

600V 1.7Ω Super Junction Power MOSFET

Description

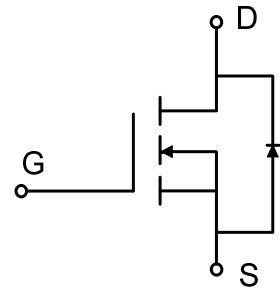
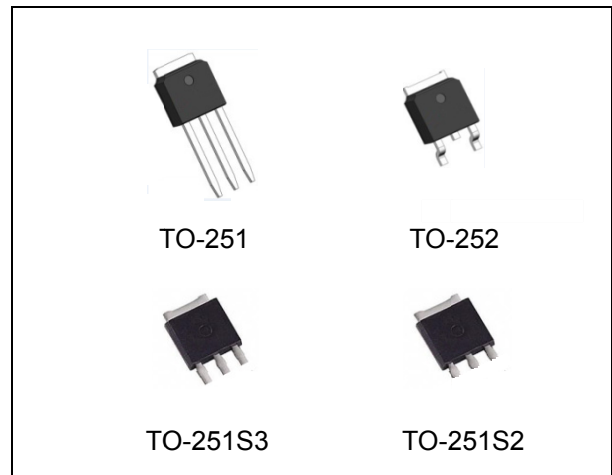
WMOS™ C2 is Wayon's 2nd generation super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ C2 is suitable for applications which require superior power density and outstanding efficiency.

Features

- $V_{DS} = 650V @ T_{j,max}$
- Typ. $R_{DS(on)} = 1.7\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

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



Absolute Maximum Ratings

Parameter	Symbol	WMO/WMP/WMG/WMH	Unit
Drain-source voltage	V_{DSS}	600	V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$)	I_D	3	A
		1.8	A
Pulsed drain current ²⁾	I_{DM}	5	A
Gate-source voltage	V_{GS}	± 30	V
Avalanche energy, single pulse ³⁾	E_{AS}	11	mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.05	mJ
Avalanche current, repetitive ²⁾	I_{AR}	0.6	A
Power dissipation ($T_C = 25^\circ C$) - Derate above $25^\circ C$	P_D	29	W
		0.23	W/ $^\circ C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^\circ C$
Continuous diode forward current	I_S	3	A
Diode pulse current	$I_{S,pulse}$	5	A

Thermal Characteristics

Parameter	Symbol	WMO/WMP/WMG/WMH	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	4.3	$^\circ C/W$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	62	$^\circ C/W$

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}	$V_{GS}=0\text{ V}, I_D=0.25\text{ mA}$	600	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=0.25\text{ mA}$	2.5	3.3	4.5	V
Drain cut-off current	I_{DSS}	$V_{DS}=600\text{ V}, V_{GS}=0\text{ V},$ $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	-	-	1	μA
Gate leakage current, forward	I_{GSSF}	$V_{GS}=30\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
Gate leakage current, reverse	I_{GSSR}	$V_{GS}=-30\text{ V}, V_{DS}=0\text{ V}$	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=1\text{ A}$ $T_j = 25^\circ\text{C}$	-	1.7	1.9	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=25\text{ V}, V_{GS}=0\text{ V},$	-	186	-	pF
Output capacitance	C_{oss}	$f = 1\text{ MHz}$	-	165	-	
Reverse transfer capacitance	C_{rss}		-	3	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 300\text{ V}, I_D = 1\text{ A}$	-	12	-	ns
Rise time	t_r	$R_G = 25\Omega, V_{GS}=10\text{ V}$	-	12	-	
Turn-off delay time	$t_{d(off)}$		-	32	-	
Fall time	t_f		-	18	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DD}=480\text{ V}, I_D=1\text{ A},$	-	1.4	-	nC
Gate to drain charge	Q_{gd}	$V_{GS}=0\text{ to }10\text{ V}$	-	3.3	-	
Gate charge total	Q_g		-	6.7	-	
Gate plateau voltage	$V_{plateau}$		-	5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=1\text{ A}$	-	-	1.2	V
Reverse recovery time	t_{rr}	$V_R=50\text{ V}, I_F=1\text{ A},$	-	118	-	ns
Reverse recovery charge	Q_{rr}	$dI_F/dt=100\text{ A}/\mu\text{s}$	-	0.42	-	μC
Peak reverse recovery current	I_{rrm}		-	7	-	A

Notes:

- Limited by $T_{j\max}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $I_{AS} = 0.6\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\Omega$, starting $T_j = 25^\circ\text{C}$.

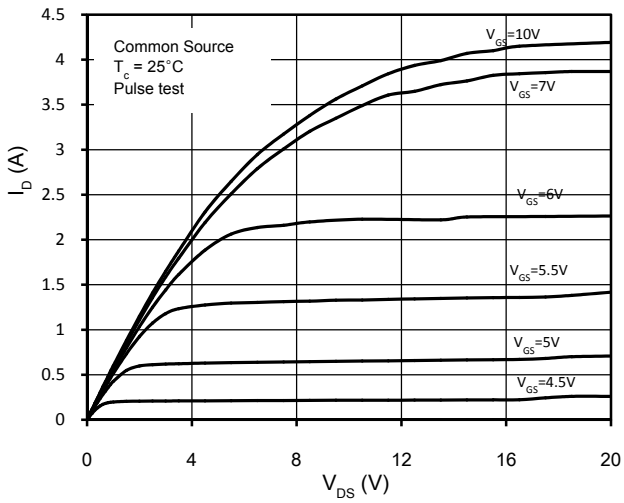


Figure 1. On-Region Characteristics

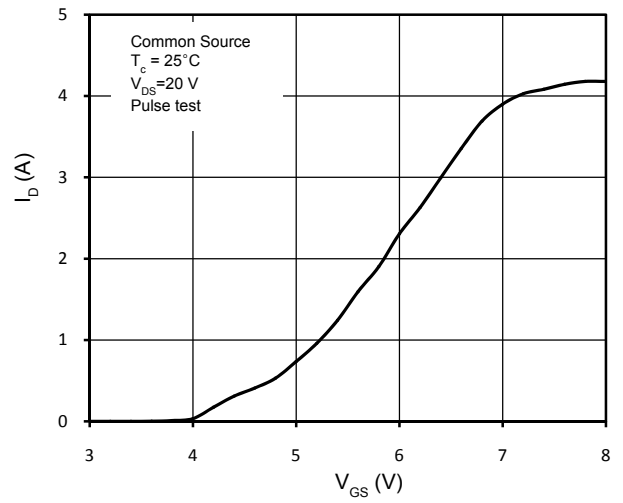


Figure 2. Transfer Characteristics

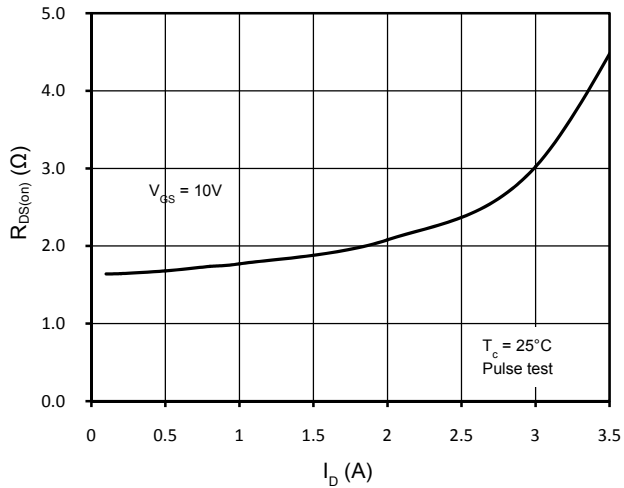


Figure 3. Static Drain-Source On Resistance

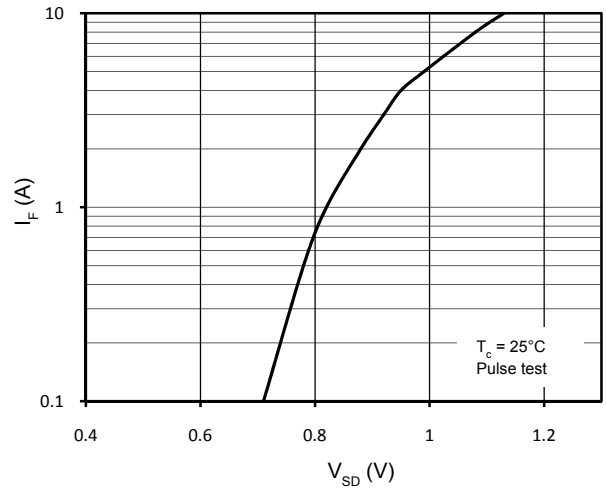


Figure 4. Body-Diode Forward Characteristics

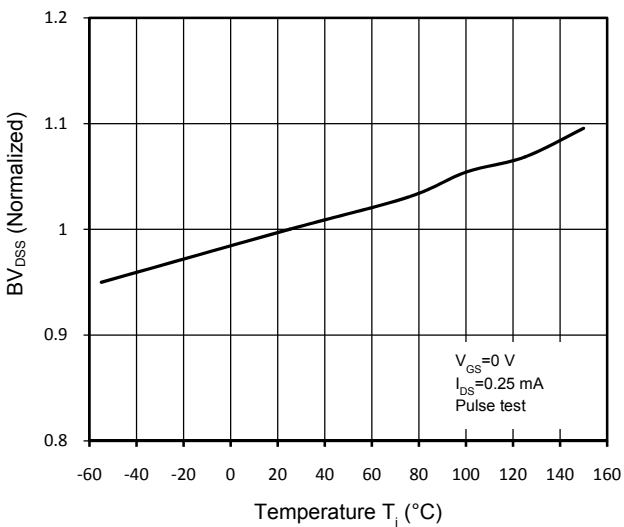


Figure 5. Normalized BV_{DSS} vs. Temperature

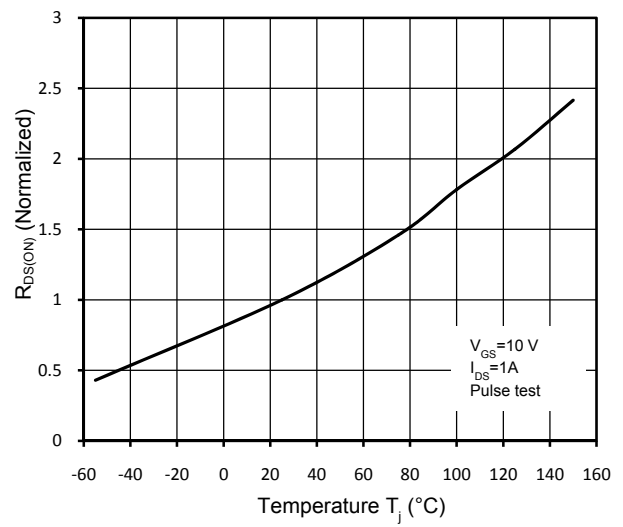


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

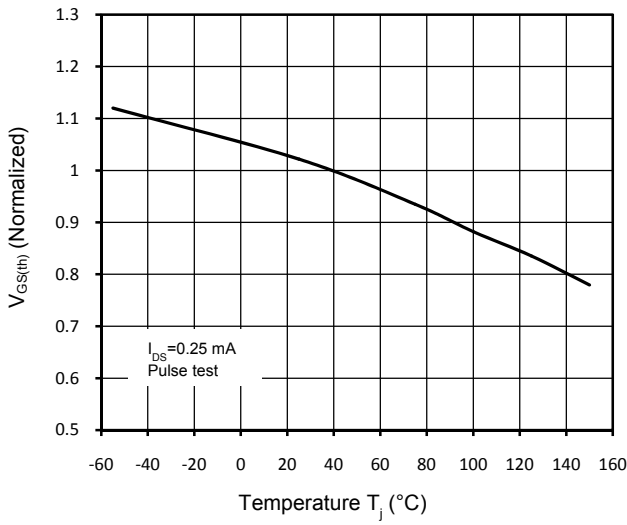


Figure 7. Threshold Voltage vs. Temperature

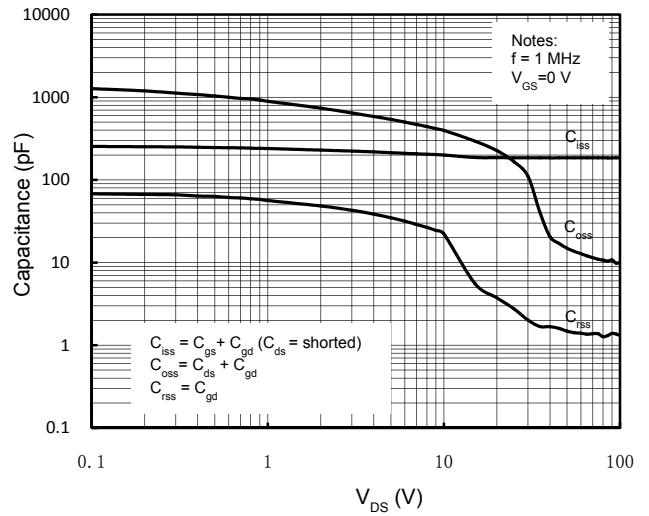


Figure 8. Capacitance Characteristics

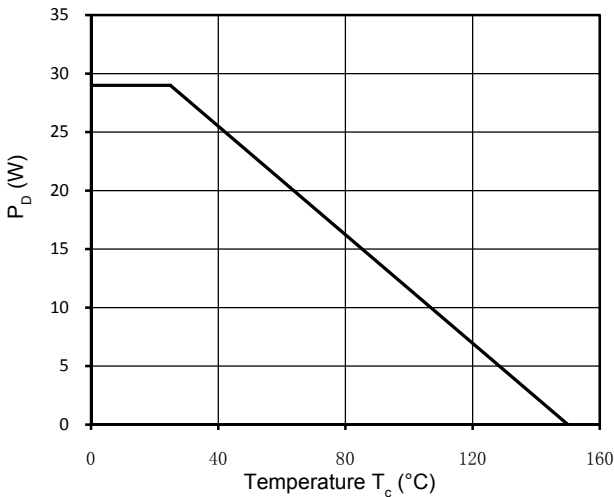


Figure 9. Power Dissipation

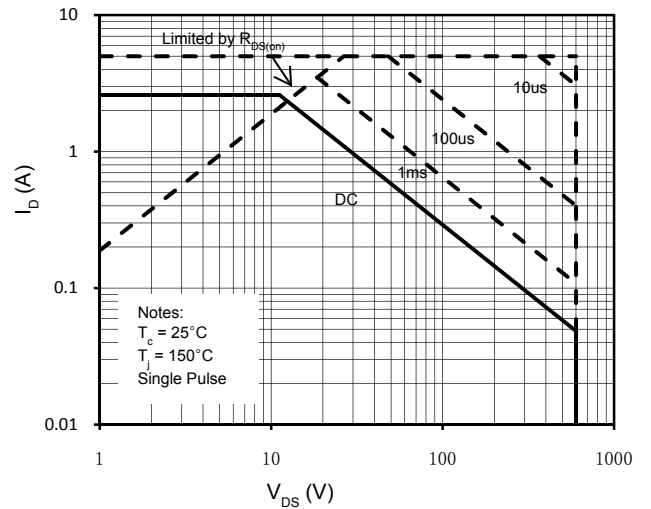


Figure 10. Maximum Safe Operating Area

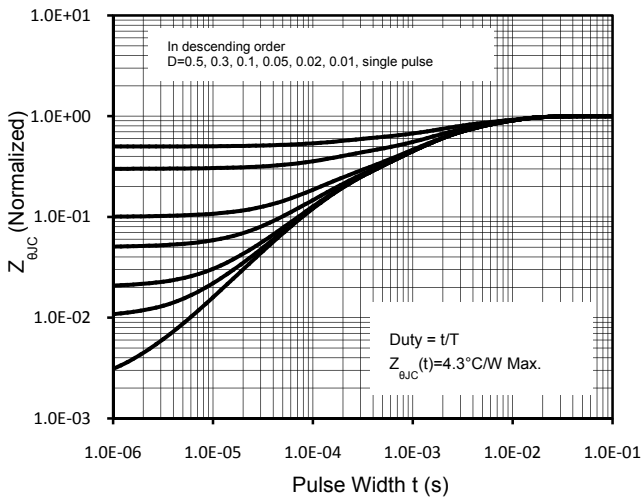


Figure 11. Transient Thermal Response Curve

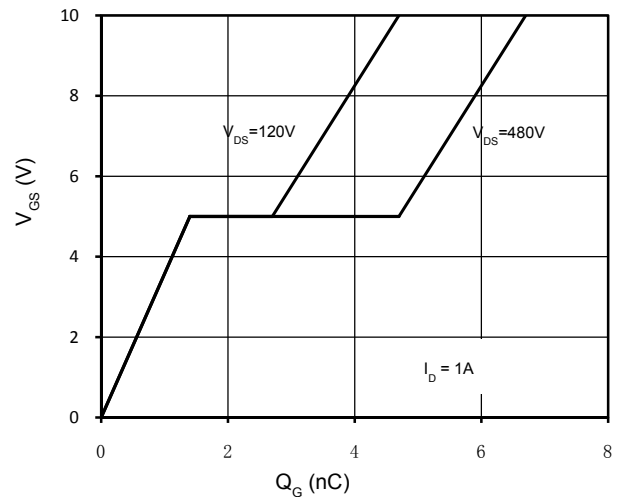
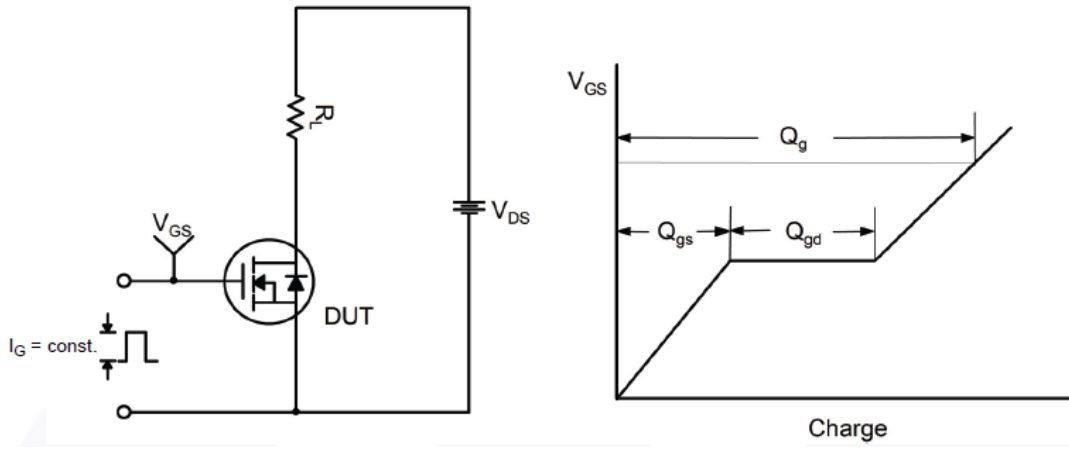
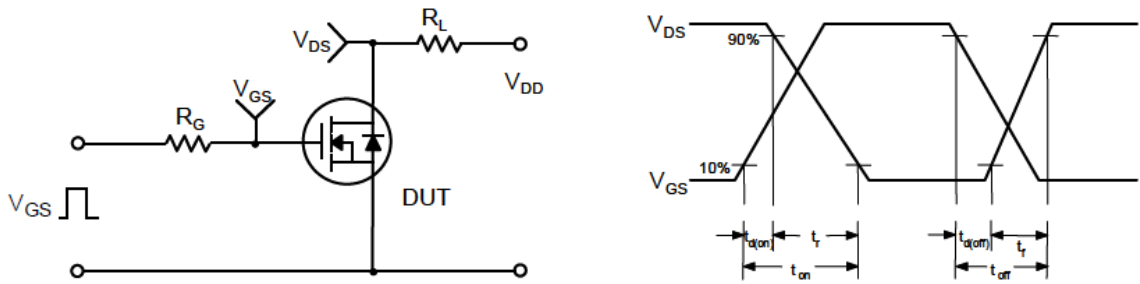


Figure 12. Gate Charge Characteristics

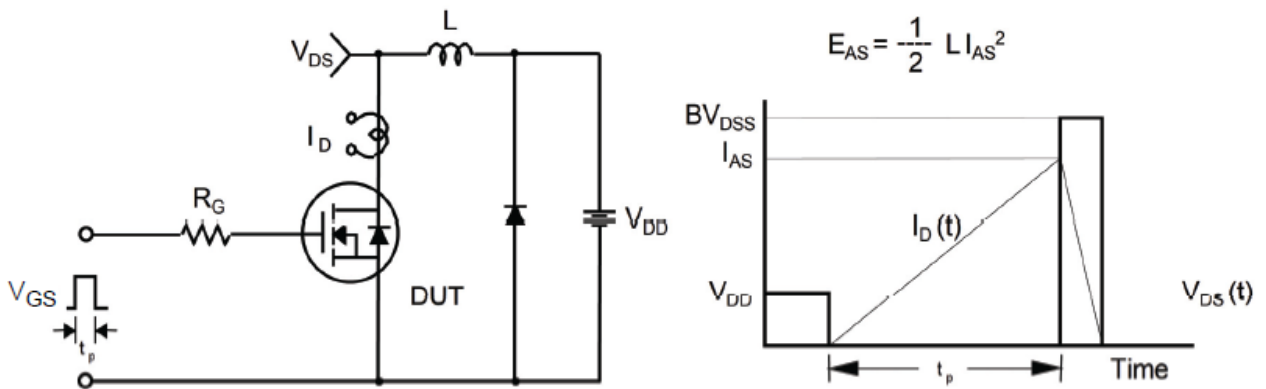
Gate Charge Test Circuit & Waveform



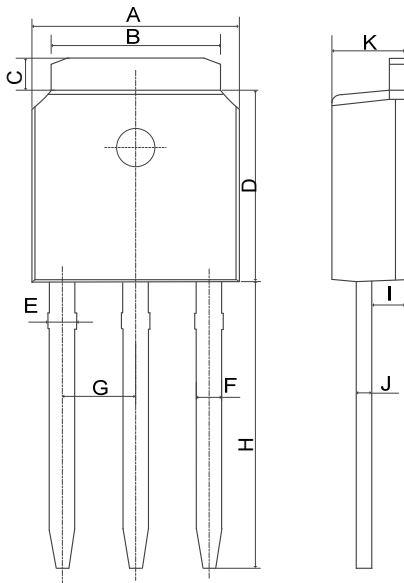
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



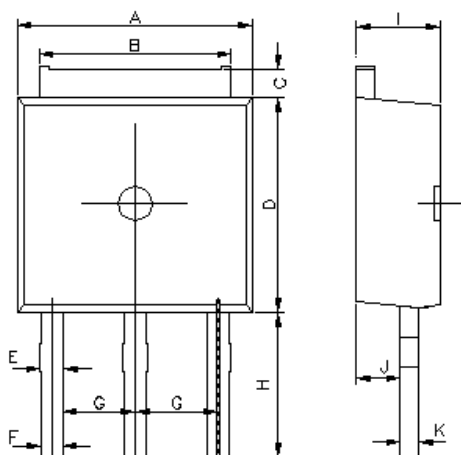
Mechanical Dimensions for TO-251



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.46
C	0.90	1.25
D	5.90	6.20
E	0.80	1.00
F	0.71	0.91
G	2.19	2.39
H	9.00	9.60
I	0.90	1.10
J	0.40	0.60
K	2.10	2.50

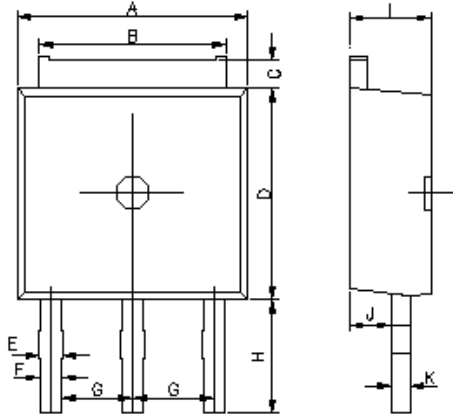
Mechanical Dimensions for TO-251S3



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.18	5.48
C	0.75	1.02
D	5.95	6.35
E	0.70	1.00
F	0.70	0.90
G	2.14	2.44
H	3.30	3.70
I	2.10	2.50
J	0.85	1.15
K	0.41	0.61

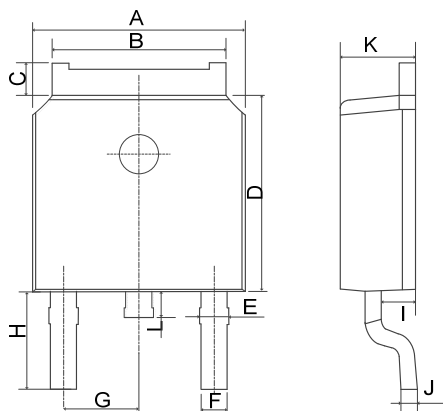
Mechanical Dimensions for TO-251S2



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.18	5.48
C	0.75	1.02
D	5.95	6.35
E	0.70	1.00
F	0.70	0.90
G	2.14	2.44
H	2.30	2.70
I	2.10	2.50
J	0.85	1.15
K	0.41	0.61

Mechanical Dimensions for TO-252



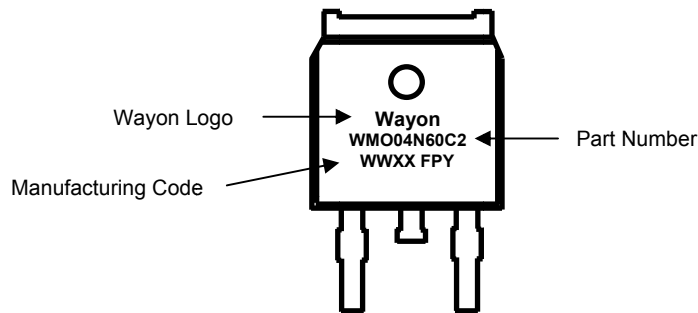
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.46
C	0.90	1.25
D	5.90	6.20
E	0.80	1.00
F	0.71	0.91
G	2.19	2.39
H	2.60	3.10
I	0.90	1.10
J	0.40	0.60
K	2.10	2.50
L	0.60	1.00

Ordering Information

Part	Package	Marking	Packing method	Quantity
WMO04N60C2	TO-252	WMO04N60C2	Tape and Reel	2500
WMP04N60C2	TO-251	WMP04N60C2	Tube	80
WMG04N60C2	TO-251S3	WMG04N60C2	Tube	80
WMH04N60C2	TO-251S2	WMH04N60C2	Tube	80

Marking Information



Contact Information

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