

## 1500V 3A 5.7Ω N-ch Power MOSFET

### Description

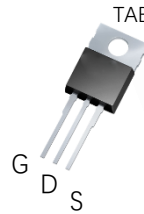
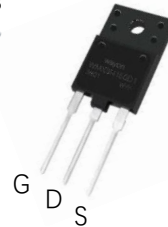
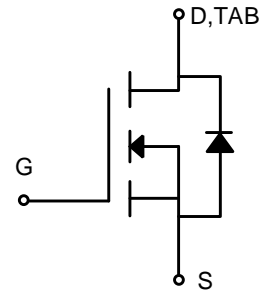
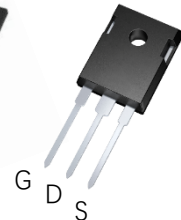
WMOS™ D1 is Wayon's 1<sup>st</sup> generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

### Features

- Typ. $R_{DS(on)}=5.7\Omega@V_{GS}=10V$
- 100% avalanche tested
- Pb-free, Halogen free

### Applications

- SMPS
- Charger
- DC-DC

**TO-220**

**TO-3PF**

**TO-247**


### Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ )

Parameter	Symbol	WMK3N150D1	WMX3N150D1	WMJ3N150D1	Unit
Drain-source voltage	$V_{DSS}$	1500			V
Gate-source voltage	$V_{GS}$	$\pm 30$			V
Continuous drain current	$I_D$	3			A
Pulsed drain current	$I_{DM}$	12			A
Avalanche energy, single pulse	$E_{AS}$	500			mJ
Power dissipation	$P_D$	125	90	125	W
Derate above 25°C		1	0.72	1	W/°C
Operating junction temperature	$T_j$	-55~150			°C
Storage temperature	$T_{stg}$	-55~150			°C
Continuous diode forward current	$I_S$	3			A
Diode pulse current	$I_{Spulse}$	12			A
Insulation withstand voltage (RMS) from all three leads to external heat sink ( $t=1s, T_c=25^\circ\text{C}$ )	$V_{ISO}$	3500			V

### Thermal Characteristic

Thermal resistance,junction-to-case	$R_{\theta JC}$	1	1.38	1	$^{\circ}C/W$
Thermal resistance,junction-to-ambient	$R_{\theta JA}$	65	50	20	$^{\circ}C/W$

### Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source break down voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	$T_C=25^{\circ}C$	1500	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	$T_J=25^{\circ}C$	2.5	3.5	4.5	V
Drain-source leakage current	$I_{DSS}$	$V_{DS}=1500V, V_{GS}=0V$	$T_J=25^{\circ}C$	-	-	1	$\mu A$
		$V_{DS}=1200V, V_{GS}=0V$	$T_J=125^{\circ}C$	-	-	400	$\mu A$
Gate-source leakage current,forward	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=30V$	$T_J=25^{\circ}C$	-	-	100	nA
Gate-source leakage current,reverse	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-30V$	$T_J=25^{\circ}C$	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2A$	$T_J=25^{\circ}C$	-	5.7	8.2	$\Omega$
Transconductance	$G_{fs}$	$V_{DS}=20V$	$T_J=25^{\circ}C$	-	3.0	-	S

### Dynamic Characteristics of MOSFET ( $T_C=25^{\circ}C$ )

				Min.	Typ.	Max.	
Input capacitance	$C_{iss}$	$f=1MHz, V_{DS}=25V, V_{GS}=0V$		-	1800	-	pF
Output capacitance	$C_{oss}$			-	100	-	pF
Reverse transfer capacitance	$C_{riss}$			-	11	-	pF
Gate to source charge	$Q_{gs}$	$V_{DD}=750V$		-	8	-	nC
Gate to drain charge	$Q_{gd}$	$I_D=3A$		-	15	-	nC
Total gate charge	$Q_g$	$V_{GS}=0$ to 10V		-	40	-	nC

### Switching Characteristics of MOSFET ( $T_C=25^{\circ}C$ )

				Min.	Typ.	Max.	
Turn-on delay time	$t_{d on}$	$V_{DS}=750V, I_D=3A,$ $R_G=4.7\Omega, V_{GS}=0$ to 10V		-	16.4	-	ns
Rise time	$t_r$			-	9.6	-	ns
Turn-off delay time	$t_{d off}$			-	36	-	ns
Fall time	$t_f$			-	31	-	ns

### Characteristics of Body Diode ( $T_C=25^{\circ}C$ )

				Min.	Typ.	Max.	
Forward voltage	$V_{SD}$	$I_{SD}=3A, V_{GS}=0V$		-	-	1.5	V
Reverse recovery time	$t_{rr}$	$V_{DS}=750V, I_S=3A, V_{GS}=10V$ $-di/dt=100A/us$		-	255	-	ns
Reverse recovery current	$I_{rr}$			-	11	-	A
Recovery charge	$Q_{rr}$			-	1.4	-	$\mu C$

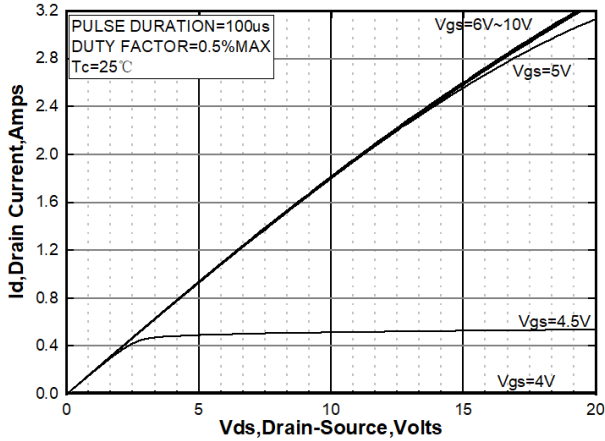


Figure 1. On-Region Characteristics

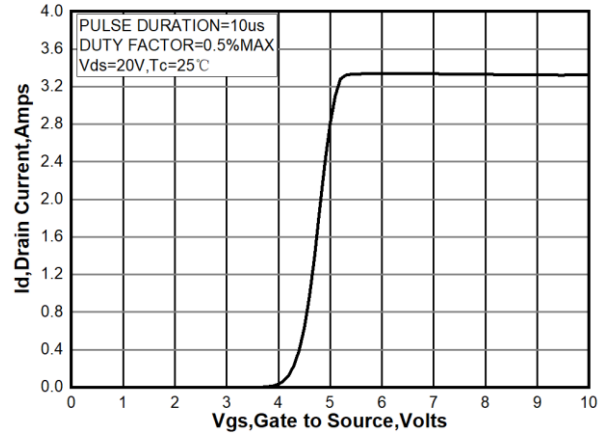


Figure 2. Transfer Characteristics

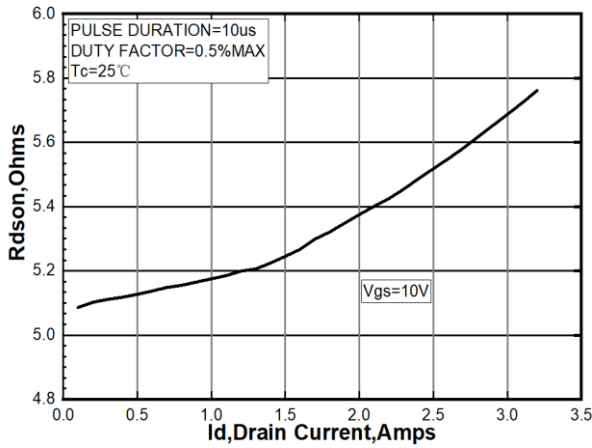


Figure 3. Static Drain-Source On Resistance

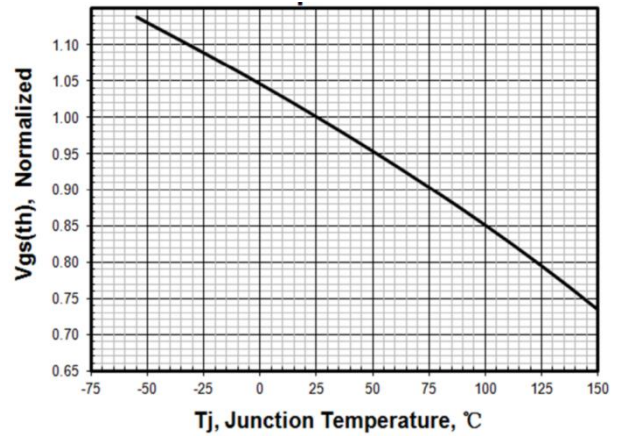


Figure 4. Normalized VGS(th) vs. Temperature

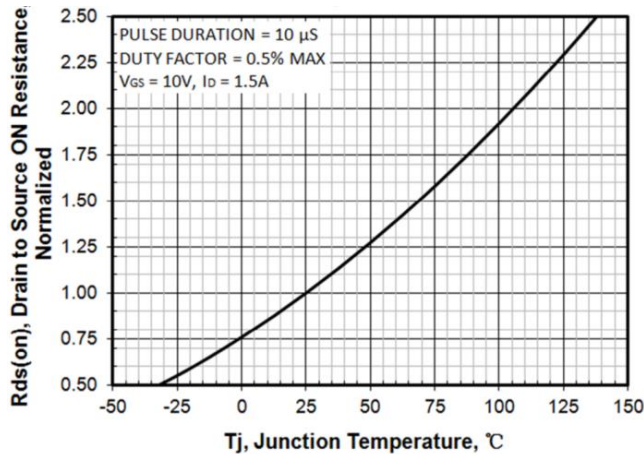


Figure 5. Normalized  $R_{DS(on)}$  vs. Temperature

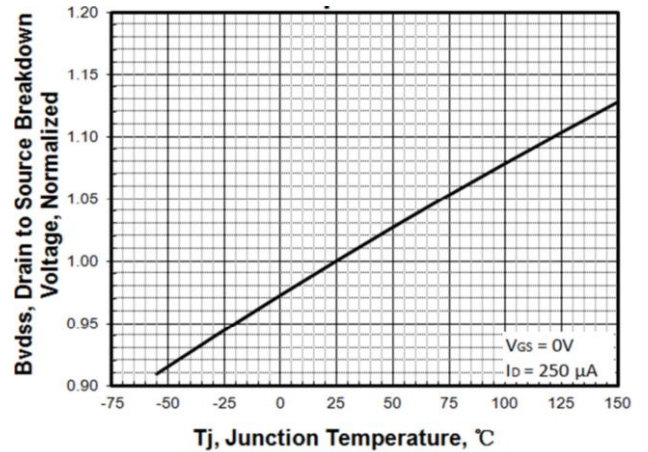


Figure 6. Normalized  $BV_{DSS}$  vs. Temperature

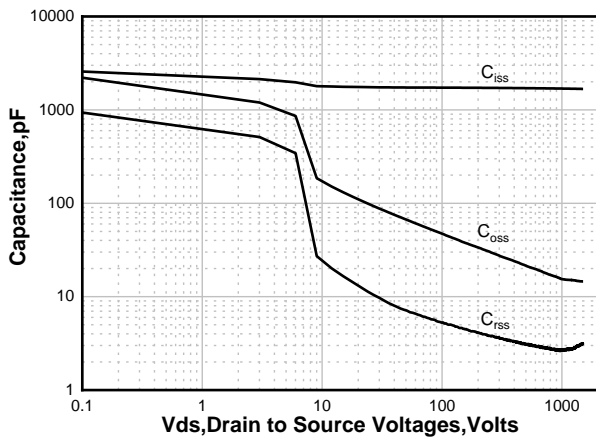


Figure 7. Capacitance Characteristics

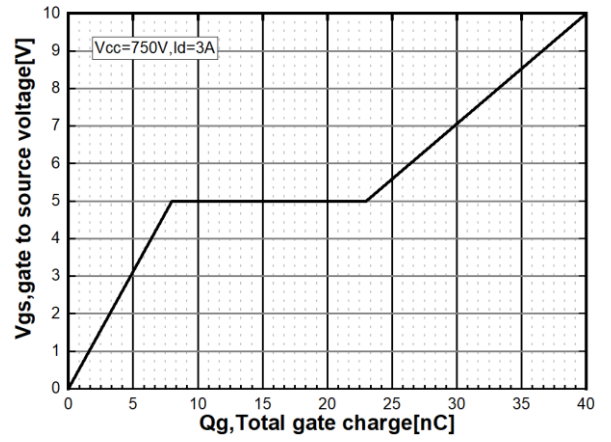


Figure 8. Gate Charge Characteristics

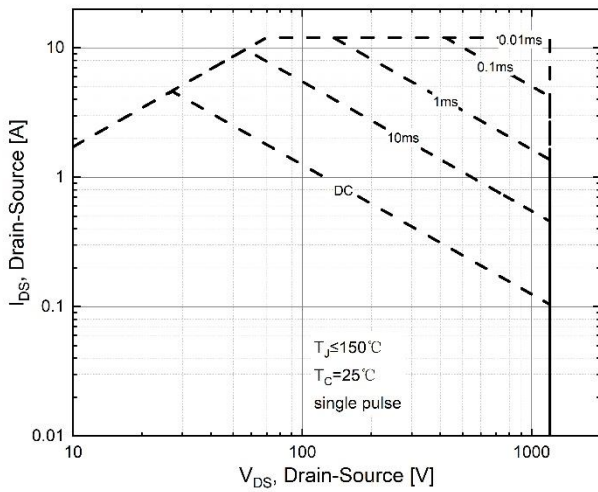


Figure 9. Maximum Safe Operating Area (TO-220)

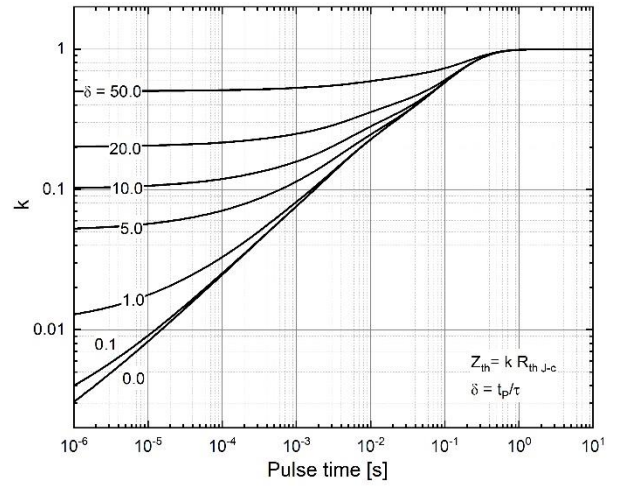


Figure 10. Transient Thermal Response Curve (TO-220)

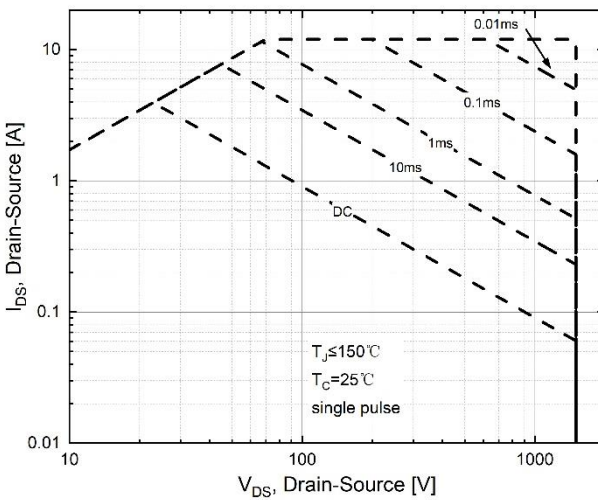


Figure 11. Maximum Safe Operating Area (TO-3PF)

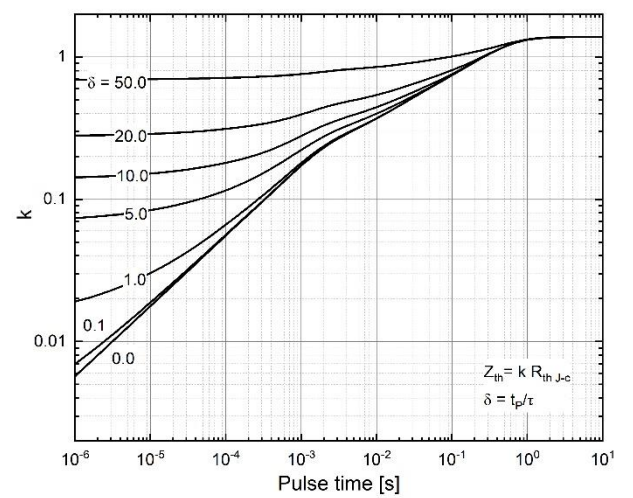


Figure 12. Transient Thermal Response Curve (TO-3PF)

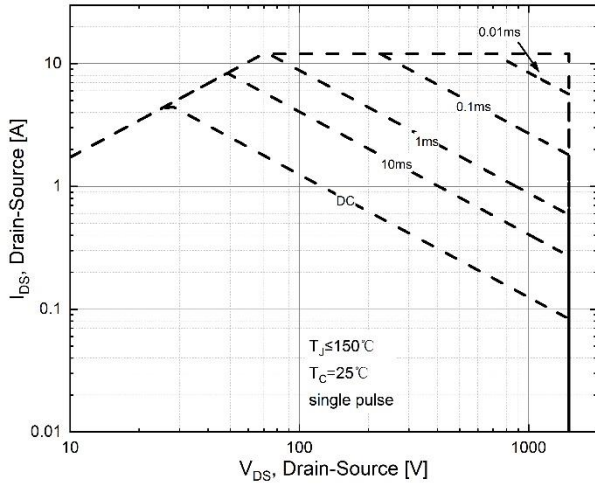


Figure 13. Maximum Safe Operating Area (TO-247)

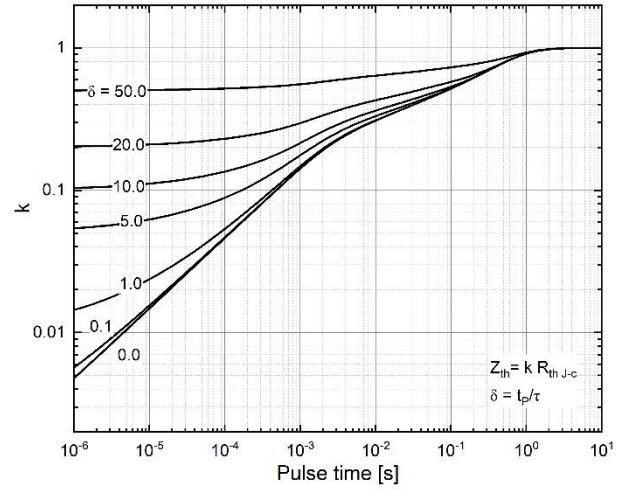
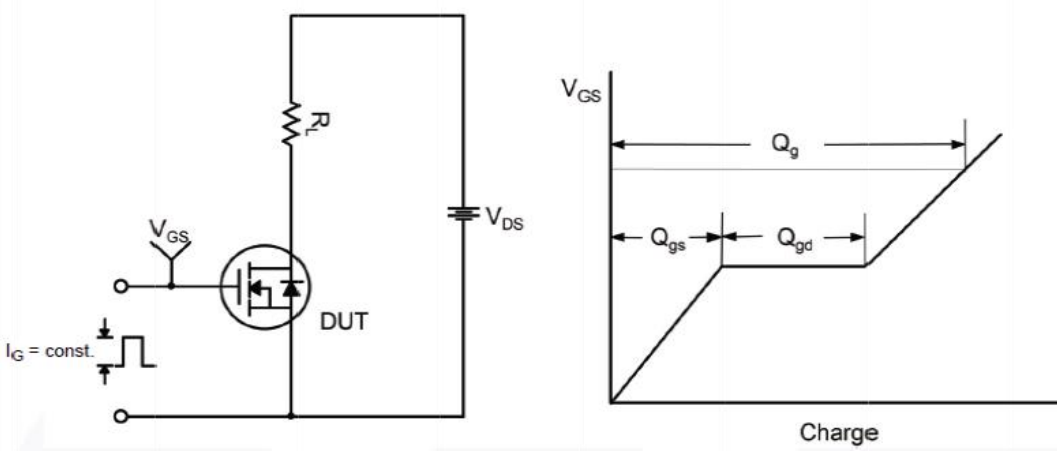
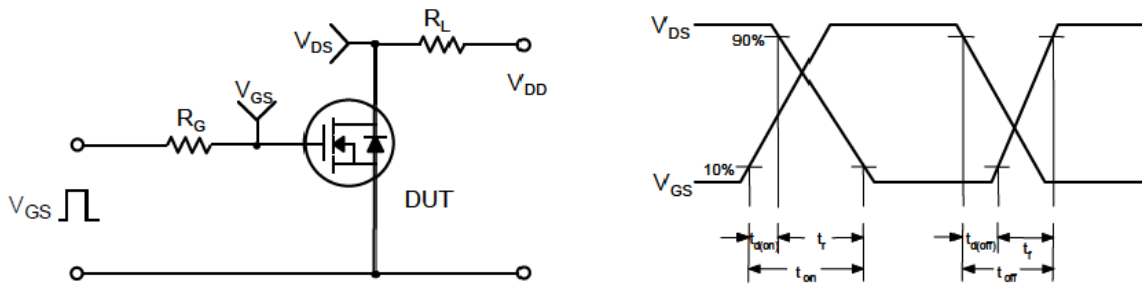


Figure 14. Transient Thermal Response Curve (TO-247)

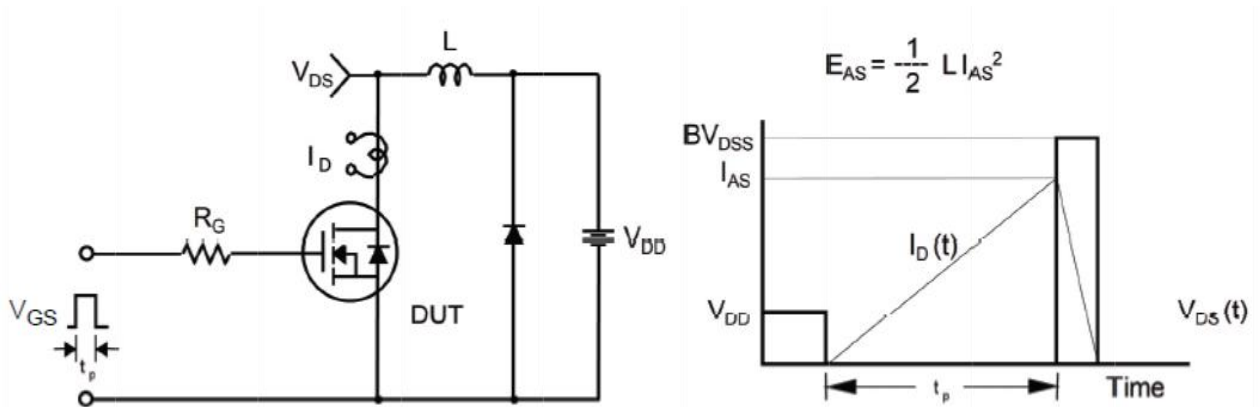
Gate Charge Test Circuit & Waveform



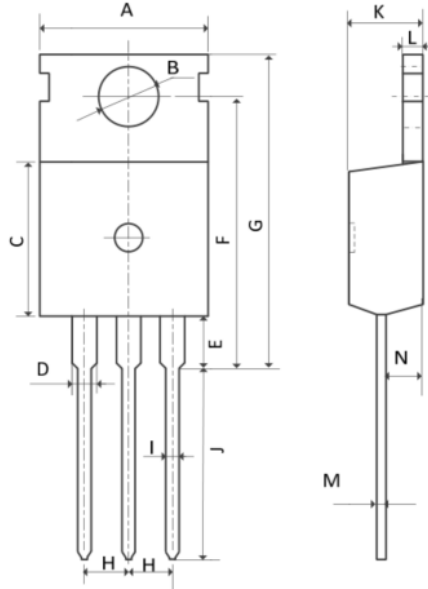
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



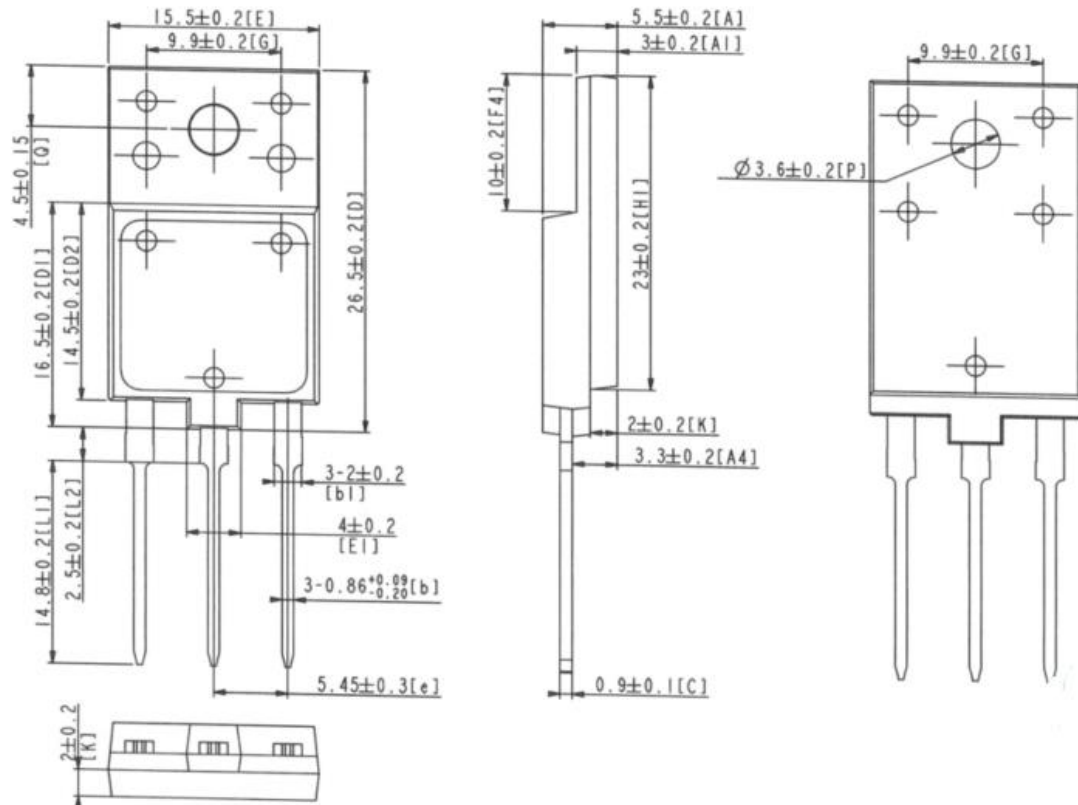
Mechanical Dimensions for TO-220



COMMON DIMENSIONS

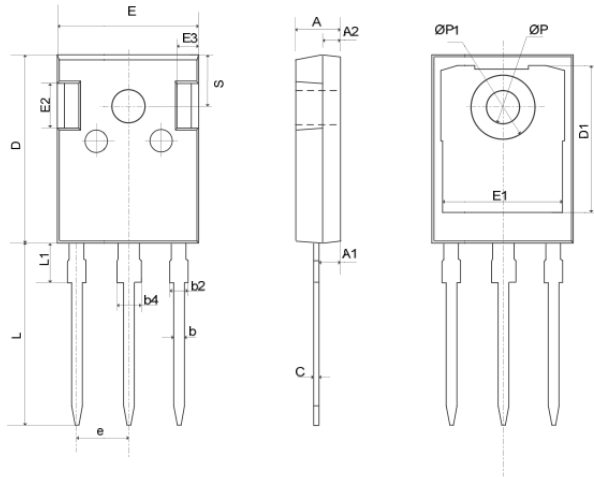
SYMBOL	MM	
	MIN	MAX
A	9.70	10.20
B	3.40	3.80
C	8.90	9.40
D	1.17	1.47
E	2.60	3.40
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

Mechanical Dimensions for TO-3PF



### Mechanical Dimensions for TO-247

COMMON DIMENSIONS

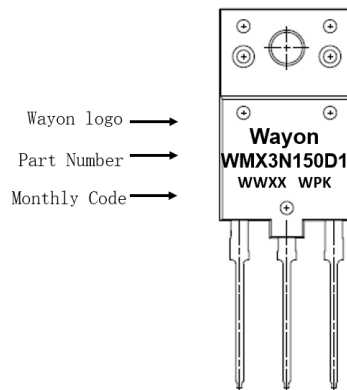


SYMBOL	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.11	1.36
b2	1.91	2.21
b4	2.91	3.21
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.44BSC	
L	19.62	20.22
L1	—	4.30
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	

### Ordering Information

Part	Package	Marking	Packing method
WMK3N150D1	TO-220	WMK3N150D1	Tube
WMX3N150D1	TO-3PF	WMX3N150D1	Tube
WMJ3N150D1	TO-247	WMJ3N150D1	Tube

### Marking Information





## Contact Information

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