

600V 0.52Ω Super Junction Power MOSFET

Description

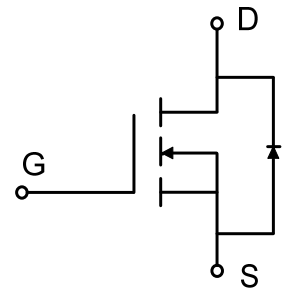
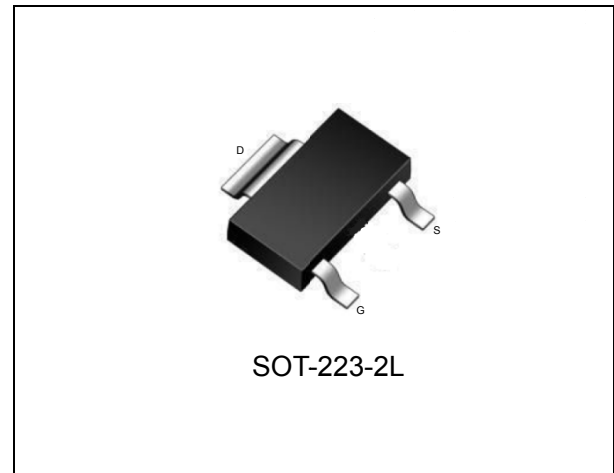
WMOS™ C4 is Wayon's 4th generation super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ C4 is suitable for applications which require superior power density and outstanding efficiency.

Features

- $V_{DS} = 650V @ T_{j,max}$
- Typ. $R_{DS(on)} = 0.52\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

LED Lighting, Charger, Adapter, PC, LCD TV, Server



Absolute Maximum Ratings

Parameter	Symbol	WMF10N60C4	Unit
Drain-source voltage	V_{DSS}	600	V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$)	I_D	8	A
($T_C = 100^\circ C$)		4.8	A
Pulsed drain current ²⁾	I_{DM}	19	A
Gate-source voltage	V_{GS}	± 30	V
Avalanche energy, single pulse ³⁾	E_{AS}	45	mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.15	mJ
Avalanche current, repetitive ²⁾	I_{AR}	1.0	A
Power dissipation ($T_C = 25^\circ C$)	P_D	6.5	W
- Derate above $25^\circ C$		0.05	W/ $^\circ C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^\circ C$
Continuous diode forward current	I_S	8	A
Diode pulse current	$I_{S,pulse}$	19	A

Thermal Characteristics

Parameter	Symbol	WMF10N60C4	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	19	$^\circ C/W$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	75	$^\circ C/W$

Electrical Characteristics $T_c = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0 V, I _D =0.25 mA	600	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =0.25mA	2	3	4	V
Drain cut-off current	I _{DSS}	V _{DS} =600 V, V _{GS} =0V, T _J = 25°C T _J = 125°C	- -	- 30	1 -	μA
Gate leakage current, forward	I _{GSSF}	V _{GS} =20V, V _{DS} =0V	-	-	100	nA
Gate leakage current, reverse	I _{GSSR}	V _{GS} =-20V, V _{DS} =0V	-	-	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =1A T _J = 25°C	- -	 0.52	 0.61	 Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1 MHz	-	415	-	pF
Output capacitance	C _{Oss}		-	19	-	
Reverse transfer capacitance	C _{rss}		-	0.95	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 300V, I _D = 2A R _G = 25Ω, V _{GS} =10V	-	12	-	ns
Rise time	t _r		-	10	-	
Turn-off delay time	t _{d(off)}		-	62	-	
Fall time	t _f		-	13	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =480V, I _D =2A, V _{GS} =0 to 10V	-	1.7	-	nC
Gate to drain charge	Q _{gd}		-	3.5	-	
Gate charge total	Q _g		-	9.6	-	
Gate plateau voltage	V _{plateau}		-	5.2	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =1.5A	-	-	1.2	V
Reverse recovery time	t _{rr}	V _R =50V, I _F =2A, dI _F /dt=100A/μs	-	105	-	ns
Reverse recovery charge	Q _{rr}		-	0.6	-	μC
Peak reverse recovery current	I _{rrm}		-	11.3	-	A

Notes:

- Limited by $T_{j\max}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $I_{AS}=1.0\text{ A}$, $V_{DD}=50\text{ V}$, $R_G=25\Omega$, starting $T_j=25^\circ\text{C}$.

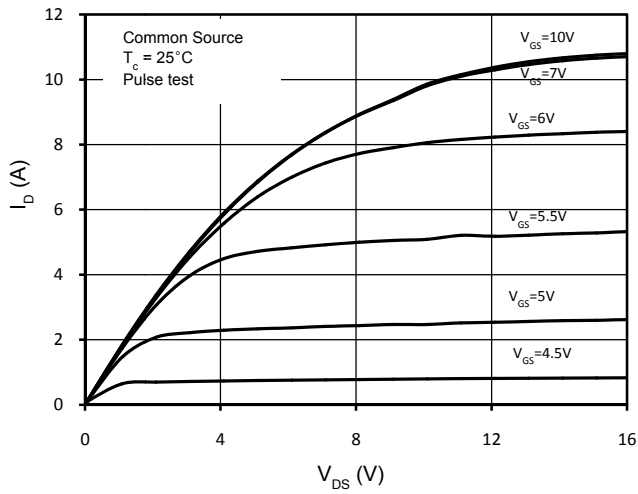


Figure 1. On-Region Characteristics

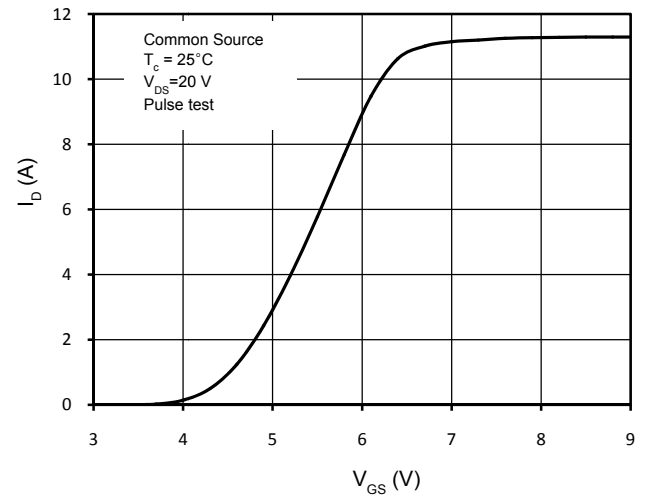


Figure 2. Transfer Characteristics

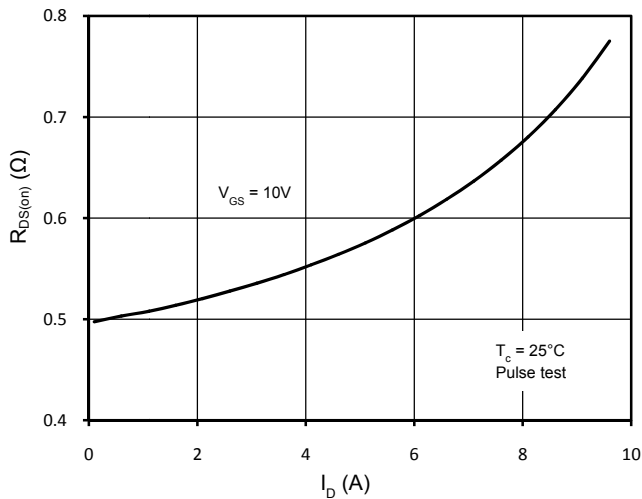


Figure 3. Static Drain-Source On Resistance

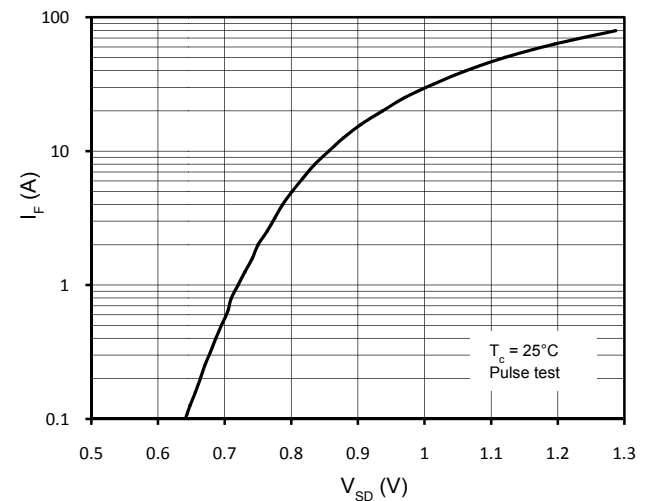
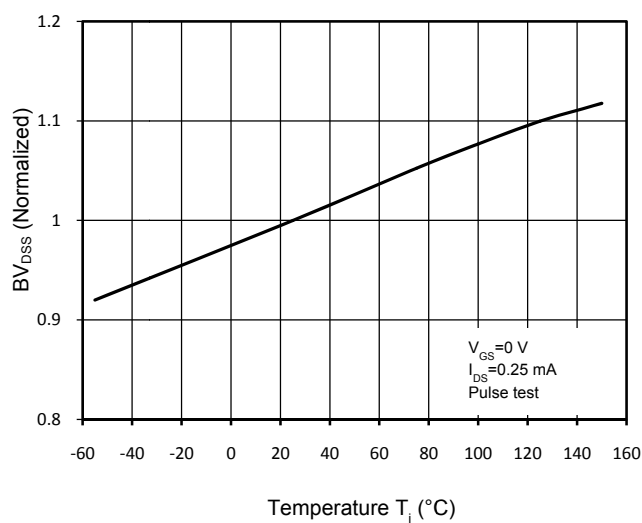
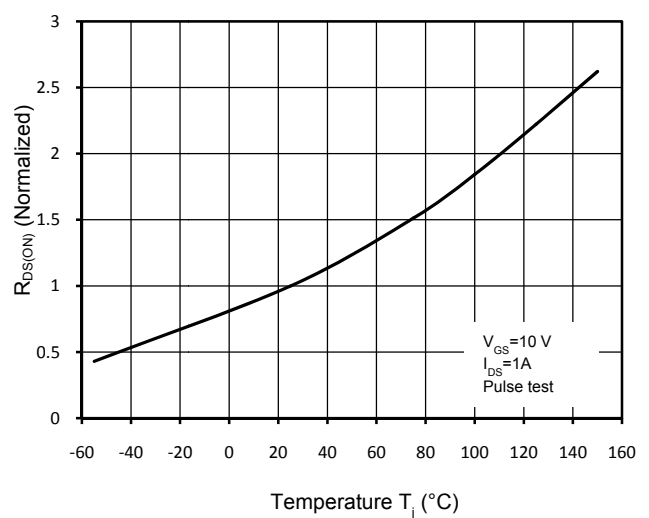


Figure 4. Body-Diode Forward Characteristics

Figure 5. Normalized BV_{DS} vs. TemperatureFigure 6. Normalized $R_{DS(on)}$ vs. Temperature

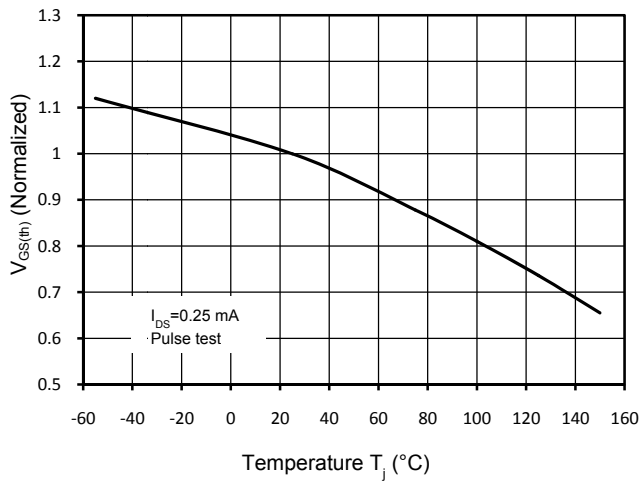


Figure 7. Threshold Voltage vs. Temperature

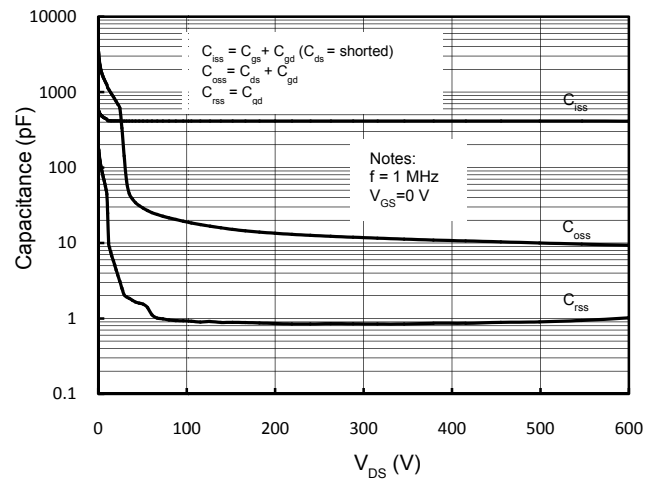


Figure 8. Capacitance Characteristics

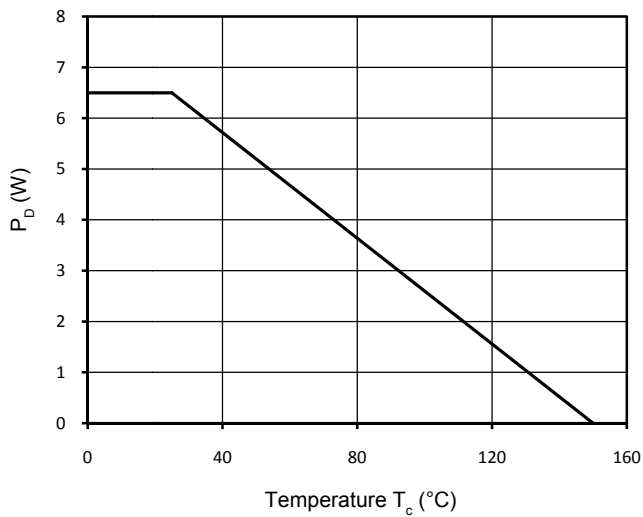


Figure 9. Power Dissipation

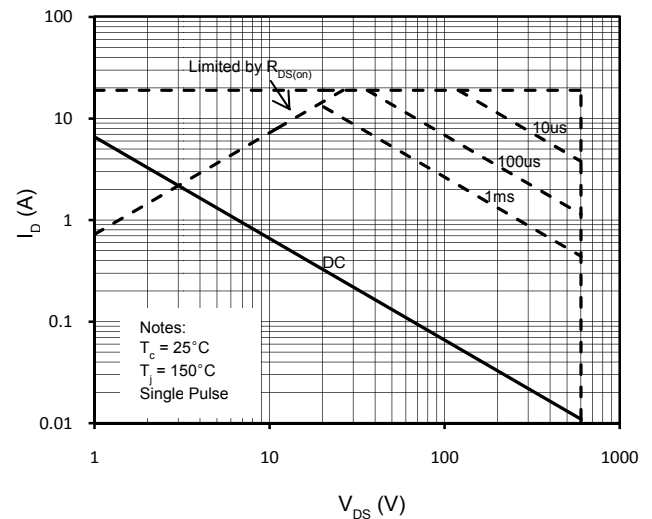


Figure 10. Maximum Safe Operating Area

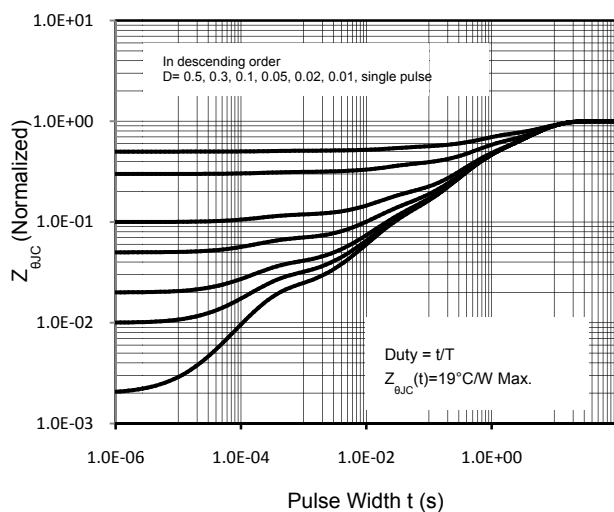


Figure 11. Transient Thermal Response Curve

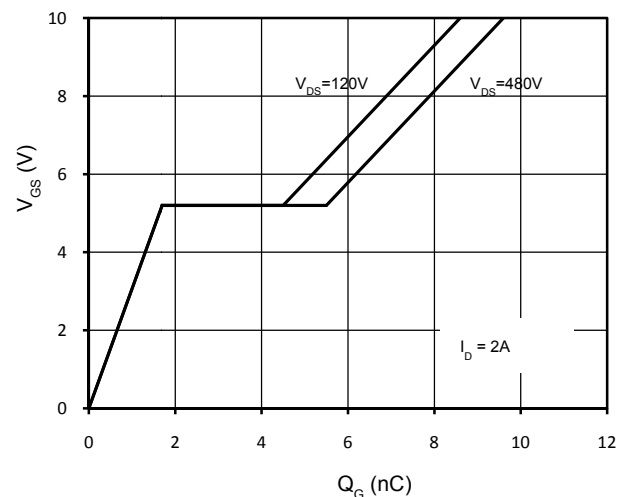
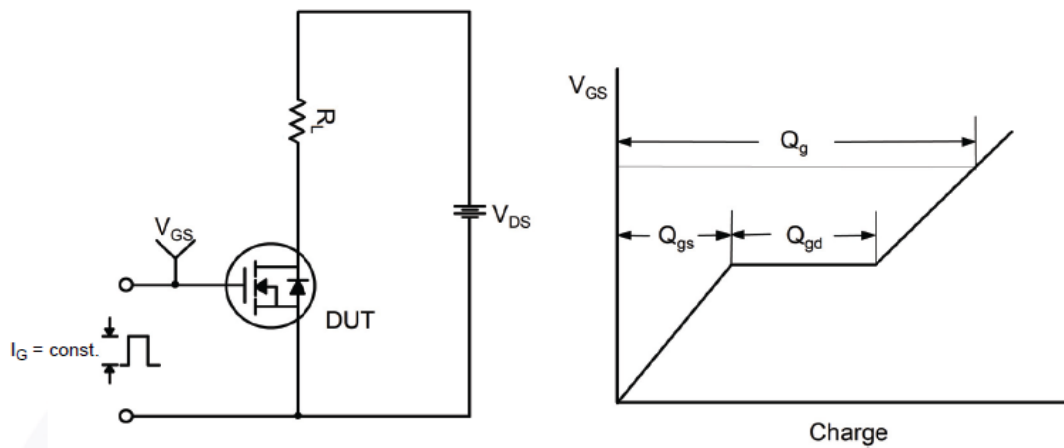
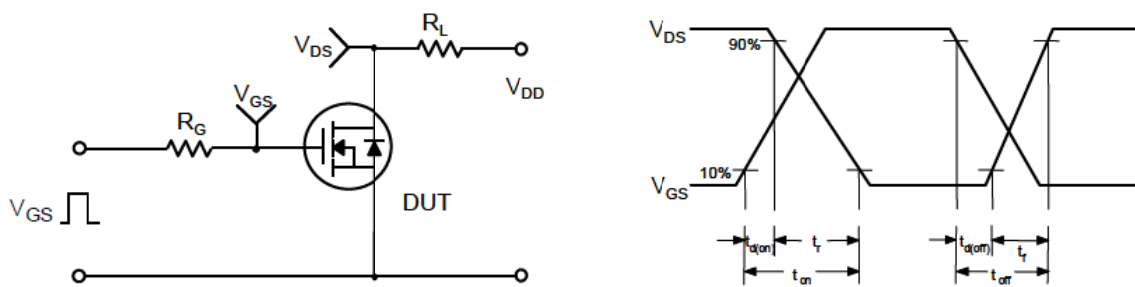


Figure 12. Gate Charge Characteristics

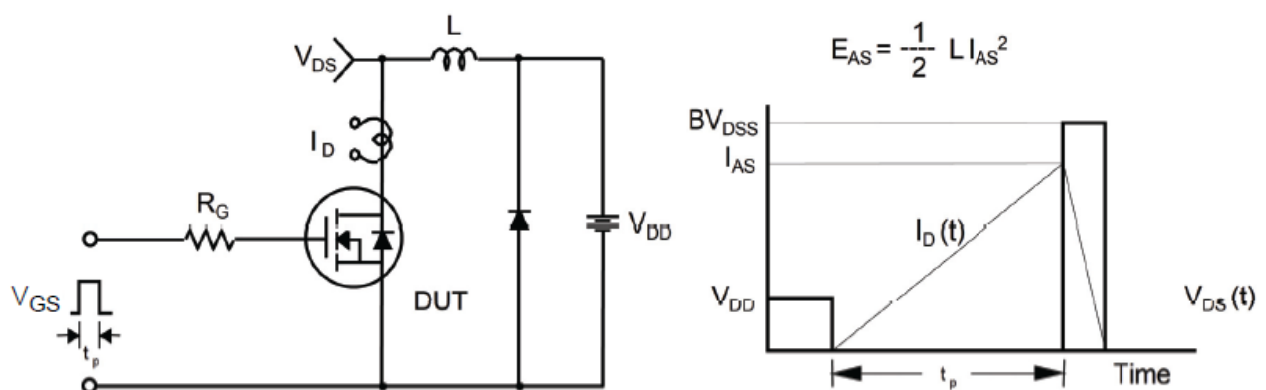
Gate Charge Test Circuit & Waveform



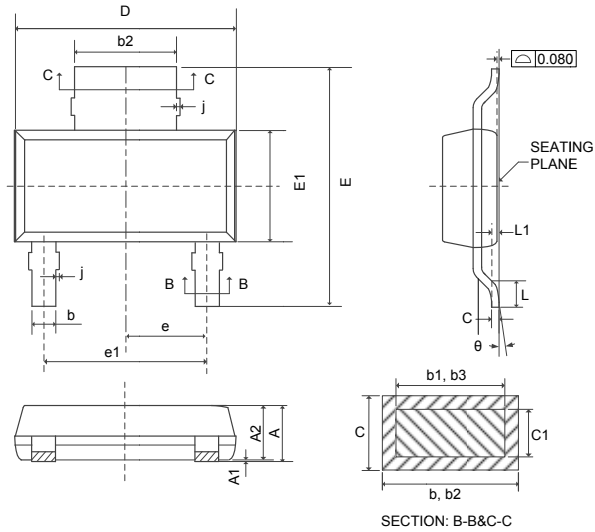
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for SOT-223-2L



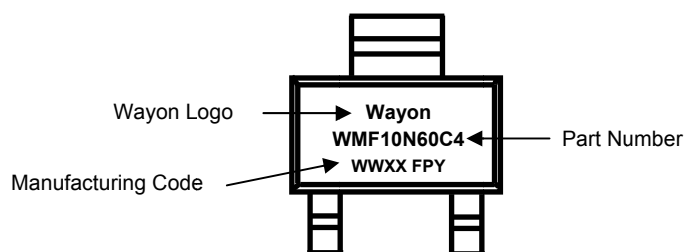
COMMON DIMENSIONS

SYMBOL	mm	
	MIN	MAX
A	-	1.80
A1	0.02	0.10
A2	1.50	1.70
b	0.6	0.84
b1	0.6	0.79
b2	2.90	3.10
b3	2.84	3.05
C	0.23	0.35
C1	0.23	0.33
D	6.30	6.95
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.81	-
L1	0.25 BSC	
θ	0°	10°
j	-	0.15

Ordering Information

Part	Package	Marking	Packing method
WMF10N60C4	SOT-223-2L	WMF10N60C4	Tape and Reel

Marking Information



Contact Information

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