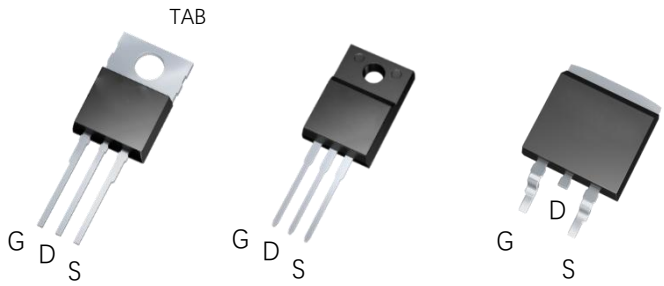
900V 6A 1.7Ω N-ch Power MOSFET

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.

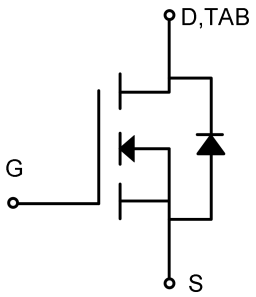
TO-220 TO-220F TO-263



Features

- Typ.$R_{DS(on)}$=1.7Ω@V_{GS}=10V
- 100% avalanche tested
- Pb-free, Halogen free

RoHS compliant



Applications

- SMPS
- Charge
- DC-DC

Absolute Maximum Ratings (Tc=25℃)

Parameter	Symbol	WMK6N90D1	WML6N90D1	WMM6N90D1	Unit
Drain-source voltage	V_{DSS}	900			V
Gate-source voltage	V_{GS}	±30			V
Continuous drain current	I_D	6			A
Pulsed drain current	I_{DM}	24			A
Avalanche energy, single pulse	E_{AS}	370			mJ
Power dissipation	P_D	100	50	100	W
Derate above 25°C		0.8	0.4	0.8	W/℃
Operating junction temperature	T_j	-55~150			℃
Storage temperature	T_{stg}	-55~150			℃
Continuous diode forward current	I_S	6			A
Diode pulse current	I_{Spulse}	24			A

Thermal Characteristic

Thermal resistance,junction-to-case	$R_{\theta JC}$	1.25	2.5	1.2	℃/W
Thermal resistance,junction-to-ambient	$R_{\theta JA}$	62.5	62.5	62.5	℃/W

Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source break down voltage	BV_{DSS}	I_D=250uA, V_{GS}=0V	T_C=25℃	900	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250uA, V_{DS}=V_{GS}	T_J=25℃	3	3.3	5	V
Drain-source leakage current	I_{DSS}	V_{DS}=900V, V_{GS}=0V	T_J=25℃	-	-	1	uA
		V_{DS}=720V, V_{GS}=0V	T_J=125℃	-	-	100	uA
Gate-source leakage current,forward	I_{GSSF}	V_{DS}=0V, V_{GS}=30V	T_J=25℃	-	-	100	nA
Gate-source leakage current,reverse	I_{GSSR}	V_{DS}=0V, V_{GS}=-30V	T_J=25℃	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3A	T_J=25℃	-	1.7	2	Ω
Transconductance	G_{fs}	V_{DS}=20V	T_J=25℃	-	7.8	-	S

Dynamic Characteristics of MOSFET (T_C=25℃)

			Min.	Typ.	Max.	
Input capacitance	C_{iss}	f=1MHz, V_{DS}=27V, V_{GS}=0V	-	1390	-	nF
Output capacitance	C_{oss}		-	123	-	nF
Reverse transfer capacitance	C_{rss}		-	18.7	-	nF
Gate to source charge	Q_{gs}	V_{DD}=450V	-	18	-	nC
Gate to drain charge	Q_{gd}	I_D=6A	-	35.2	-	nC
Total gate charge	Q_g	V_{GS}= 0 to10V	-	86.2	-	nC

Switching Characteristics of MOSFET (T_C=25℃)

			Min.	Typ.	Max.	
Turn-on delay time	$t_{d\ on}$	V_{DD}=450V, I_D=6A, R_G=25Ω, V_{GS}=10V	-	22.8	-	ns
Rise time	t_r		-	181	-	ns
Turn-off delay time	$t_{d\ off}$		-	141	-	ns
Fall time	t_f		-	42	-	ns

Characteristics of Body Diode (T_C=25℃)

			Min.	Typ.	Max.	
Forward voltage	V_{SD}	I_{SD}=6A, V_{GS}=0V	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=6A, V_{GS}=0V di/dt=100A/μs	-	763	-	ns
Reverse recovery current	I_{rr}		-	12.2	-	A
Recovery charge	Q_{rr}		-	4.7	-	uC

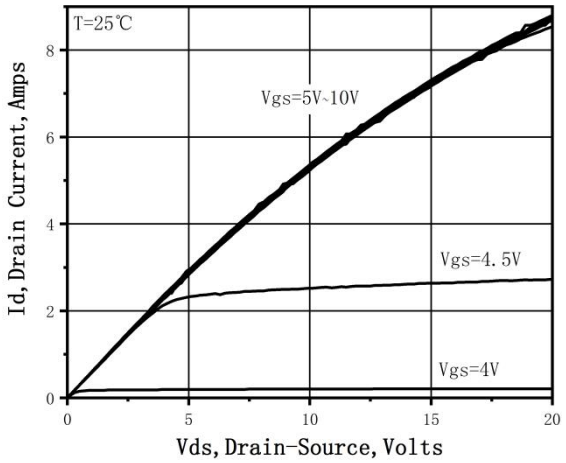


Figure 1.On-Region Characteristics

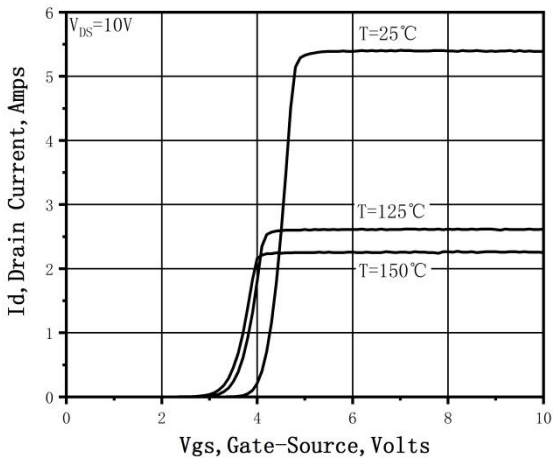


Figure 2. Transfer Characteristics

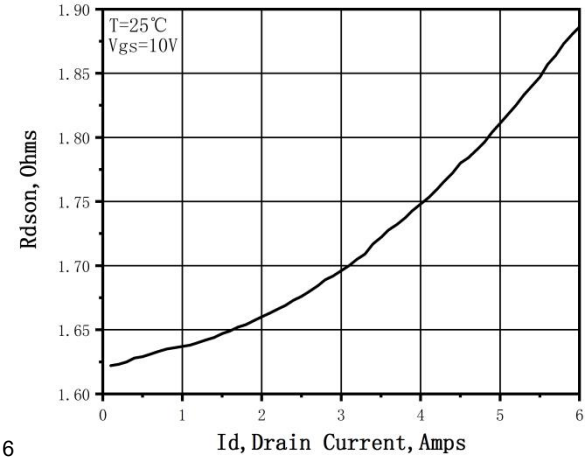


Figure 3.Static Drain-Source On Resistance

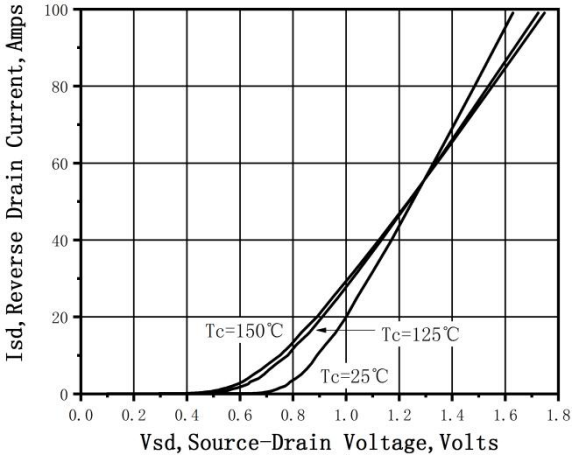


Figure 4. Typical Body Diode Transfer Characteristics

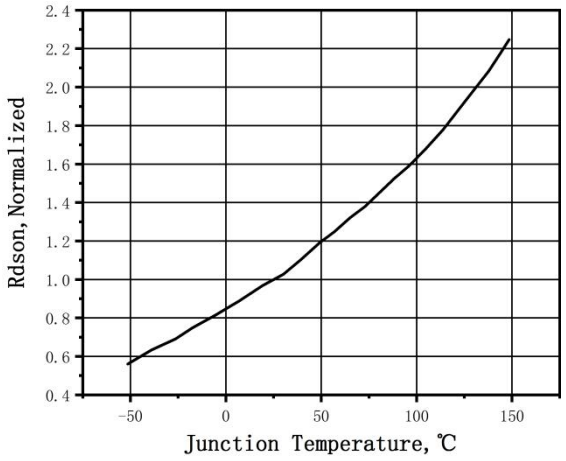


Figure 5. Normalized $R_{DS(on)}$ vs.Temperature

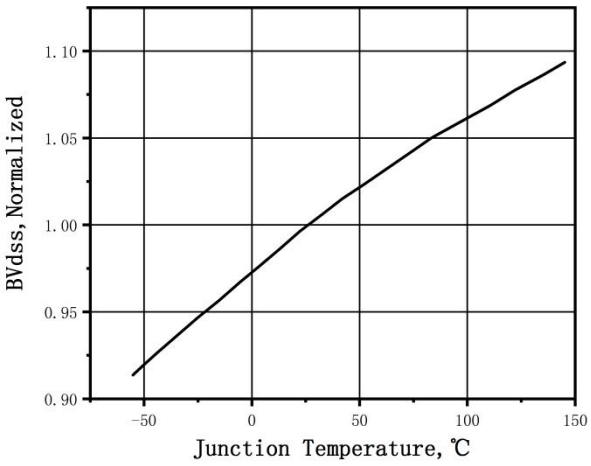


Figure 6. Normalized BV_{DSS} vs.Temperature

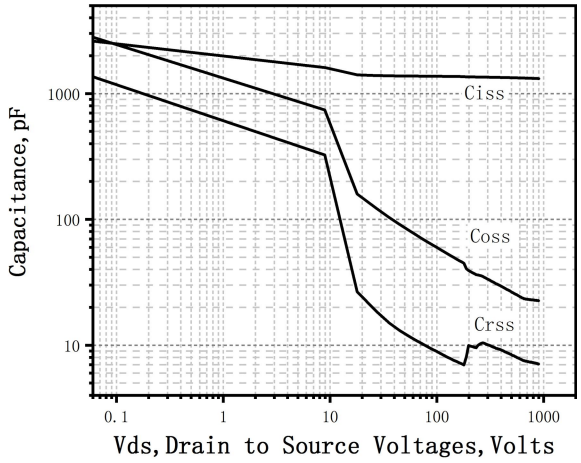


Figure 7. Capacitance Characteristics

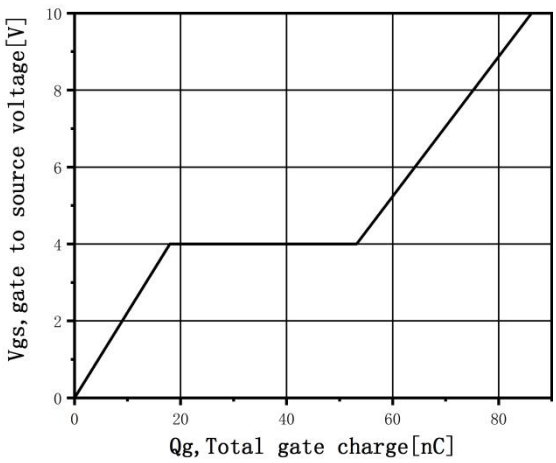


Figure 8. Gate Charge Characteristics

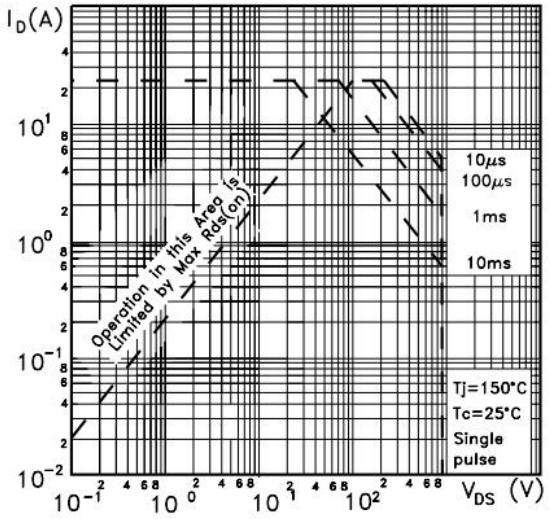


Figure 9. Maximum Safe Operating Area
（TO-220/TO-263）

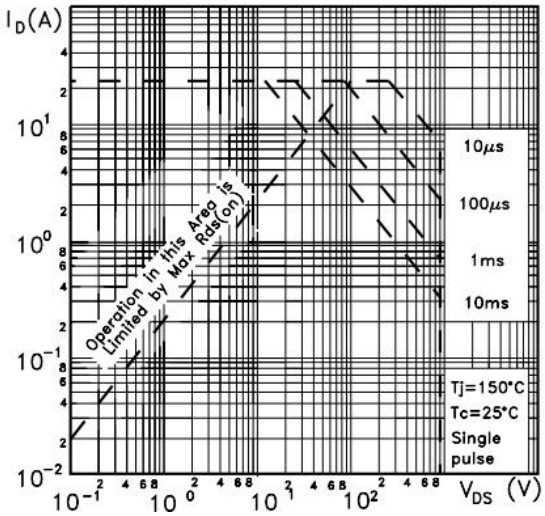


Figure 10. Maximum Safe Operating Area
（TO-220F）

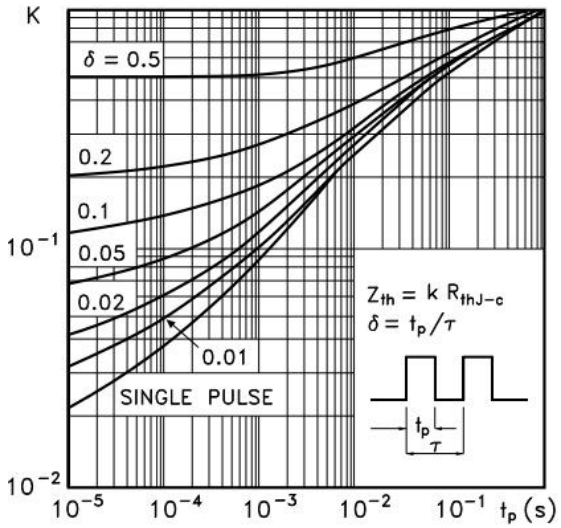


Figure 11. Transient Thermal Response Curve
(TO-220/TO-263)

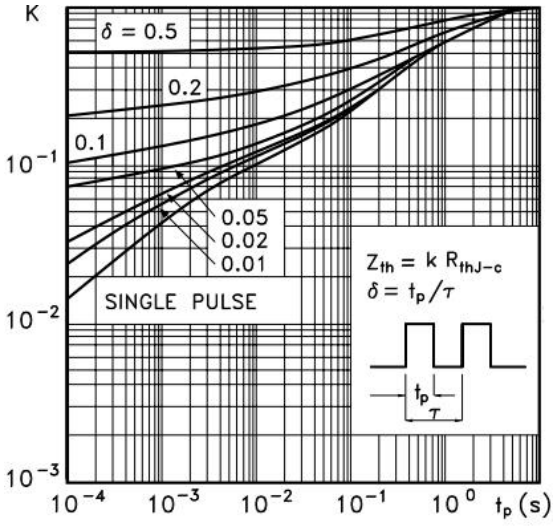
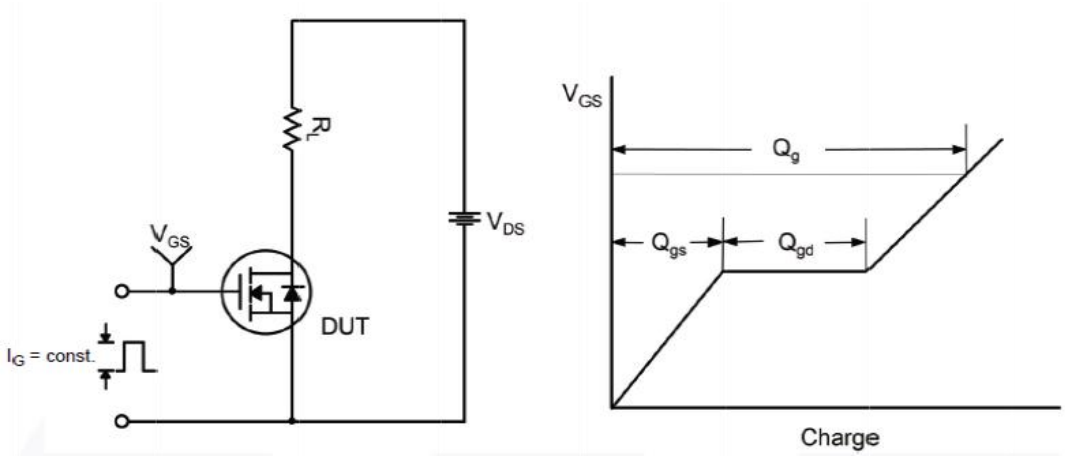
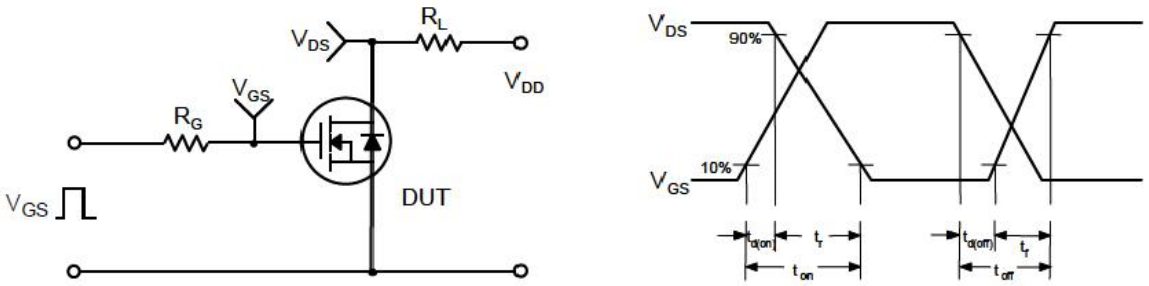


Figure 12. Transient Thermal Response Curve
(TO-220F)

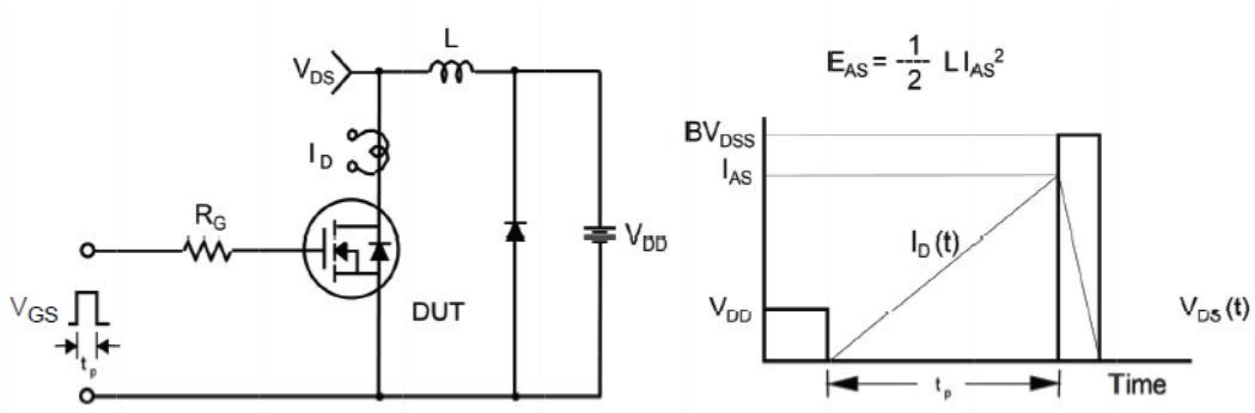
Gate Charge Test Circuit &Waveform



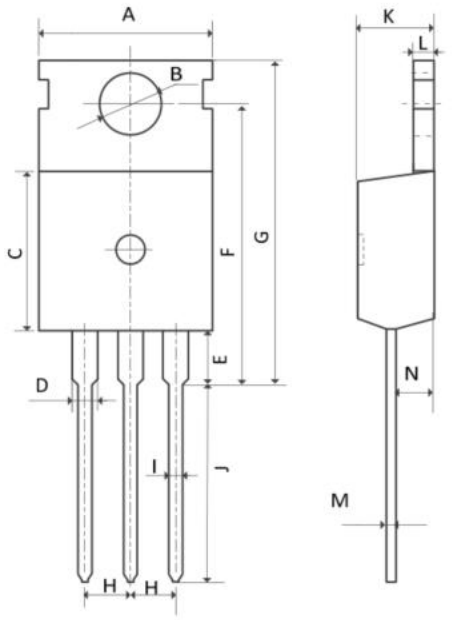
Switching Test Circuit &Waveforms



Unclamped Inductive Switching Test Circuit &Waveforms



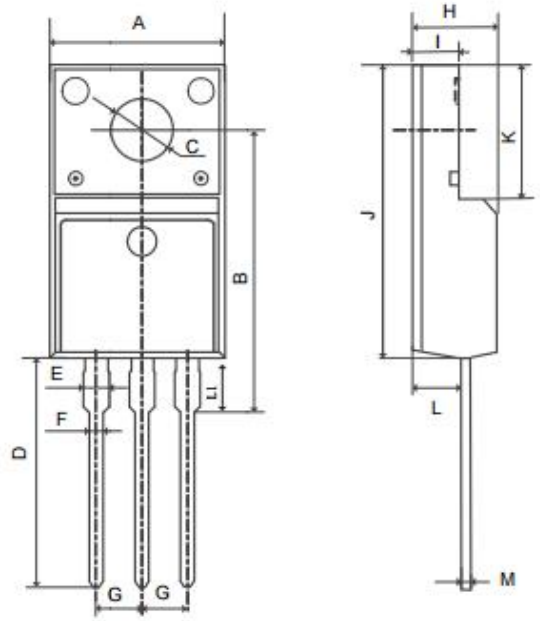
Mechanical Dimensions for TO-220



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

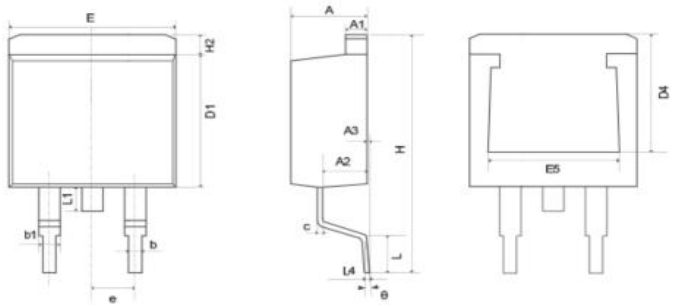
Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
B	15.10	16.10
C	3.03	3.38
D	12.64	13.28
E	1.18	1.58
F	0.70	0.95
G	2.54REF	
H	4.50	4.90
I	2.34	2.74
J	15.57	16.17
K	6.70REF	
L	2.56	2.96
M	0.40	0.65
L1	2.85	3.45

Mechanical Dimensions for TO-263



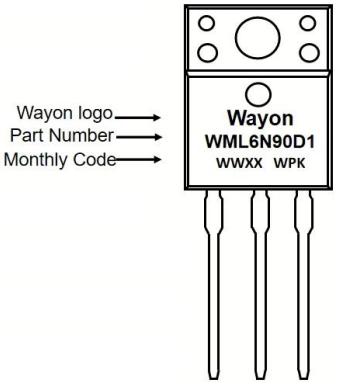
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	—
E	9.86	10.36
E5	7.06	—
e	2.54BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.60
L1	1.40	1.70
L4	0.25BSC	
θ	0°	9°

Ordering Information

Part	Package	Marking	Packing method
WMK6N90D1	TO-220	WMK6N90D1	Tube
WML6N90D1	TO-220F	WML6N90D1	Tube
WMM6N90D1	TO-263	WMM6N90D1	Tape and Reel

Marking Information



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