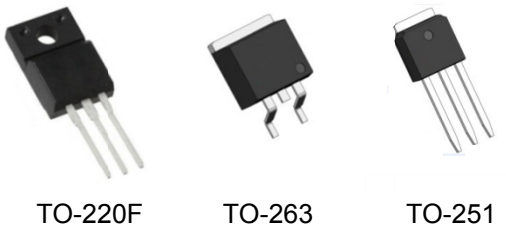
600V 0.83Ω Super Junction Power MOSFET

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.



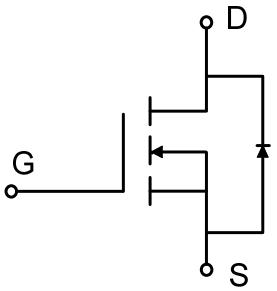
TO-220F TO-263 TO-251

TO-252 TO-251S3 TO-251S2

Features

- V_{DS} =650V @ $T_{j,max}$
- Typ. $R_{DS(on)}$ =0.83Ω
- 100% UIS tested
- Pb-free plating, Halogen free

RoHS compliant



Applications

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

Absolute Maximum Ratings

Parameter	Symbol	WMH/WMM/WMO/WMP/WMG	WML	Unit
Drain-source voltage	V_{DSS}	600		V
Continuous drain current[1] (T_C = 25°C)	I_D	6		A
(T_C = 100°C)		3.6		A
Pulsed drain current[2]	I_{DM}	12		A
Gate-source voltage	V_{GS}	±30		V
Avalanche energy, single pulse[3]	E_{AS}	26		mJ
Avalanche energy, repetitive[2]	E_{AR}	0.1		mJ
Avalanche current, repetitive[2]	I_{AR}	0.9		A
Power dissipation (T_C = 25°C)	P_D	45	26	W
- Derate above 25°C		0.36	0.21	W/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150		°C
Continuous diode forward current	I_S	6		A
Diode pulse current	$I_{S,pulse}$	12		A

Thermal Characteristics

Parameter	Symbol	WMH/WMM/WMO/WMP/WMG	WML	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	2.8	4.9	°C/W
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	62	80	°C/W

Electrical Characteristics T_c = 25°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	2.5	3.3	4.5	V
Drain cut-off current	I_{DSS}	V_{DS}=600 V, V_{GS}=0 V,				μA
		T_j = 25°C	-	-	1	
		T_j = 125°C	-	10	-	
Gate leakage current, forward	I_{GSSF}	V_{GS}=30 V, V_{DS}=0 V	-	-	100	nA
Gate leakage current, reverse	I_{GSSR}	V_{GS}=-30 V, V_{DS}=0 V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=2.5 A	-			
		T_j = 25°C	-	0.83	0.94	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}= 25 V, V_{GS}= 0 V,	-	302	-	
Output capacitance	C_{oss}	f = 1 MHz	-	221	-	pF
Reverse transfer capacitance	C_{rss}		-	2.1	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 300V, I_D = 2A	-	8	-	
Rise time	t_r	R_G = 25Ω, V_{GS}=10V	-	17	-	ns
Turn-off delay time	$t_{d(off)}$		-	27	-	
Fall time	t_f		-	13	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=480 V, I_D=2A,	-	1.8	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	2	-	nC
Gate charge total	Q_g		-	6.8	-	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=2.5A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=2A,	-	166	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	0.91	-	μC
Peak reverse recovery current	I_{rrm}		-	11.4	-	A

Notes:

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

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

3. I_{AS} = 0.9A, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C.

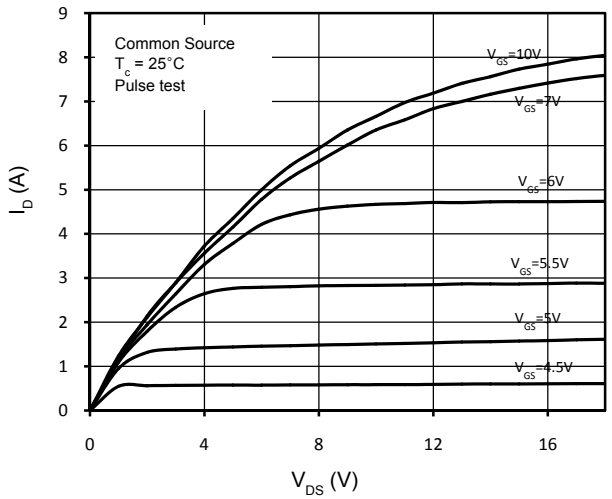


Figure 1.On-Region Characteristics

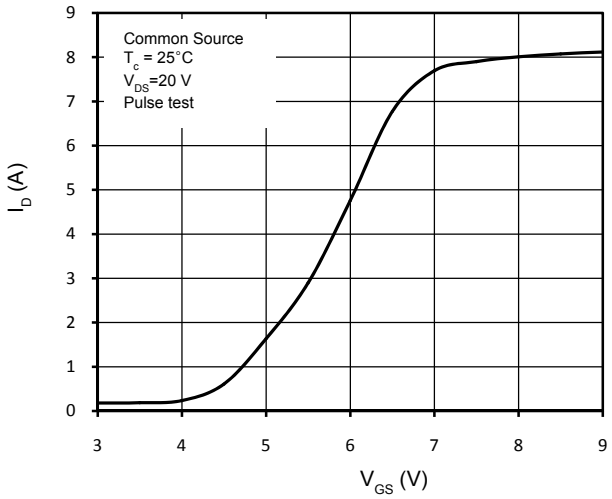


Figure 2. Transfer Characteristics

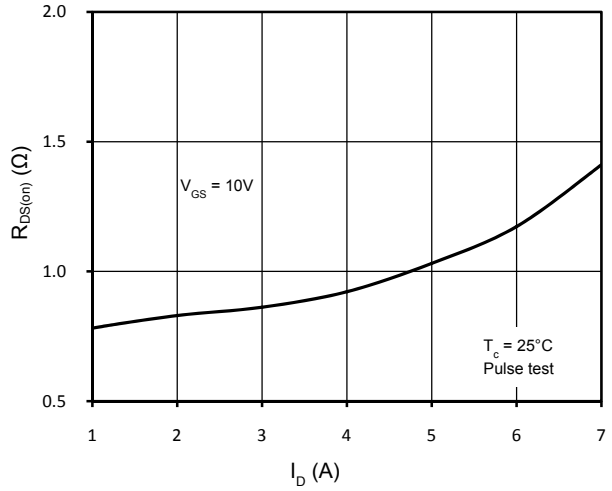


Figure 3. Static Drain-Source On Resistance

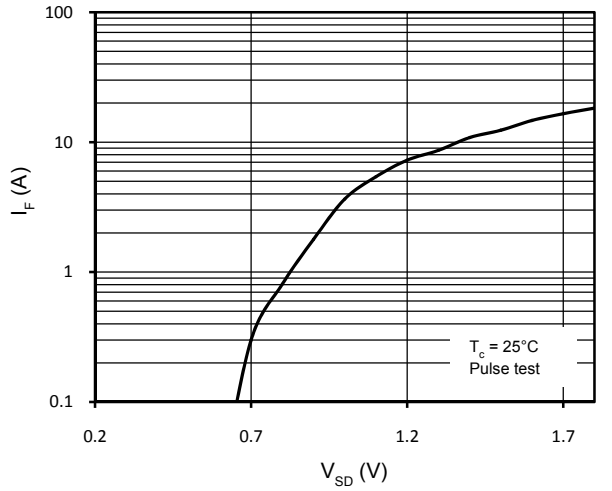


Figure 4. Body- Diode Forward Characteristics

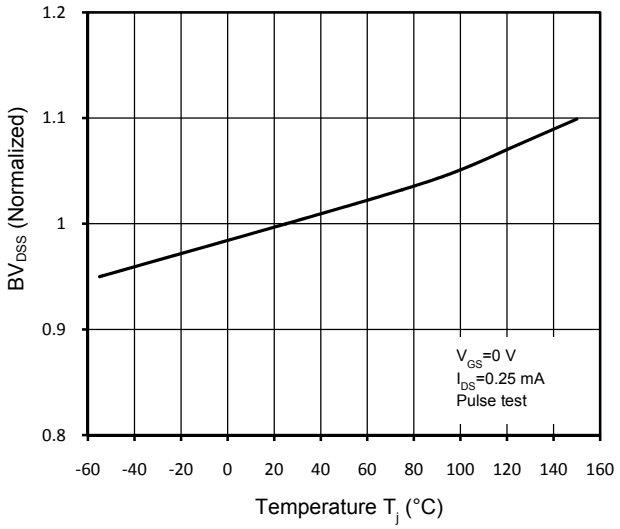


Figure 5. Normalized BV_{DSS} vs. Temperature

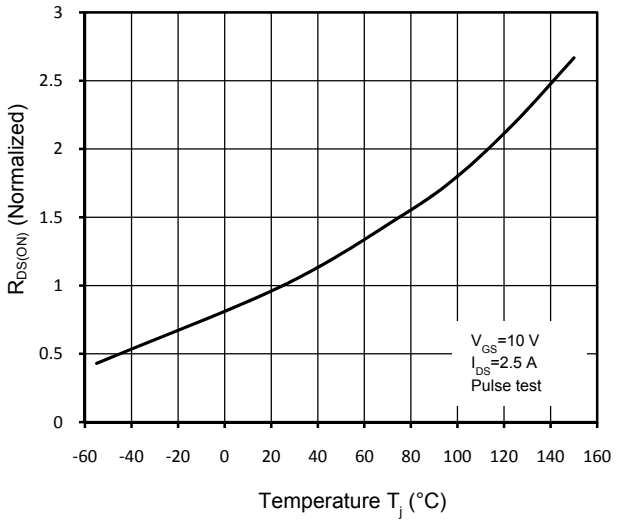


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

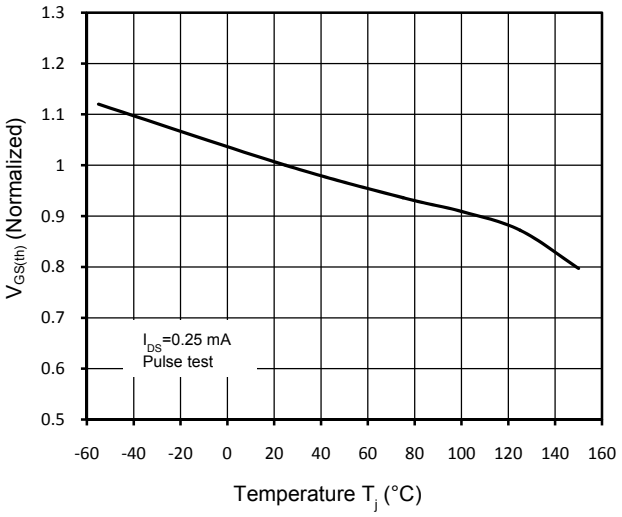


Figure 7. Threshold Voltage vs. Temperature

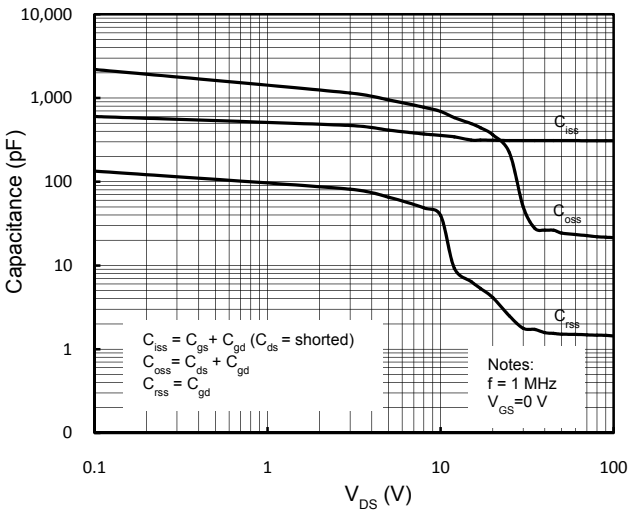


Figure 8. Capacitance Characteristics

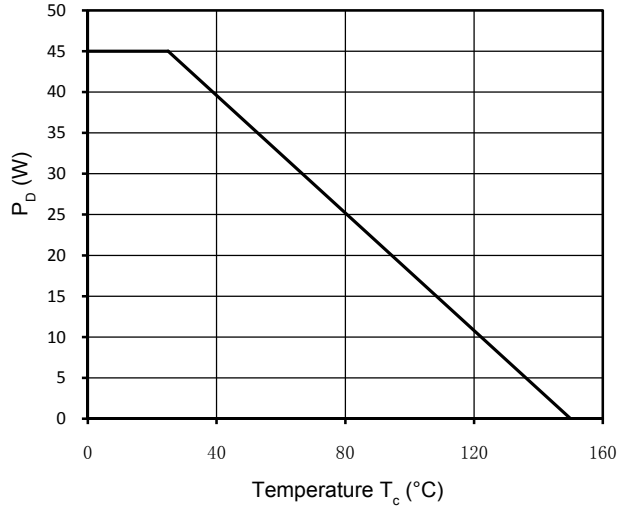


Figure 9. Power Dissipation

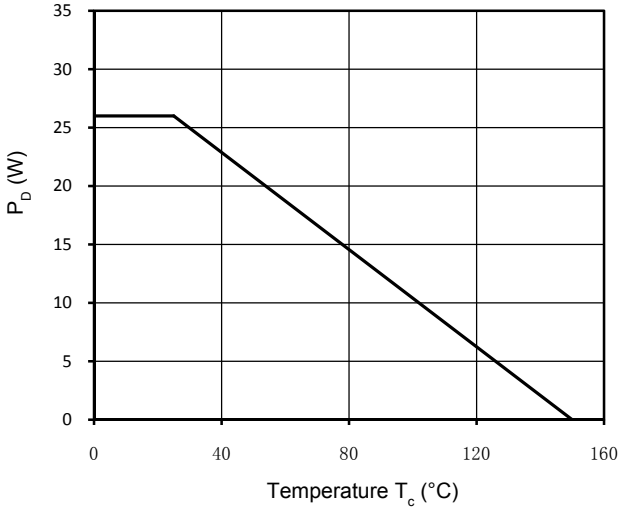


Figure 10. Power Dissipation (TO-220F)

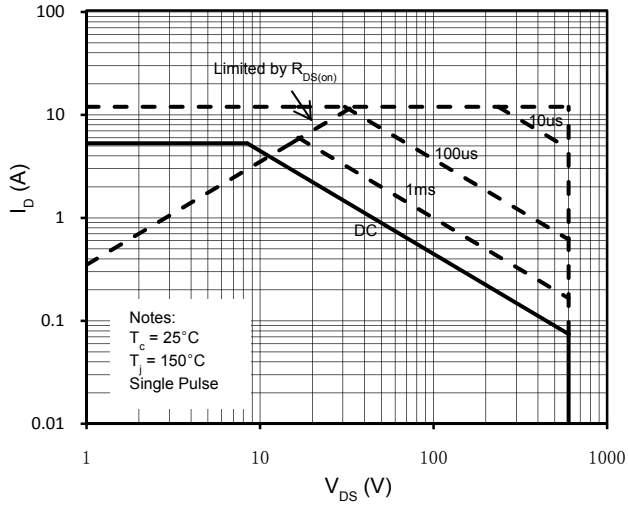


Figure 11. Maximum Safe Operating Area

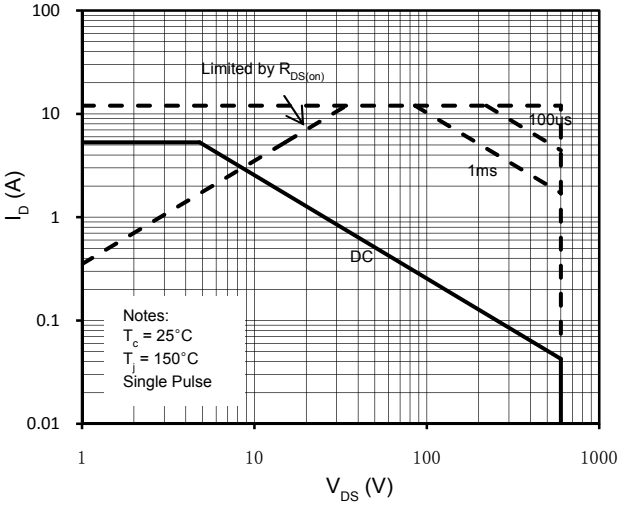


Figure 12. Maximum Safe Operating Area(TO-220F)

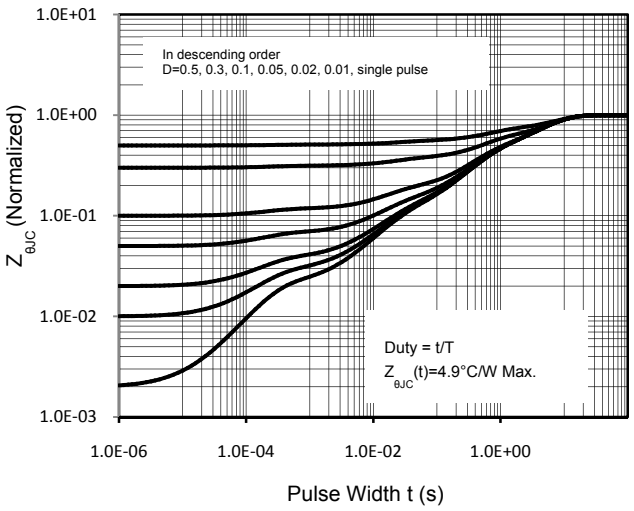


Figure 13. Transient Thermal Response Curve (TO-220F)

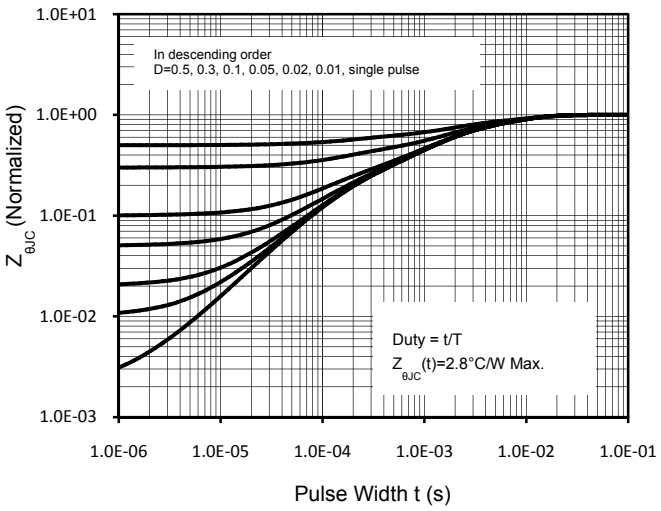


Figure 14. Transient Thermal Response Curve

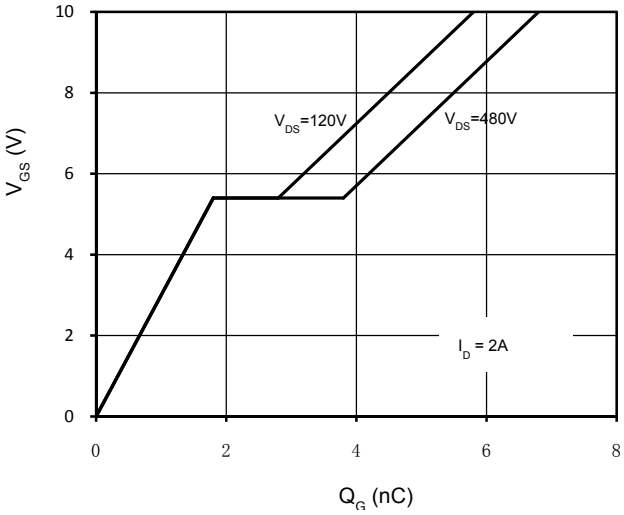
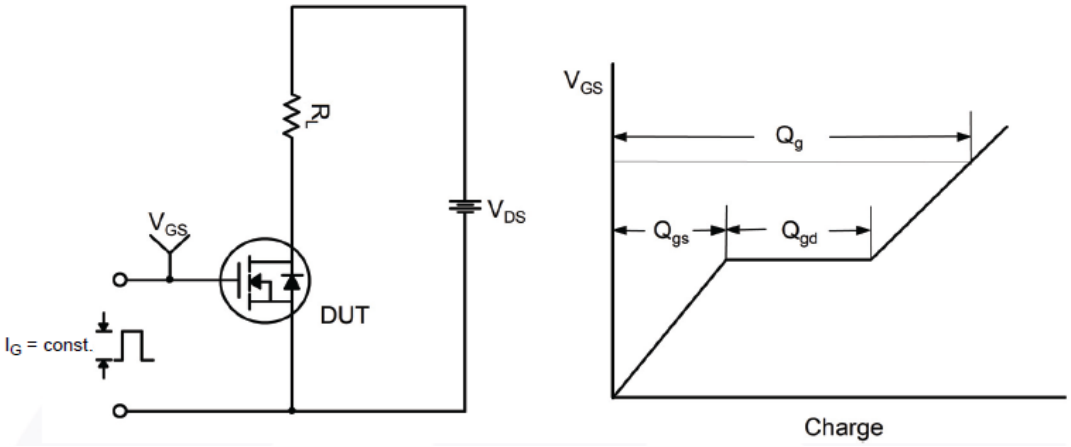
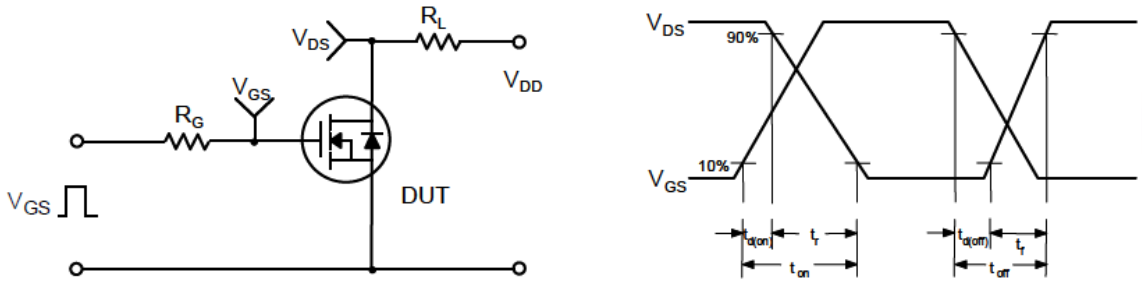


Figure 15. Gate Charge Characteristics

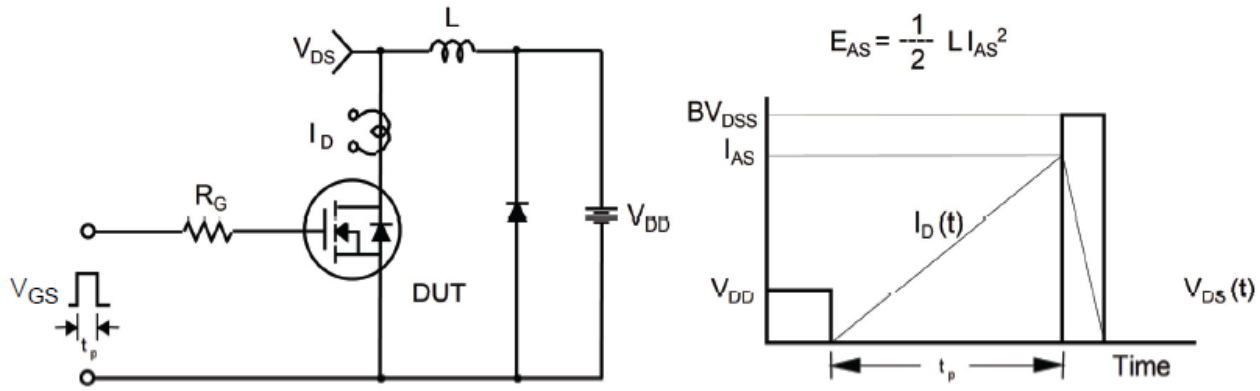
Gate Charge Test Circuit & Waveform



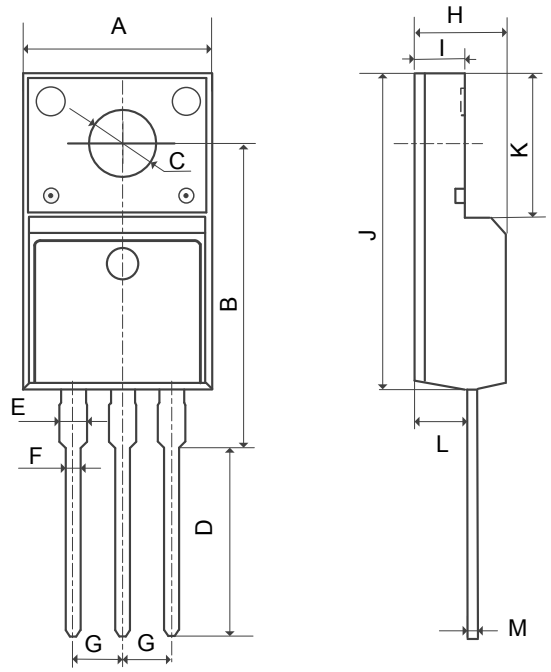
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



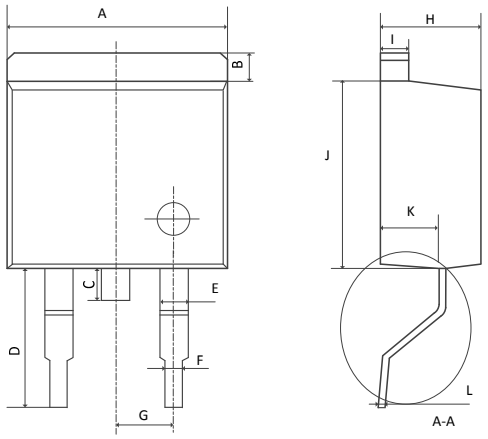
Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
B	15.50	16.10
C	3.08	3.28
D	12.64	13.24
E	1.18	1.58
F	0.70	0.90
G	2.39	2.69
H	4.50	4.90
I	2.34	2.74
J	15.67	16.07
K	6.50	6.90
L	2.56	2.96
M	0.40	0.60

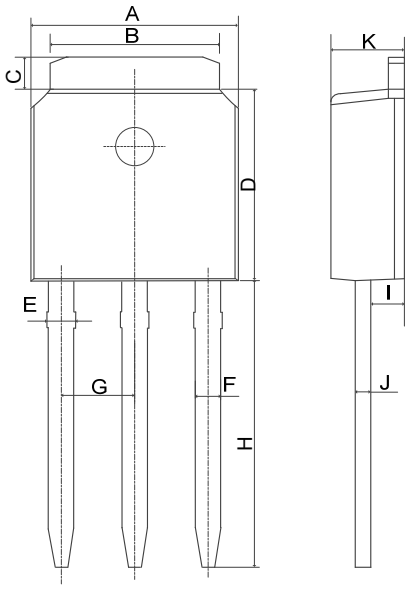
Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	10.00	10.40
B	1.11	1.41
C	1.25	1.55
D	5.10	5.50
E	1.12	1.42
F	0.71	0.91
G	2.39	2.69
H	4.49	4.89
I	1.17	1.37
J	8.45	8.85
K	2.54	2.84
L	0.28	0.48

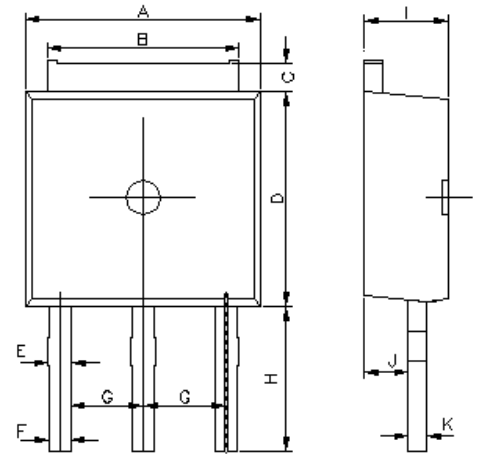
Mechanical Dimensions for TO-251



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

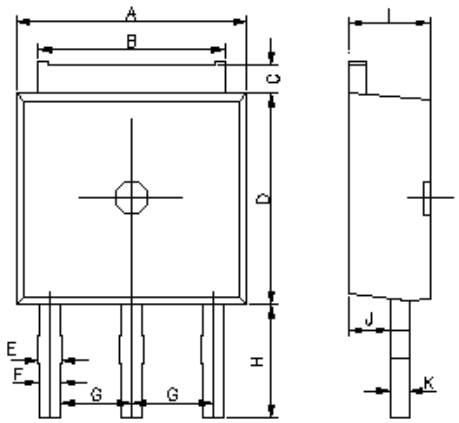
Mechanical Dimensions for TO-251S3



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

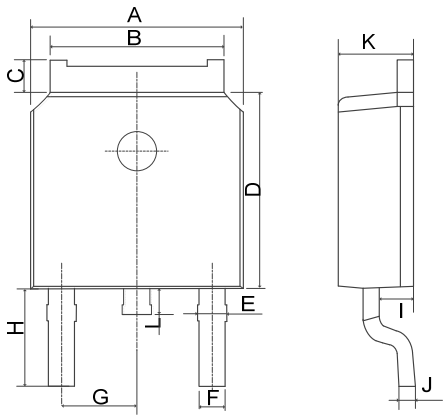
Mechanical Dimensions for TO-251S2



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



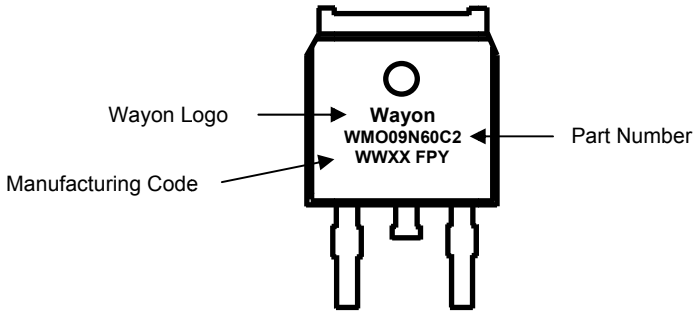
COMMON DIMENSIONS

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
WML09N60C2	TO-220F	WML09N60C2	Tube	50
WMM09N60C2	TO-263	WMM09N60C2	Tape and Reel	800
WMO09N60C2	TO-252	WMO09N60C2	Tape and Reel	2500
WMP09N60C2	TO-251	WMP09N60C2	Tube	80
WMG09N60C2	TO-251S3	WMG09N60C2	Tube	80
WMH09N60C2	TO-251S2	WMH09N60C2	Tube	80

Marking Information



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For additional information, please contact your local Sales Representative.

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