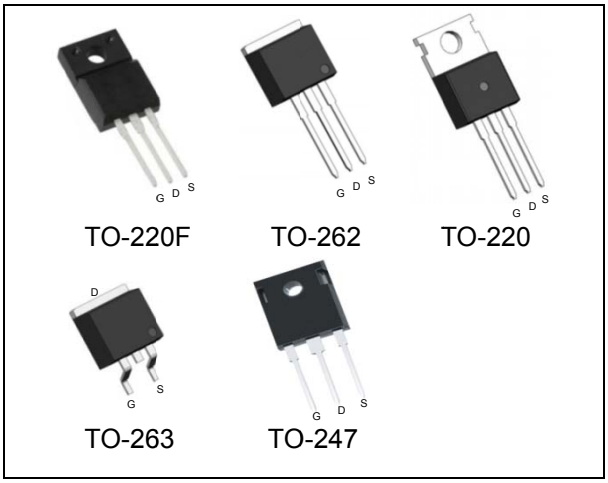
800V 0.21Ω Super Junction Power MOSFET

Description

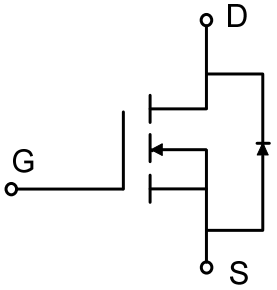
WMOS™ M3 is Wayon's 3rd generation 800V super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ M3 is suitable for applications which require superior power density and outstanding efficiency.



Features

- V_{DS} =850V @ $T_{j,max}$
- Typ. $R_{DS(on)}$ =0.21Ω
- 100% UIS tested
- Pb-free plating, Halogen free

RoHS compliant



Applications

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

Absolute Maximum Ratings

Parameter	Symbol	WMN/WMM/WMJ/WMK	WML	Unit
Drain-source voltage	V_{DSS}	800		V
Continuous drain current[1] (T_C = 25°C)	I_D	21		A
(T_C = 100°C)		12		A
Pulsed drain current[2]	I_{DM}	78		A
Gate-source voltage	V_{GS}	±30		V
Avalanche energy, single pulse[3]	E_{AS}	450		mJ
Avalanche energy, repetitive[2]	E_{AR}	0.25		mJ
Avalanche current, repetitive[2]	I_{AR}	4		A
Power dissipation (T_C = 25°C)	P_D	250	38	W
- Derate above 25°C		2.0	0.3	W/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150		°C
Continuous diode forward current[1]	I_S	21		A
Diode pulse current[2]	$I_{S,pulse}$	78		A

Thermal Characteristics

Parameter	Symbol	WMN/WMM/WMJ/WMK	WML	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	0.55	3.6	°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	800	-	-	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}=800 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=8A	-			
		T_j = 25°C	-	0.21	0.26	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}= 50 V, V_{GS}= 0 V,	-	2224	-	
Output capacitance	C_{oss}	f = 1 MHz	-	90	-	pF
Reverse transfer capacitance	C_{rss}		-	2.8	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 300V, I_D = 10A	-	45	-	
Rise time	t_r	R_G = 25Ω, V_{GS}=10V	-	62	-	ns
Turn-off delay time	$t_{d(off)}$		-	160	-	
Fall time	t_f		-	34	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=480 V, I_D=10A,	-	10	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	21	-	nC
Gate charge total	Q_g		-	45	-	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=8A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=10A,	-	270	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	3.9	-	μC
Peak reverse recovery current	I_{rrm}		-	31	-	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} = 4A, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C

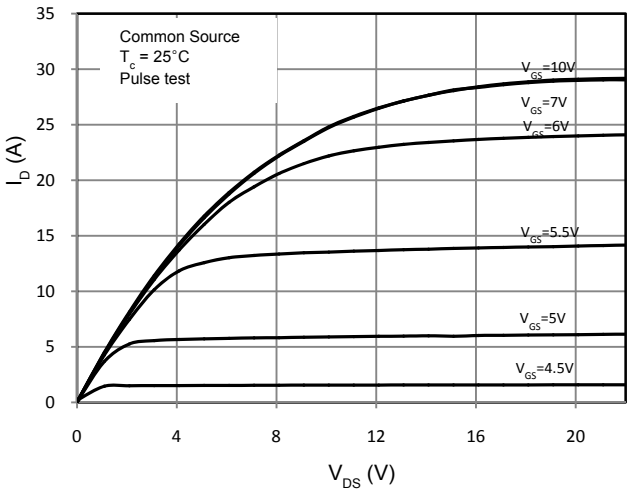


Figure 1.On-Region Characteristics

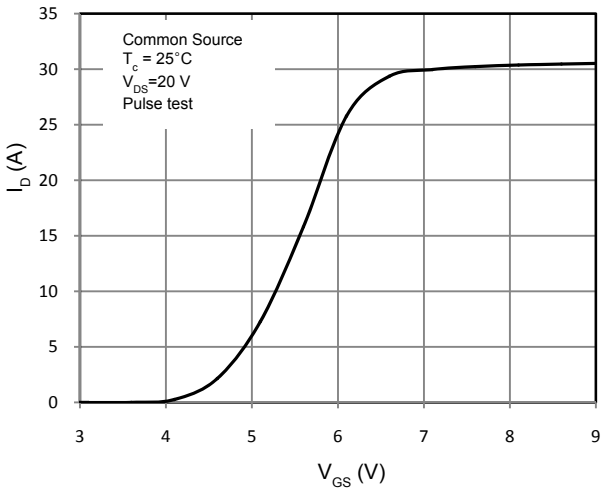


Figure 2. Transfer Characteristics

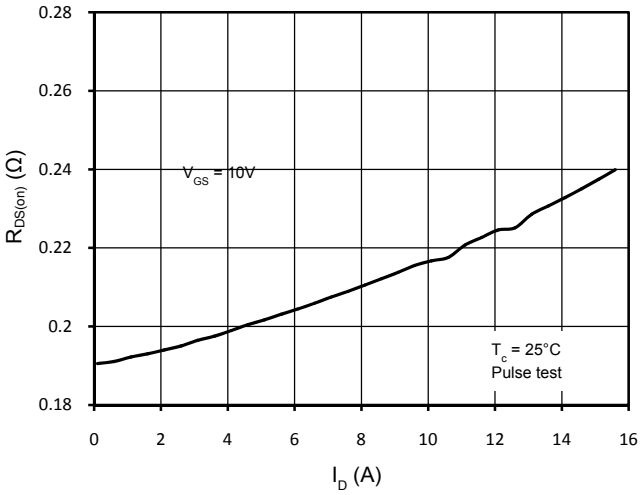


Figure 3. Static Drain-Source On Resistance

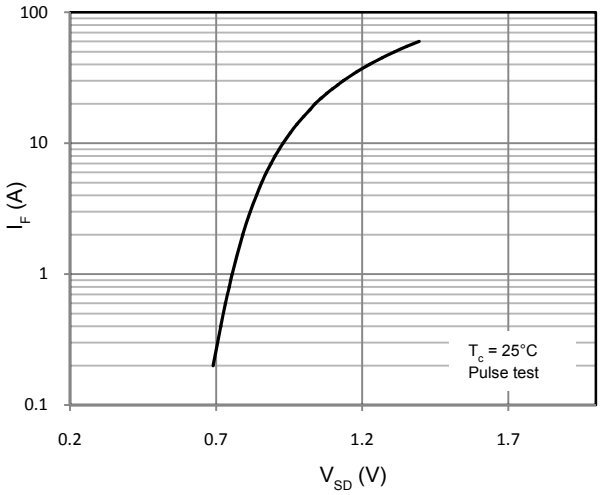


Figure 4. Body- Diode Forward Characteristics

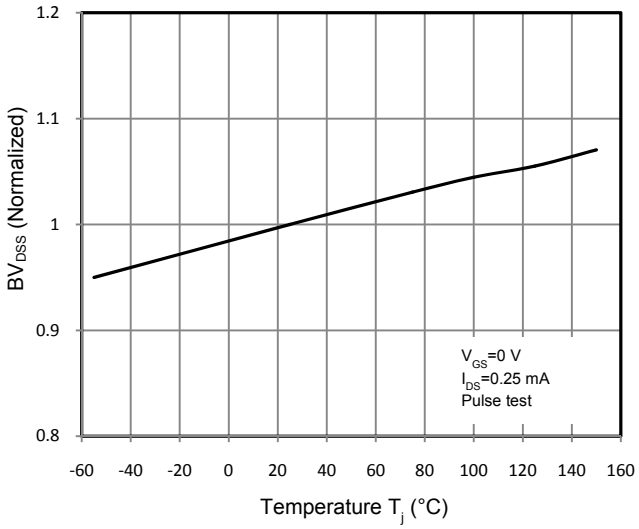


Figure 5. Normalized BV_{DSS} vs. Temperature

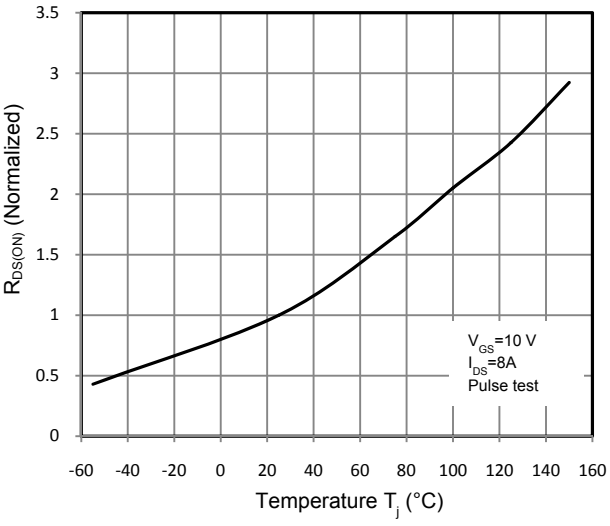


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

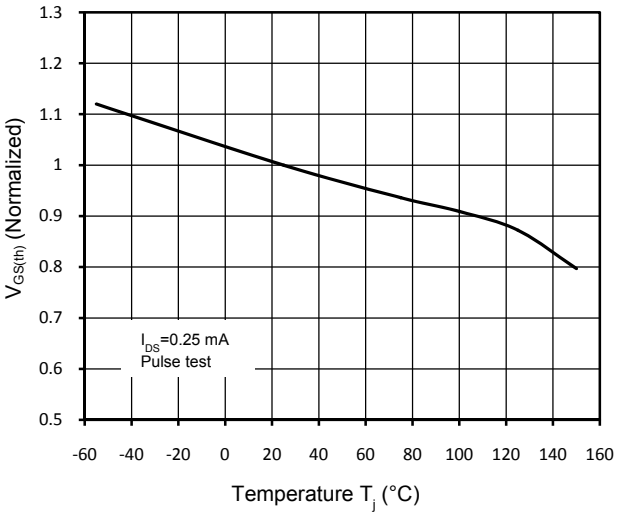


Figure 7. Threshold Voltage vs. Temperature

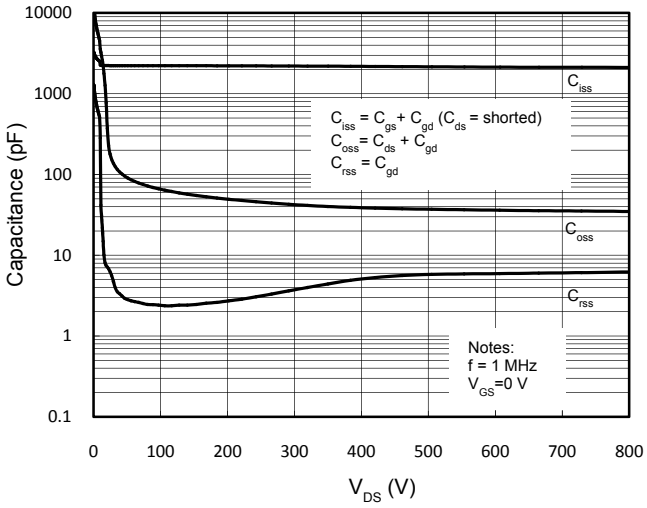


Figure 8. Capacitance Characteristics

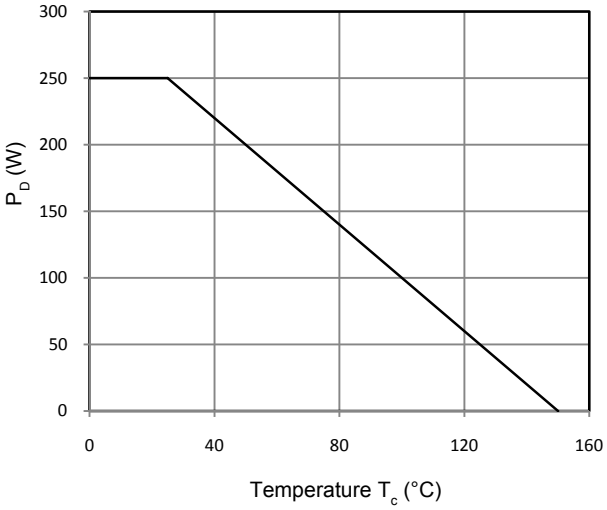


Figure 9. Power Dissipation

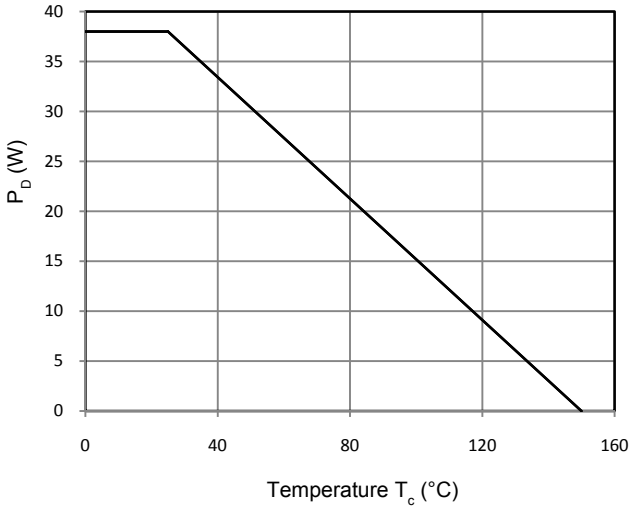


Figure 10. Power Dissipation (TO-220F)

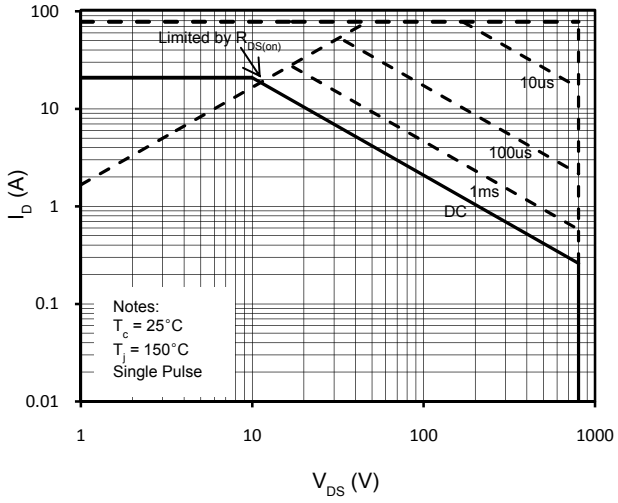


Figure 11. Maximum Safe Operating Area

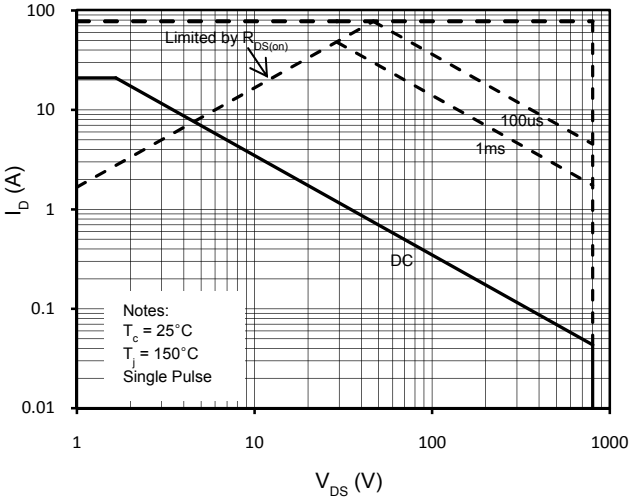


Figure 12. Maximum Safe Operating Area(TO-220F)

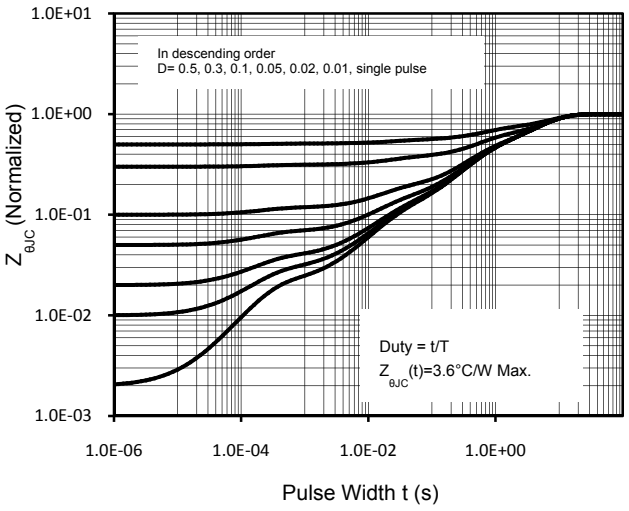


Figure 13. Transient Thermal Response Curve (TO-220F)

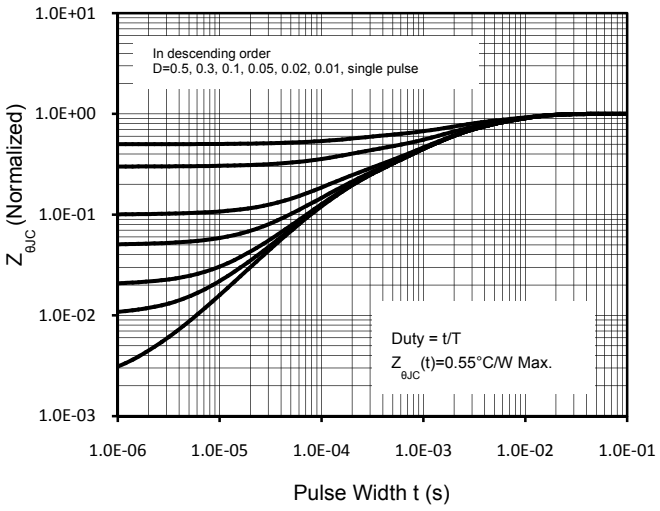


Figure 14. Transient Thermal Response Curve

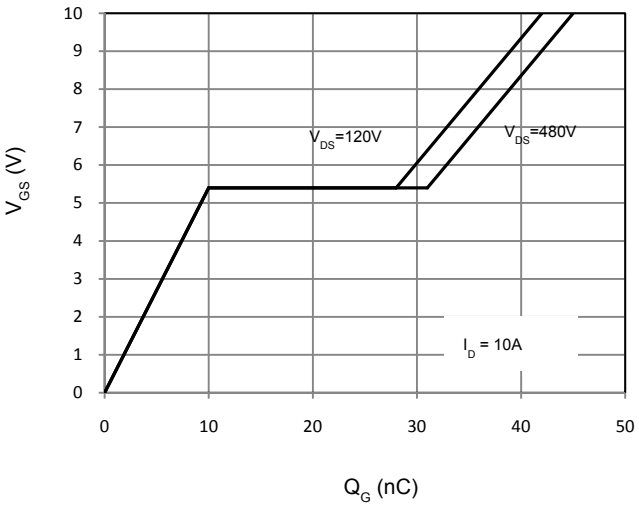
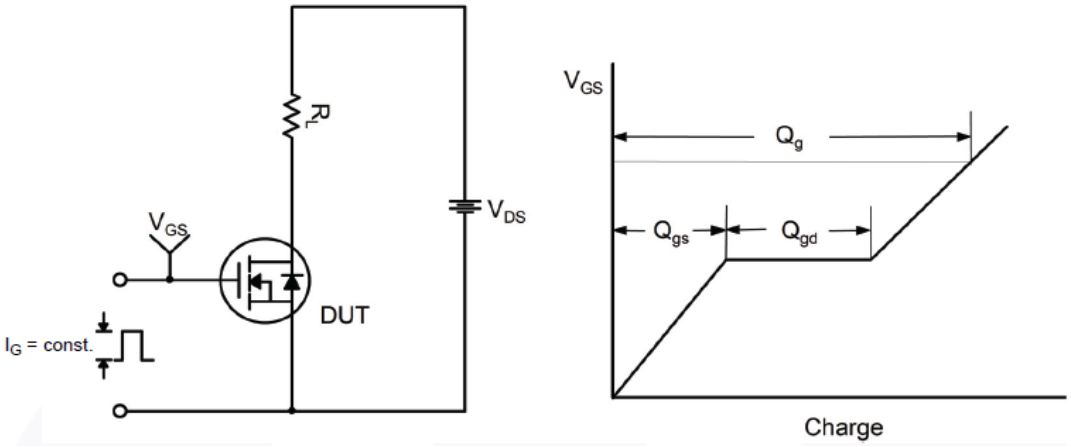
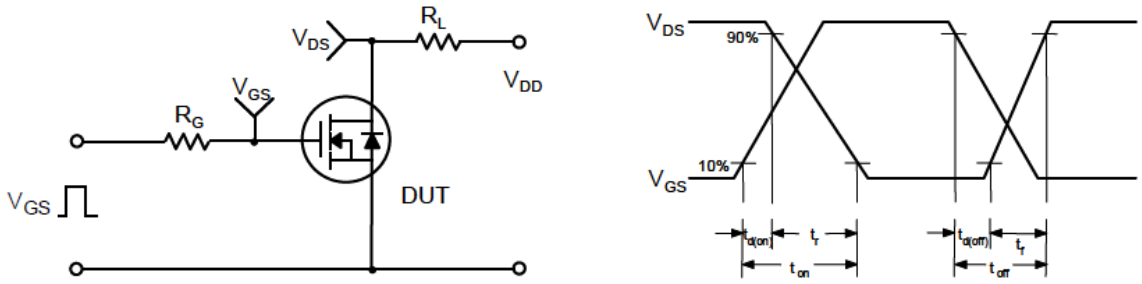


Figure 15. Gate Charge Characteristics

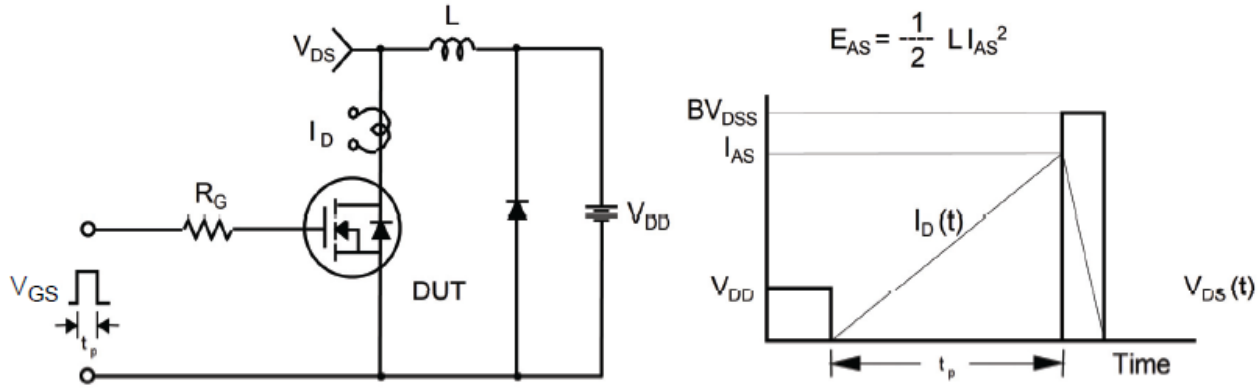
Gate Charge Test Circuit & Waveform



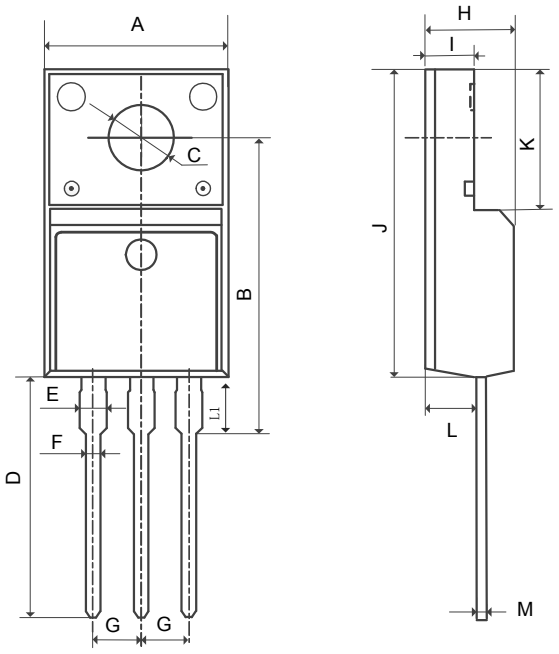
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



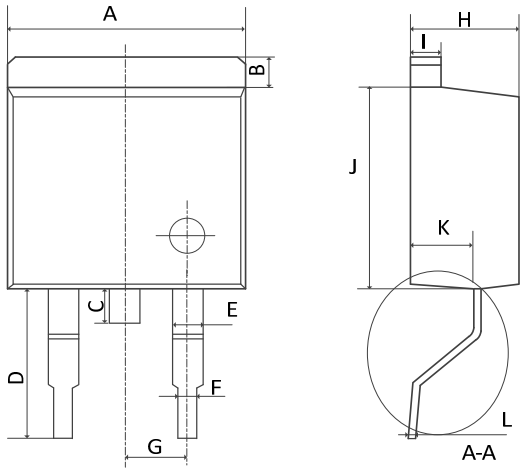
Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
B	15.10	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

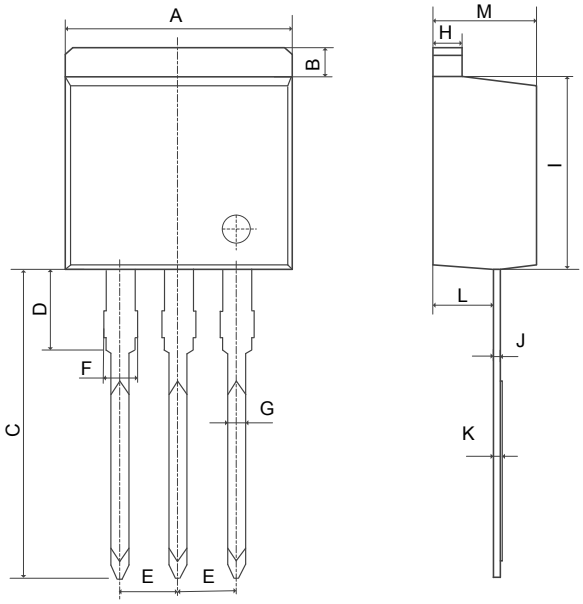
Mechanical Dimensions for TO-263



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

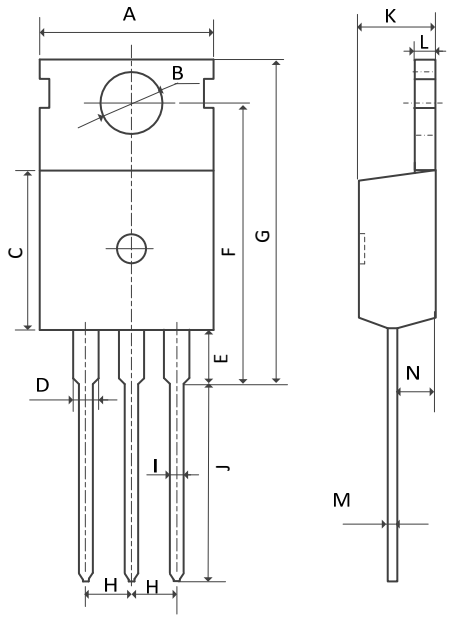
Mechanical Dimensions for TO-262



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

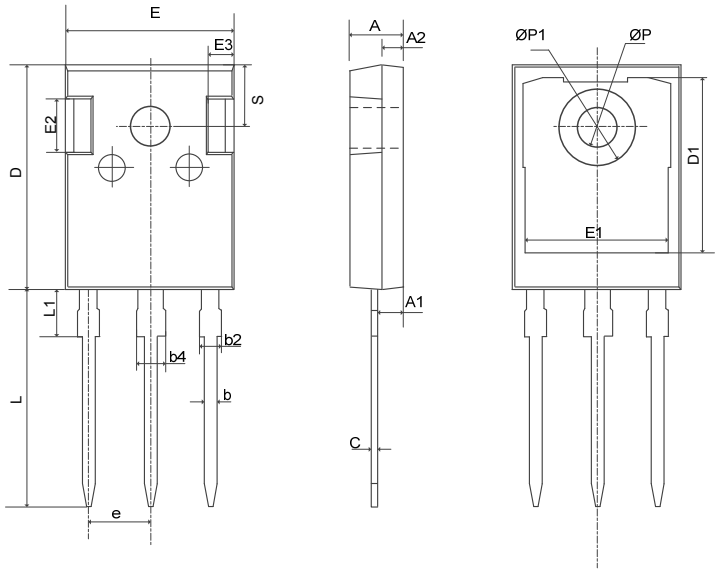
Mechanical Dimensions for TO-220



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



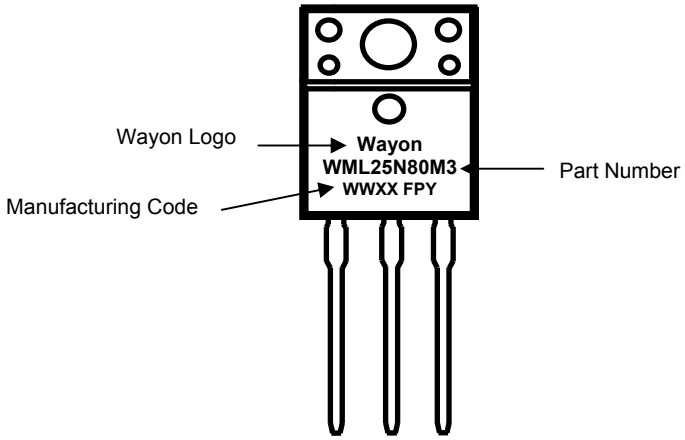
COMMON DIMENSIONS

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	5.60
E3	2.10	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
WML25N80M3	TO-220F	WML25N80M3	Tube
WMK25N80M3	TO-220	WMK25N80M3	Tube
WMN25N80M3	TO-262	WMN25N80M3	Tube
WMM25N80M3	TO-263	WMM25N80M3	Tape and Reel
WMJ25N80M3	TO-247	WMJ25N80M3	Tube

Marking Information



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WAYON website: **http://www.way-on.com**
For additional information, please contact your local Sales Representative.

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