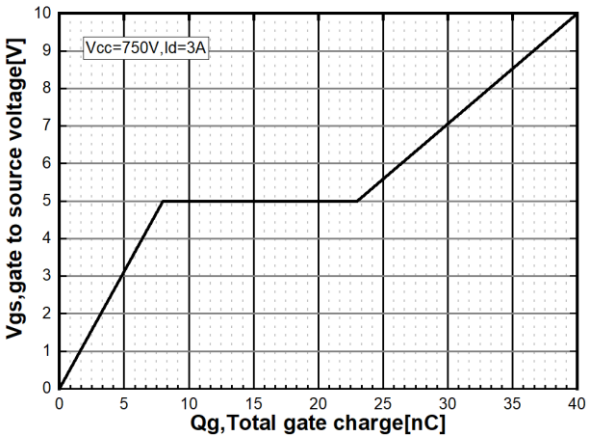


Figure 8. Gate Charge Characteristics

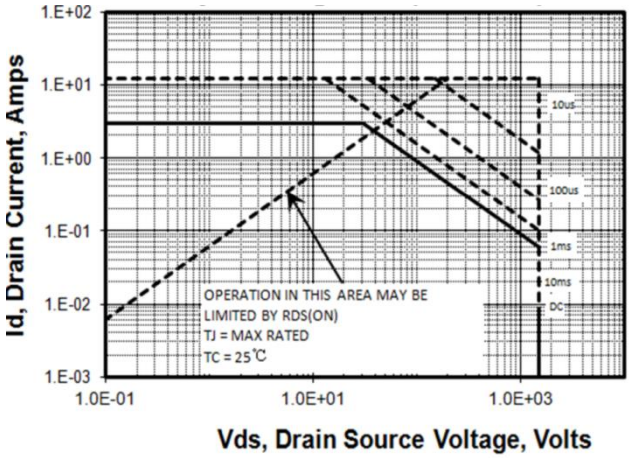


Figure 9. Maximum Safe Operating Area

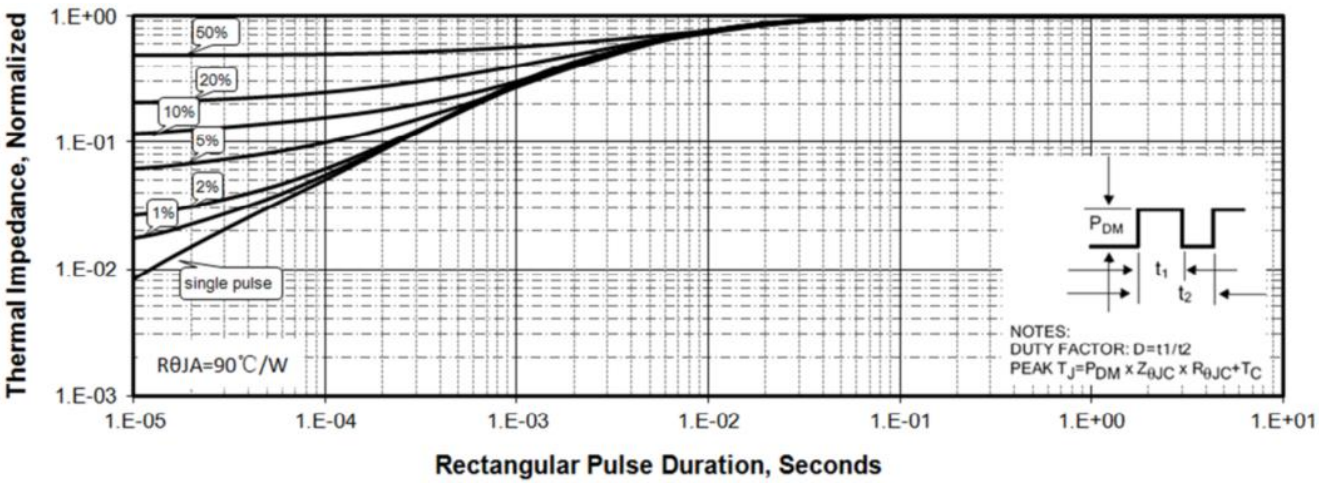
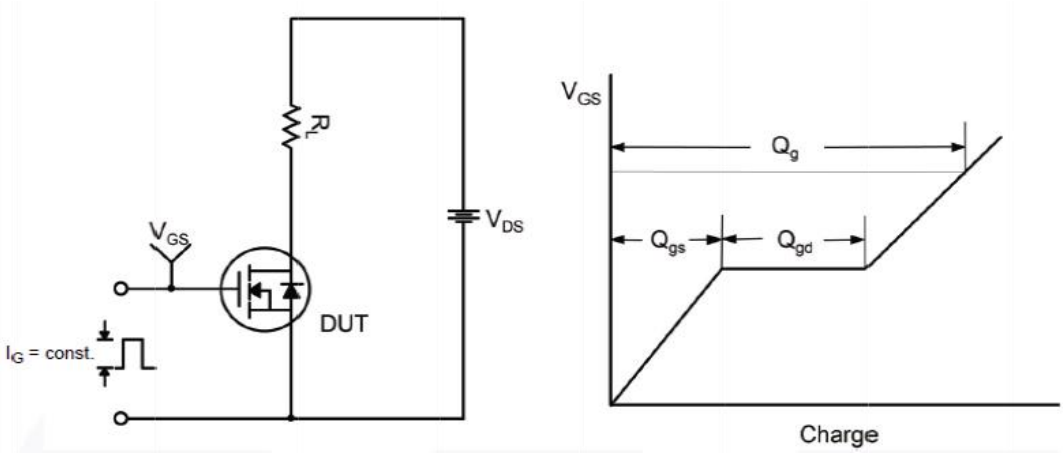
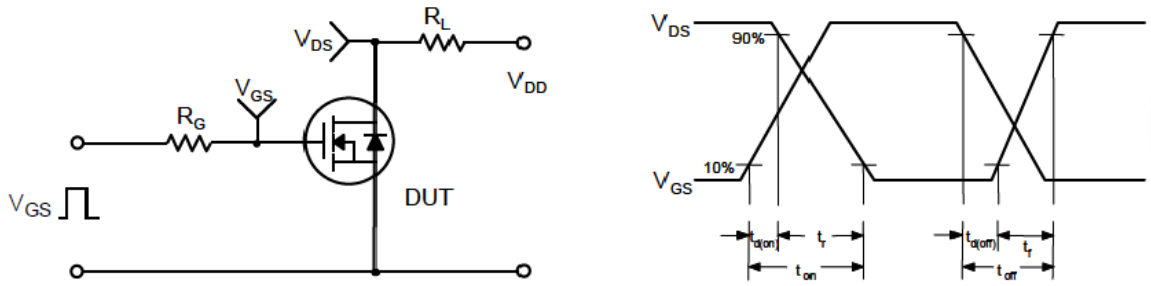


Figure 10. Transient Thermal Response Curve

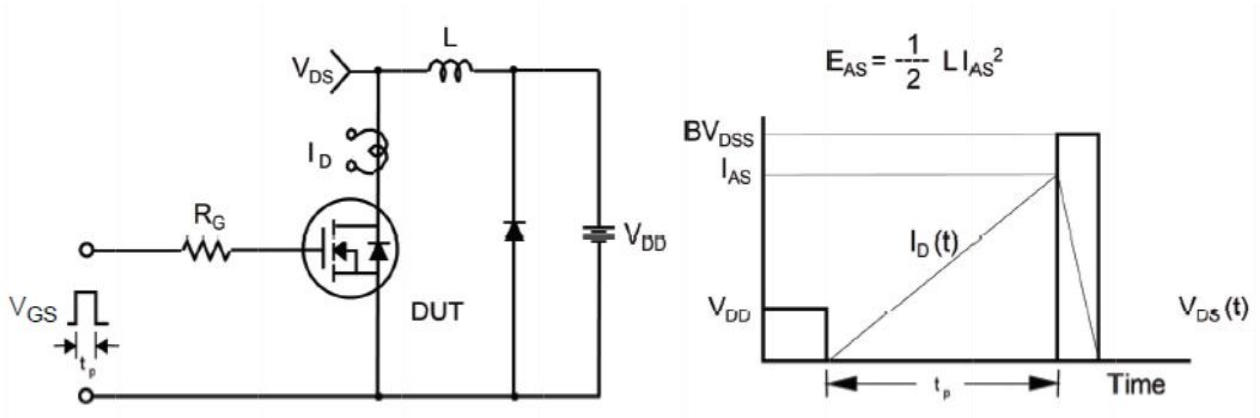
Gate Charge Test Circuit &Waveform



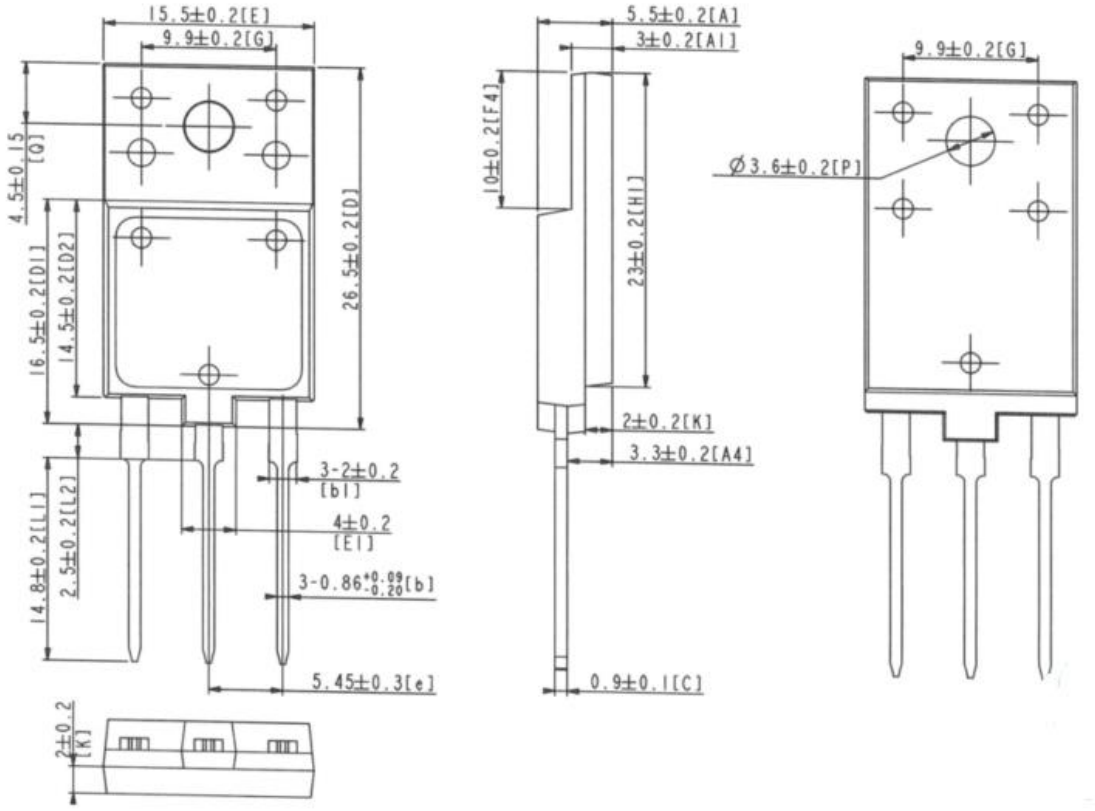
Switching Test Circuit &Waveforms



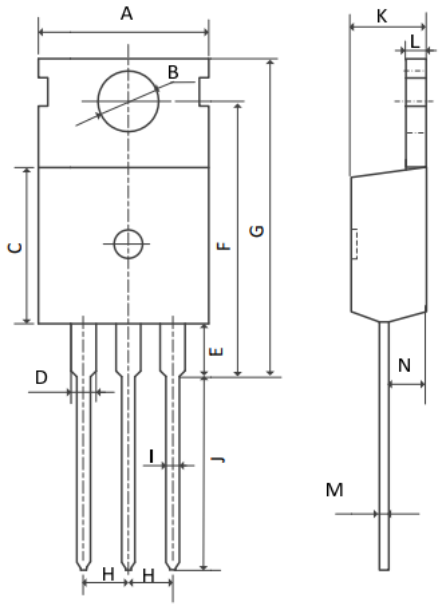
Unclamped Inductive Switching Test Circuit &Waveforms



Mechanical Dimensions for TO-3PF



Mechanical Dimensions for TO-220



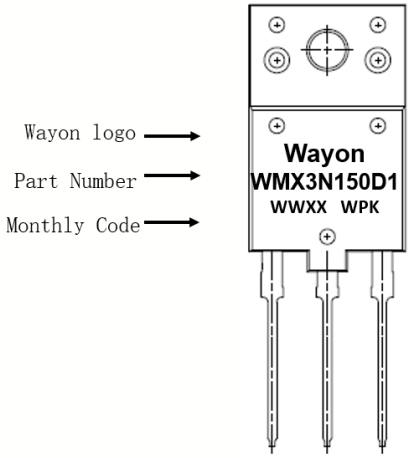
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.70	10.20
B	3.40	3.80
C	8.90	9.40
D	1.17	1.47
E	2.60	3.40
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

Ordering Information

Part	Package	Marking	Packingmethod
WMX3N150D1	TO-3PF	WMX3N150D1	Tube
WMK3N150D1	TO-220	WMK3N150D1	Tube

Marking Information



Revision history

Date	Revision	changes
2022-09-30	1	First release

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