

1000V 2.0Ω Super Junction Power MOSFET

Description

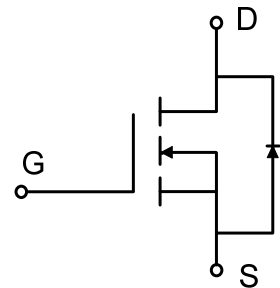
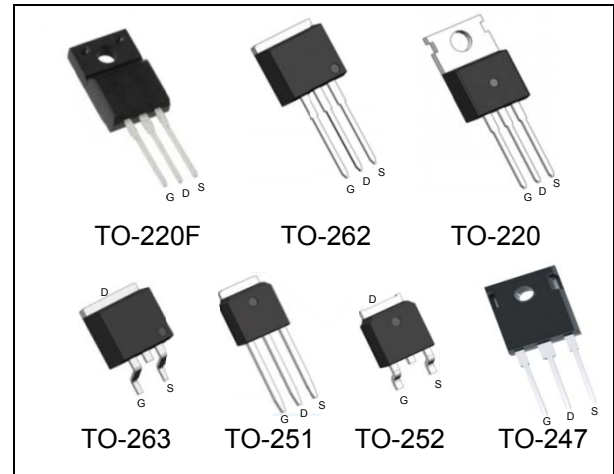
WMOS™ C2 is Wayon's 2nd generation super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ C2 is suitable for applications which require superior power density and outstanding efficiency.

Features

- $V_{DS} = 1050V @ T_{j,max}$
- Typ. $R_{DS(on)} = 2.0\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

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



Absolute Maximum Ratings

Parameter	Symbol	WMN/WMM/WMO/WMP/WMK/WMJ	WML	Unit
Drain-source voltage	V_{DSS}	1000		V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$) ($T_C = 100^\circ C$)	I_D	4		A
		2.2		A
Pulsed drain current ²⁾	I_{DM}	12		A
Gate-source voltage	V_{GS}	± 30		V
Avalanche energy, single pulse ³⁾	E_{AS}	60		mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.1		mJ
Avalanche current, repetitive ²⁾	I_{AR}	1		A
Power dissipation ($T_C = 25^\circ C$) - Derate above $25^\circ C$	P_D	65	27	W
		0.52	0.22	W/°C
Operating and storage temperature range	T_i, T_{stg}	-55 to +150		°C
Continuous diode forward current	I_S	4		A
Diode pulse current	$I_{S,pulse}$	12		A

Thermal Characteristics

Parameter	Symbol	WMN/WMM/WMO/WMP/WMK/WMJ	WML	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	2	4	°C/W
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	62	80	°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 =1 mA	1000	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I _{DSS}	V _{DS} =1000 V, V _{GS} =0 V, T _J = 25°C T _J = 125°C	- -	- 100	10 -	μA
Gate leakage current, forward	I _{GSSF}	V _{GS} =20 V, V _{DS} =0 V	-	-	100	nA
Gate leakage current, reverse	I _{GSSR}	V _{GS} =-20 V, V _{DS} =0 V	-	-	-100	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =1A T _J = 25°C	- -	 2.0	 2.5	 Ω
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 100 V, V _{GS} = 0 V, f = 1 MHz	-	580	-	pF
Output capacitance	C _{Oss}		-	18	-	
Reverse transfer capacitance	C _{rss}		-	1.2	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 300V, I _D = 2.5A R _G = 25Ω, V _{GS} =10V	-	21	-	ns
Rise time	t _r		-	15	-	
Turn-off delay time	t _{d(off)}		-	52	-	
Fall time	t _f		-	13	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =480 V, I _D =2.5A, V _{GS} =0 to 10 V	-	3.8	-	nC
Gate to drain charge	Q _{gd}		-	6.6	-	
Gate charge total	Q _g		-	15.8	-	
Gate plateau voltage	V _{plateau}		-	5.4	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =1A	-	-	1.2	V
Reverse recovery time	t _{rr}	V _R =50 V, I _F =2.5A, dI _F /dt=100 A/μs	-	260	-	ns
Reverse recovery charge	Q _{rr}		-	1.8	-	μC
Peak reverse recovery current	I _{rrm}		-	9	-	A

Notes:

- Limited by $T_{j\text{max}}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature
- $I_{AS}=1\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, starting $T_j=25^\circ\text{C}$

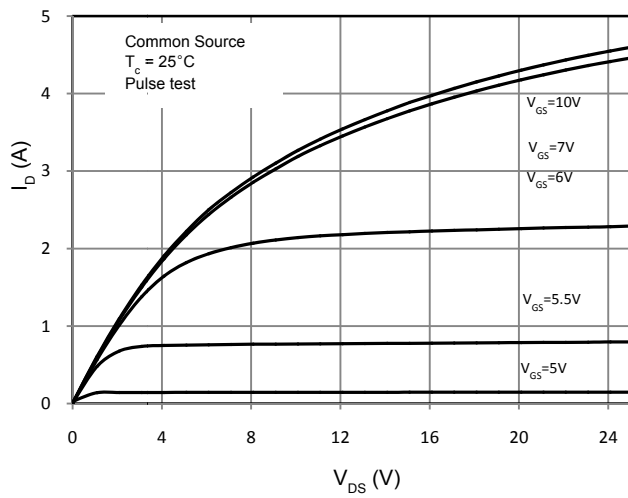


Figure 1. On-Region Characteristics

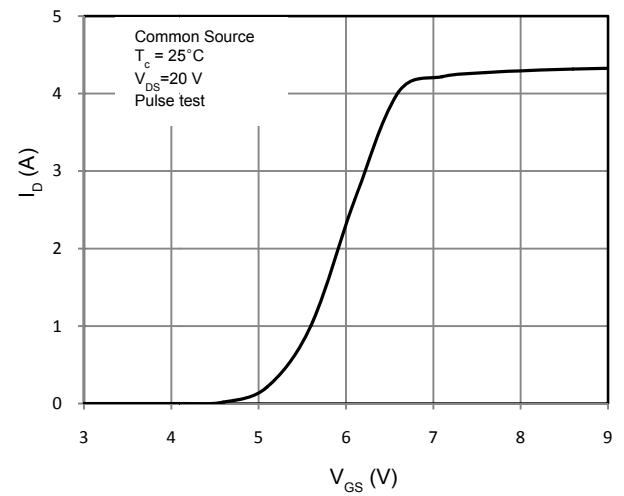


Figure 2. Transfer Characteristics

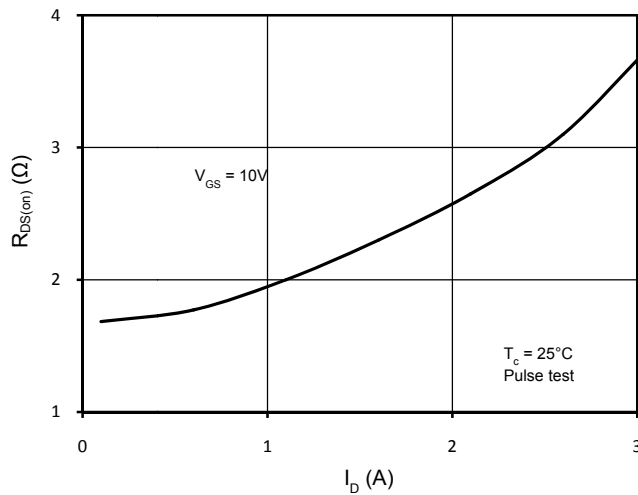


Figure 3. Static Drain-Source On Resistance

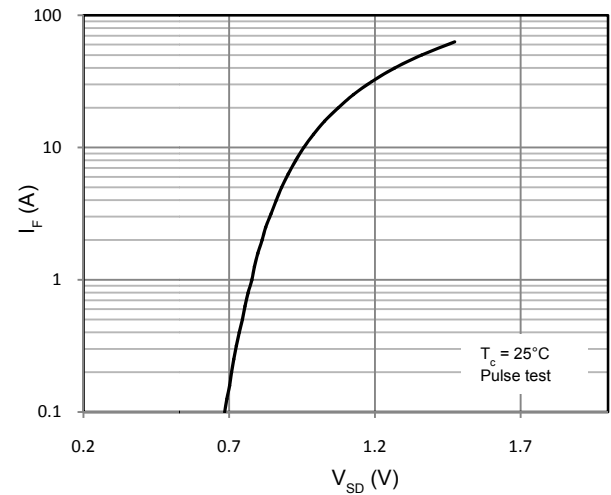
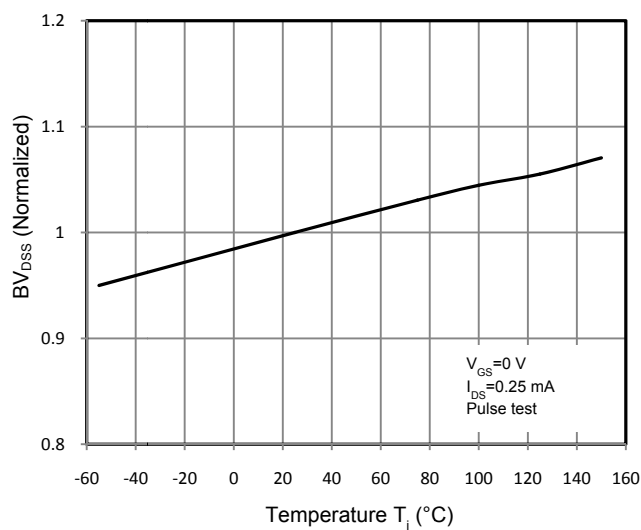
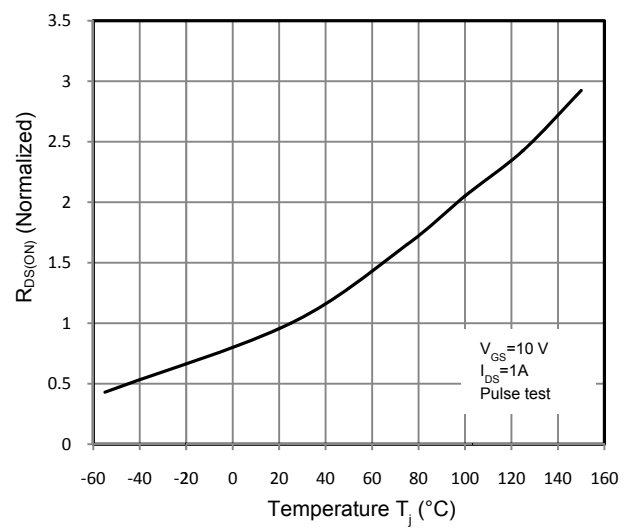


Figure 4. Body-Diode Forward Characteristics

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

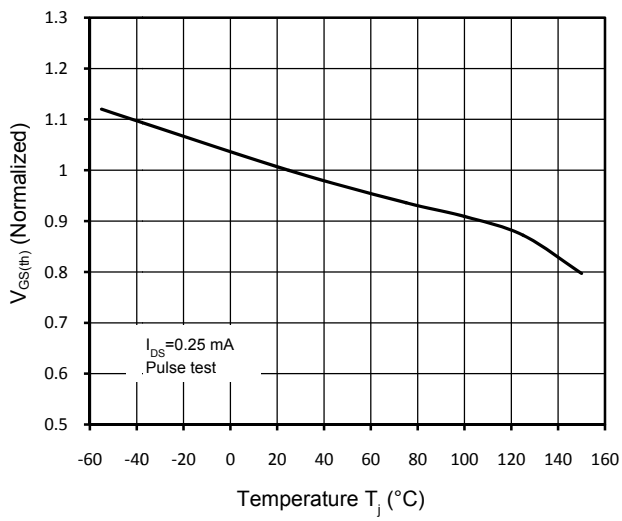


Figure 7. Threshold Voltage vs. Temperature

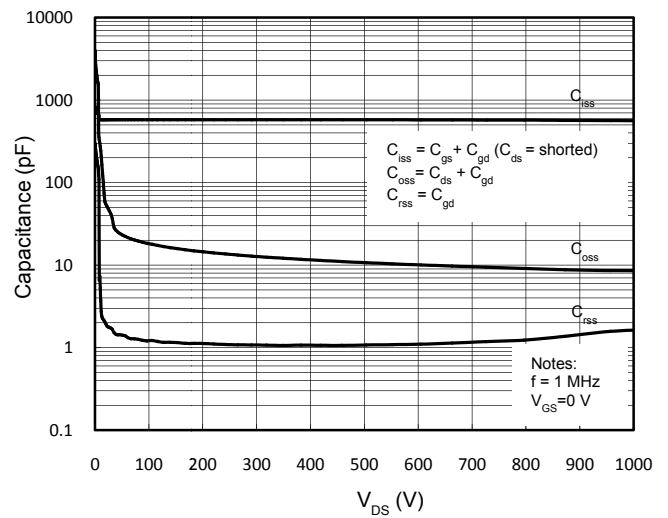


Figure 8. Capacitance Characteristics

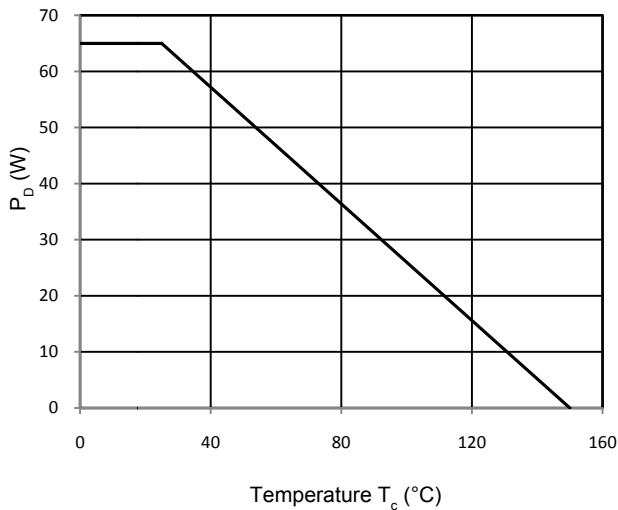


Figure 9. Power Dissipation

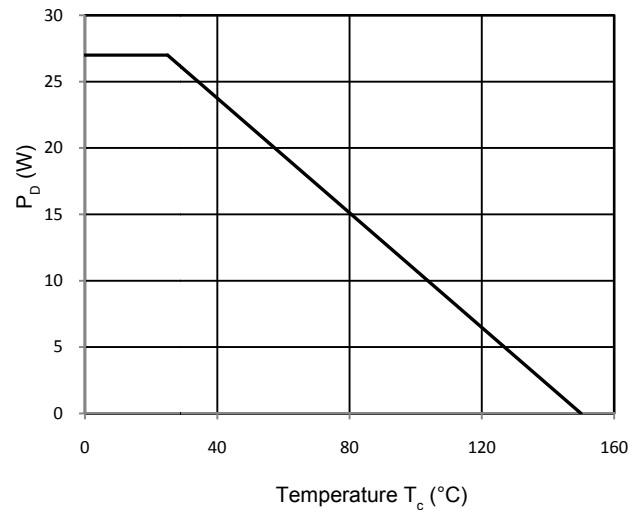


Figure 10. Power Dissipation (TO-220F)

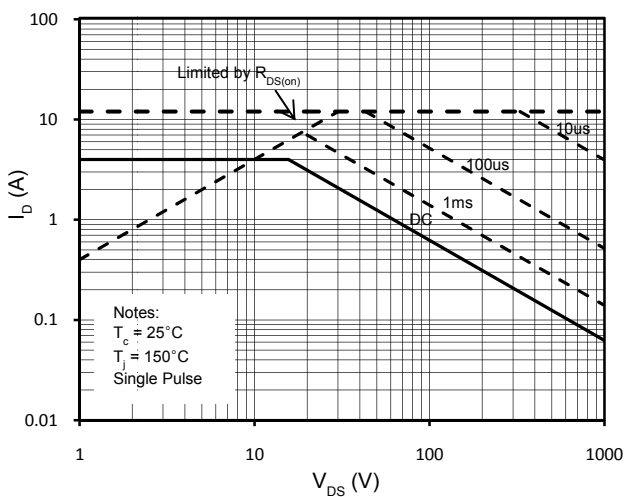


Figure 11. Maximum Safe Operating Area

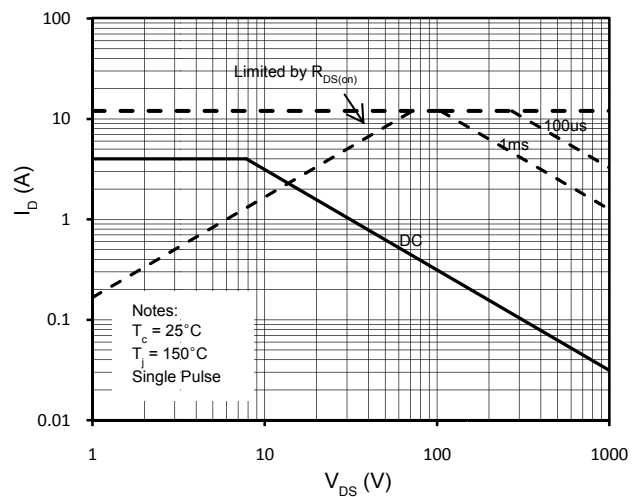


Figure 12. Maximum Safe Operating Area (TO-220F)

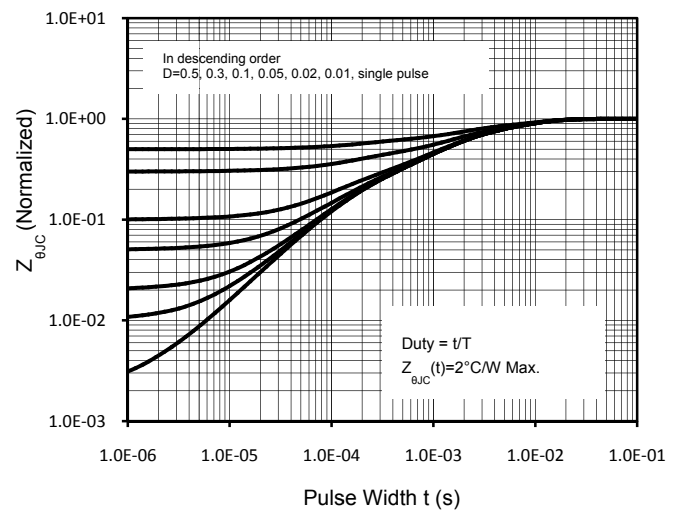
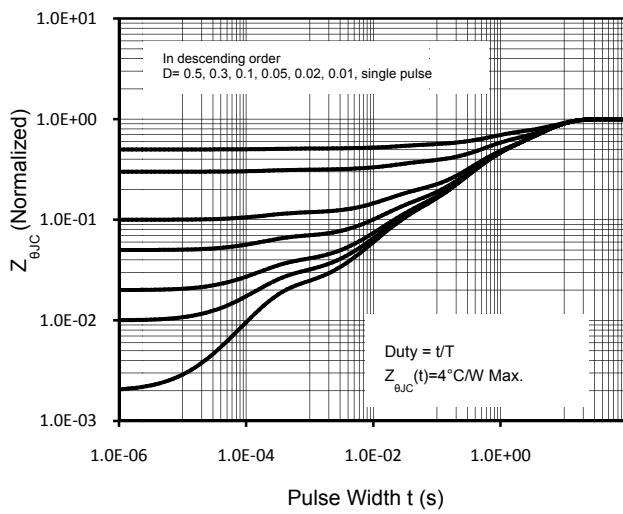


Figure 13. Transient Thermal Response Curve (TO-220F) Figure 14. Transient Thermal Response Curve

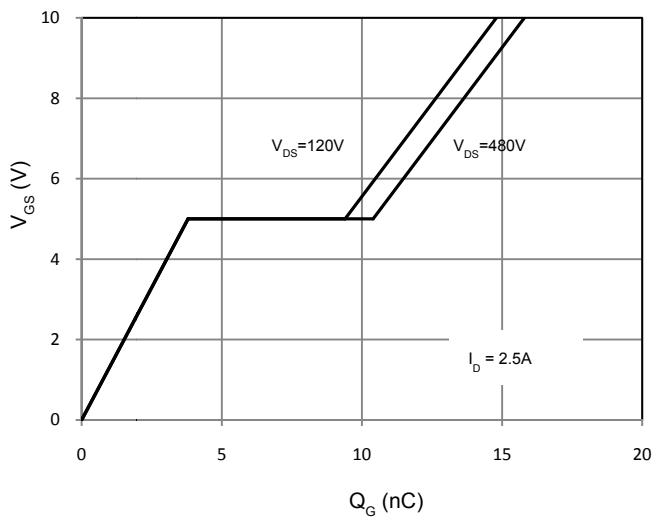
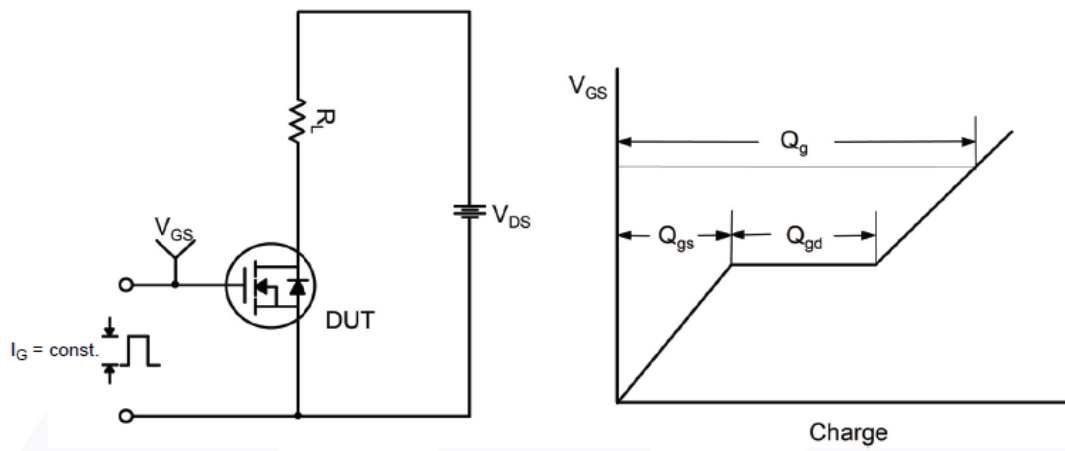
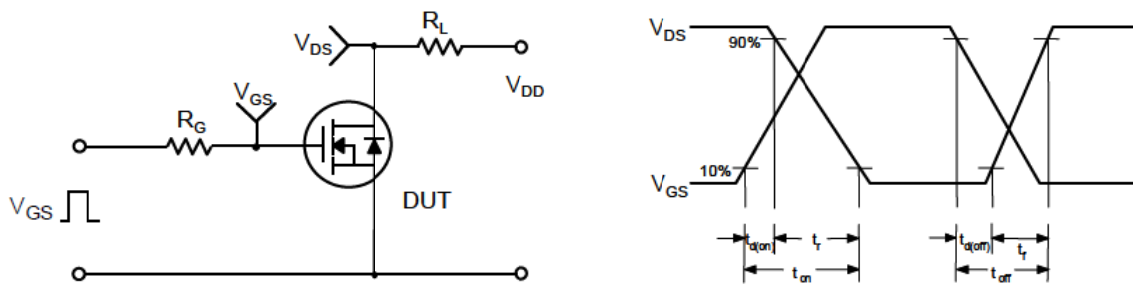


Figure 15. Gate Charge Characteristics

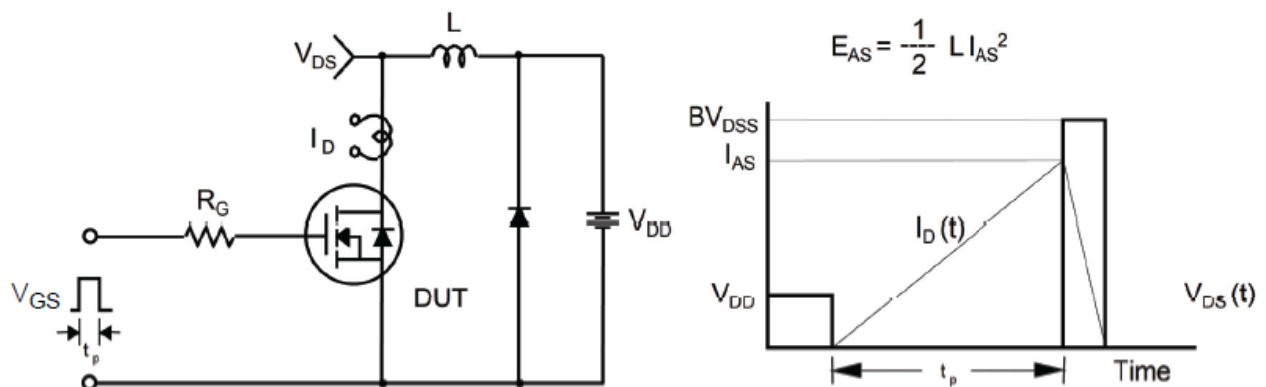
Gate Charge Test Circuit & Waveform



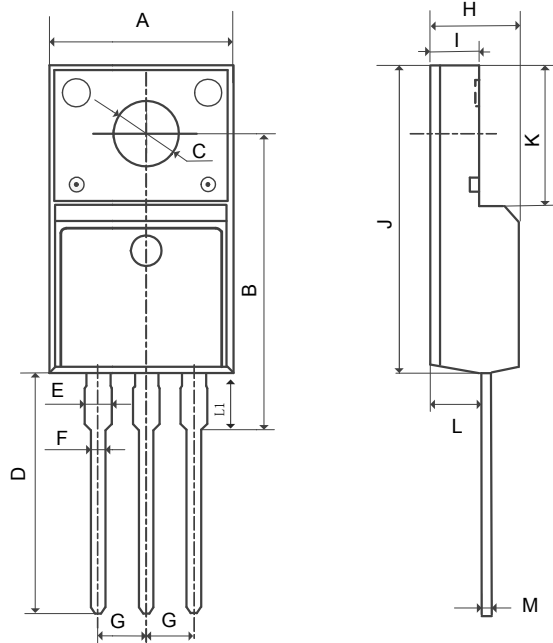
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



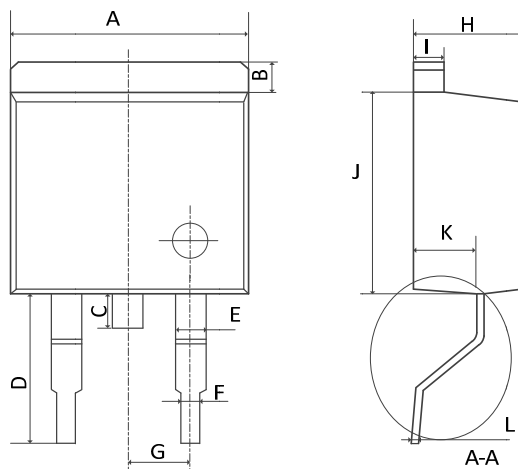
Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
B	15.10	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

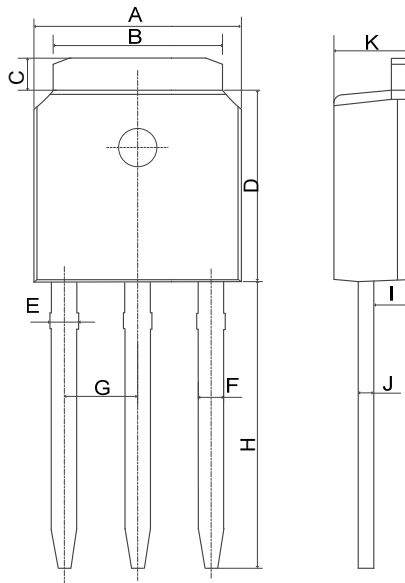
Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	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	0.92
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	0.49

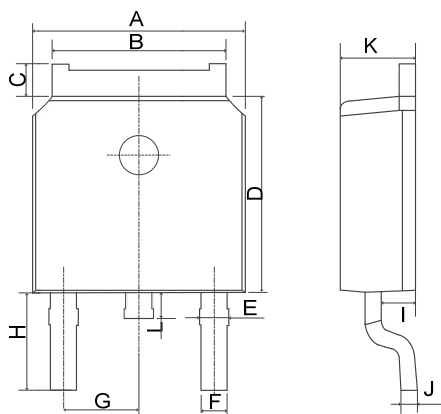
Mechanical Dimensions for TO-251



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.46
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
F	0.68	0.91
G	2.29REF	
H	9.00	9.65
I	0.90	1.17
J	0.40	0.61
K	2.10	2.50

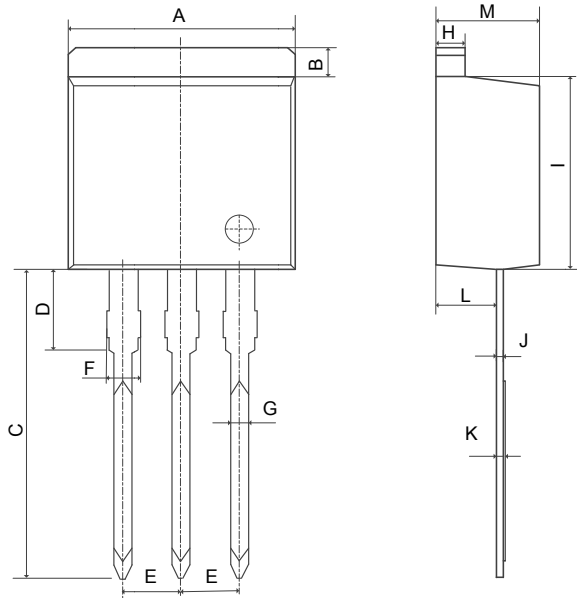
Mechanical Dimensions for TO-252



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
F	0.68	0.91
G	2.29REF	
H	2.90REF	
I	0.85	1.17
J	0.51REF	
K	2.10	2.50
L	0.40	1.00

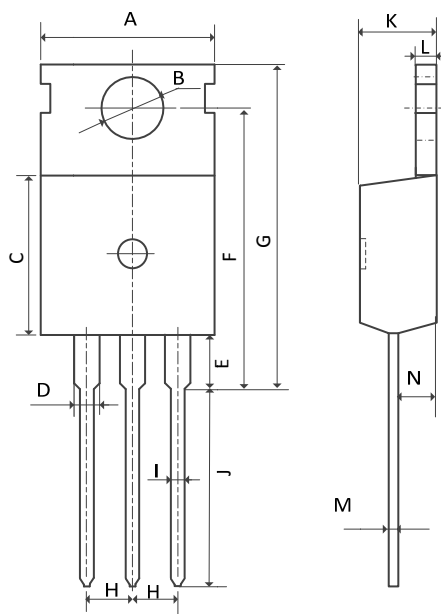
Mechanical Dimensions for TO-262



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	10.00	10.40
B	1.11	1.41
C	13.56	14.16
D	3.58	3.98
E	2.39	2.69
F	1.07	1.47
G	0.71	0.92
H	1.17	1.37
I	8.45	8.85
J	0.28	0.49
K	0.32	0.52
L	2.54	2.85
M	4.50	4.90

Mechanical Dimensions for TO-220

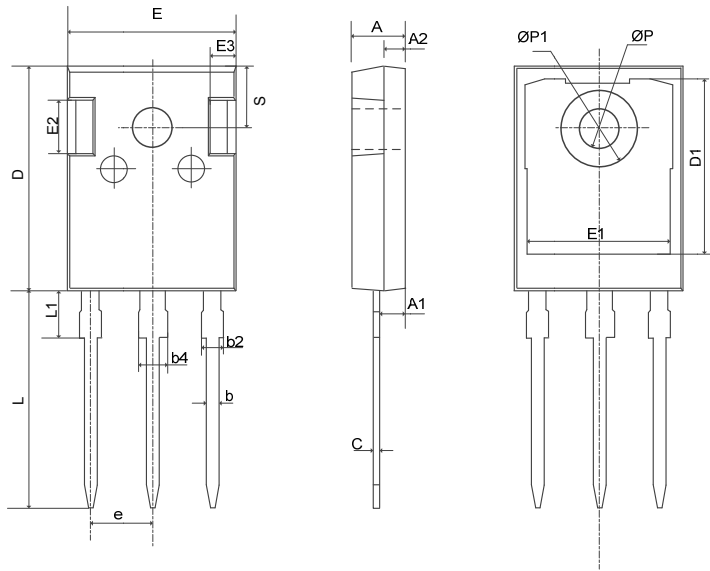


COMMON DIMENSIONS

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-247

COMMON DIMENSIONS

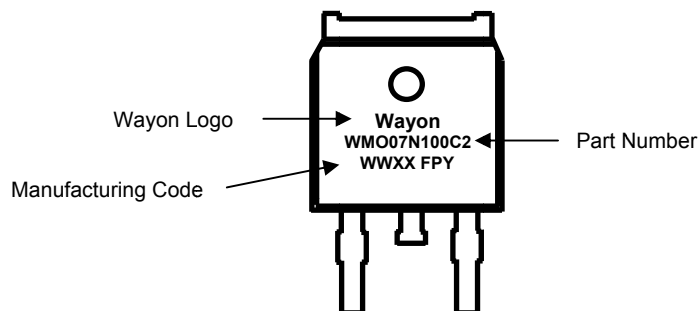


SYMBOL	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.11	1.36
b2	1.91	2.21
b4	2.91	3.21
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.44BSC	
L	19.62	20.22
L1	—	4.30
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	

Ordering Information

Part	Package	Marking	Packing method
WML07N100C2	TO-220F	WML07N100C2	Tube
WMM07N100C2	TO-263	WMM07N100C2	Tape and Reel
WMO07N100C2	TO-252	WMO07N100C2	Tape and Reel
WMP07N100C2	TO-251	WMP07N100C2	Tube
WMK07N100C2	TO-220	WMK07N100C2	Tube
WMJ07N100C2	TO-247	WMJ07N100C2	Tube
WMN07N100C2	TO-262	WMN07N100C2	Tube

Marking Information



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