

## 800V 1.2Ω Super Junction Power MOSFET

### Description

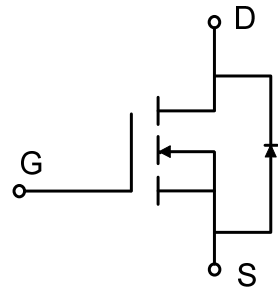
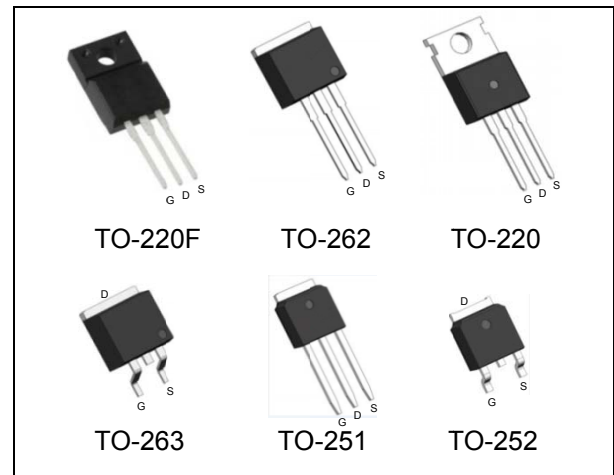
WMOS™ M3 is Wayon's 3<sup>rd</sup> generation 800V super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ M3 is suitable for applications which require superior power density and outstanding efficiency.

### Features

- $V_{DS} = 850V @ T_{j,max}$
- Typ.  $R_{DS(on)} = 1.2\Omega$
- 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	WML	Unit
Drain-source voltage	$V_{DSS}$	800		V
Continuous drain current <sup>1)</sup> ( $T_C = 25^\circ C$ )	$I_D$	7		A
( $T_C = 100^\circ C$ )		4		A
Pulsed drain current <sup>2)</sup>	$I_{DM}$	21		A
Gate-source voltage	$V_{GS}$	$\pm 30$		V
Avalanche energy, single pulse <sup>3)</sup>	$E_{AS}$	56		mJ
Avalanche energy, repetitive <sup>2)</sup>	$E_{AR}$	0.1		mJ
Avalanche current, repetitive <sup>2)</sup>	$I_{AR}$	1.3		A
Power dissipation ( $T_C = 25^\circ C$ )	$P_D$	70	29	W
- Derate above $25^\circ C$		0.56	0.23	W/ $^\circ C$
Operating and storage temperature range	$T_{j}, T_{stg}$	-55 to +150		$^\circ C$
Continuous diode forward current	$I_S$	7		A
Diode pulse current	$I_{S,pulse}$	21		A

### Thermal Characteristics

Parameter	Symbol	WMN/WMM/WMO/WMP/WMK	WML	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	2	4	$^\circ C/W$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	62	80	$^\circ C/W$

**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 <sub>DSS</sub>	V <sub>GS</sub> =0 V, I <sub>D</sub> =0.25 mA	800	-	-	V
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =0.25mA	2.5	3.3	4.5	V
Drain cut-off current	I <sub>DSS</sub>	V <sub>DS</sub> =800 V, V <sub>GS</sub> =0 V, T <sub>J</sub> = 25°C T <sub>J</sub> = 125°C	- -	- 10	1 -	μA
Gate leakage current, forward	I <sub>GSSF</sub>	V <sub>GS</sub> =30 V, V <sub>DS</sub> =0 V	-	-	100	nA
Gate leakage current, reverse	I <sub>GSSR</sub>	V <sub>GS</sub> =-30 V, V <sub>DS</sub> =0 V	-	-	-100	nA
Drain-source on-state resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10 V, I <sub>D</sub> =1A T <sub>J</sub> = 25°C	- -	 1.2	 1.38	 Ω
Dynamic characteristics						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz	-	465	-	pF
Output capacitance	C <sub>OSS</sub>		-	35	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	5.4	-	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 300V, I <sub>D</sub> = 1A R <sub>G</sub> = 25Ω, V <sub>GS</sub> =10V	-	21	-	ns
Rise time	t <sub>r</sub>		-	13	-	
Turn-off delay time	t <sub>d(off)</sub>		-	50	-	
Fall time	t <sub>f</sub>		-	20	-	
Gate charge characteristics						
Gate to source charge	Q <sub>gs</sub>	V <sub>DD</sub> =480 V, I <sub>D</sub> =1A, V <sub>GS</sub> =0 to 10 V	-	2.1	-	nC
Gate to drain charge	Q <sub>gd</sub>		-	7.5	-	
Gate charge total	Q <sub>g</sub>		-	13.3	-	
Gate plateau voltage	V <sub>plateau</sub>		-	5	-	V
Reverse diode characteristics						
Diode forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0 V, I <sub>F</sub> =2A	-	-	1.2	V
Reverse recovery time	t <sub>rr</sub>	V <sub>R</sub> =50 V, I <sub>F</sub> =1A, dI <sub>F</sub> /dt=100 A/μs	-	165	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	0.64	-	μC
Peak reverse recovery current	I <sub>rrm</sub>		-	7.5	-	A

## Notes:

- Limited by  $T_{j\max}$ . Maximum duty cycle  $D=0.5$ .
- Repetitive rating: pulse width limited by maximum junction temperature
- $I_{AS}=1.3\text{ A}$ ,  $V_{DD}=50\text{ V}$ ,  $R_G=25\Omega$ , starting  $T_j=25^\circ\text{C}$

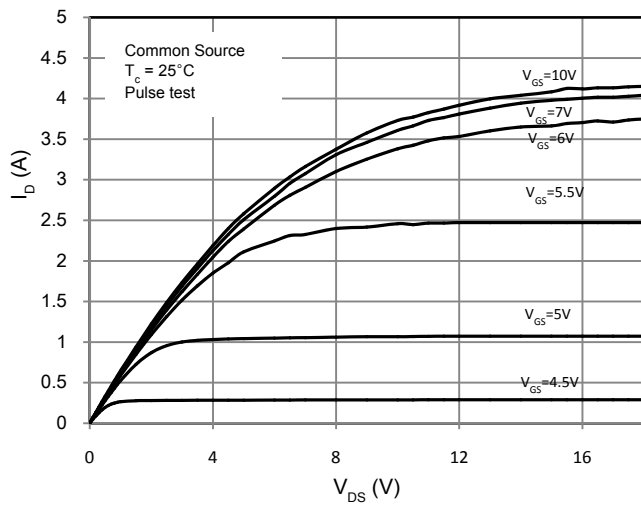


Figure 1. On-Region Characteristics

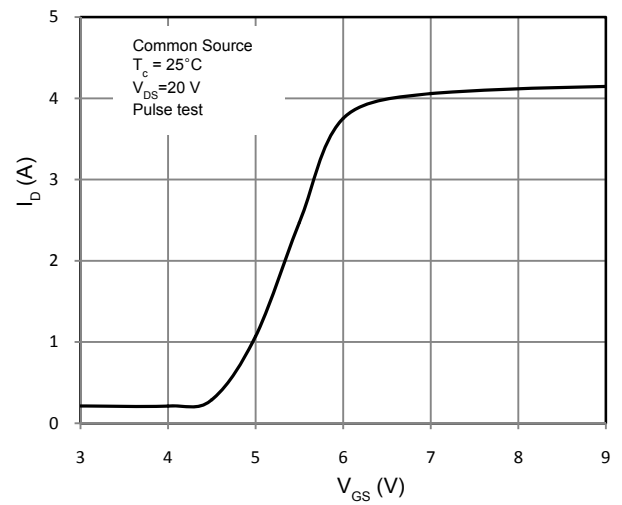


Figure 2. Transfer Characteristics

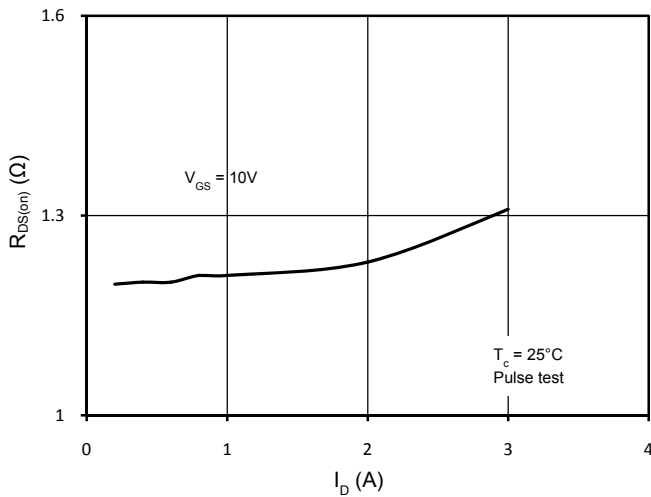


Figure 3. Static Drain-Source On Resistance

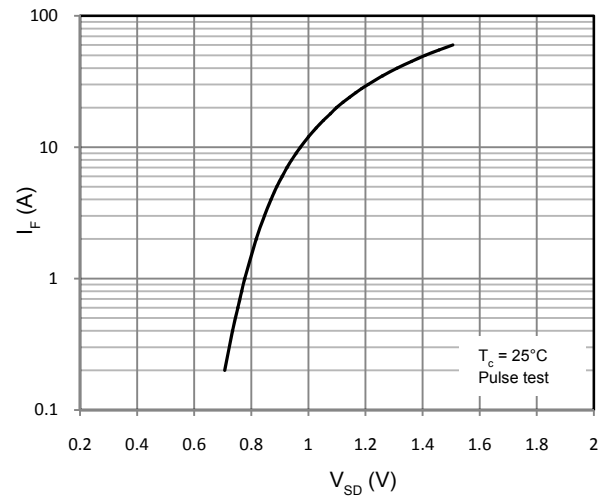
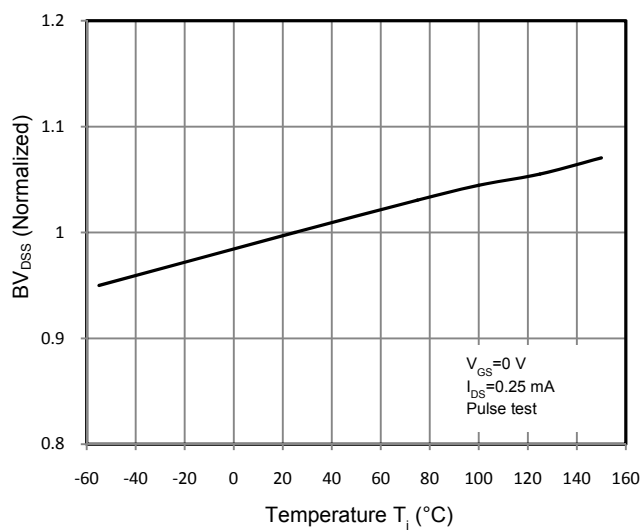
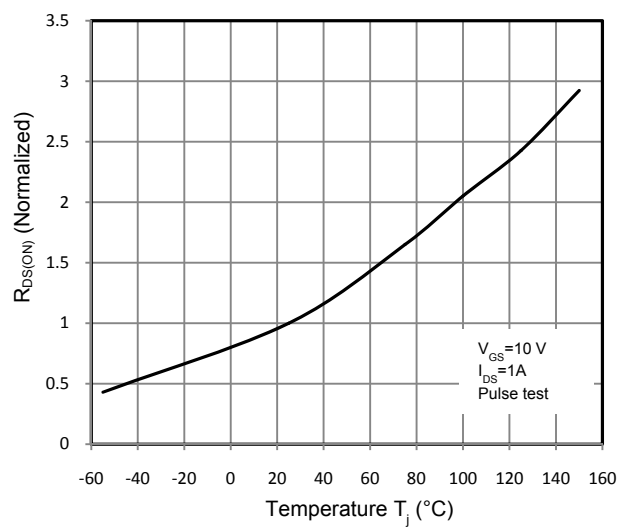


Figure 4. Body-Diode Forward Characteristics

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

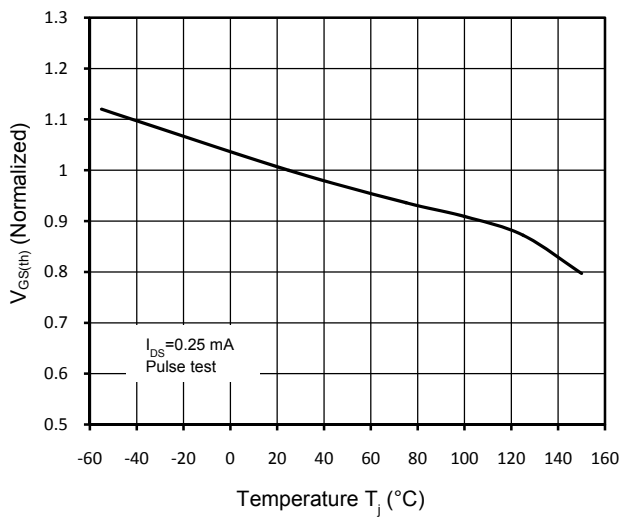


Figure 7. Threshold Voltage vs. Temperature

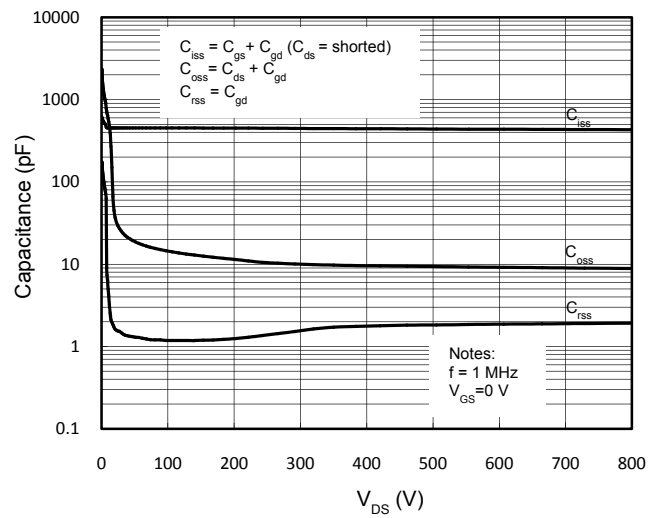


Figure 8. Capacitance Characteristics

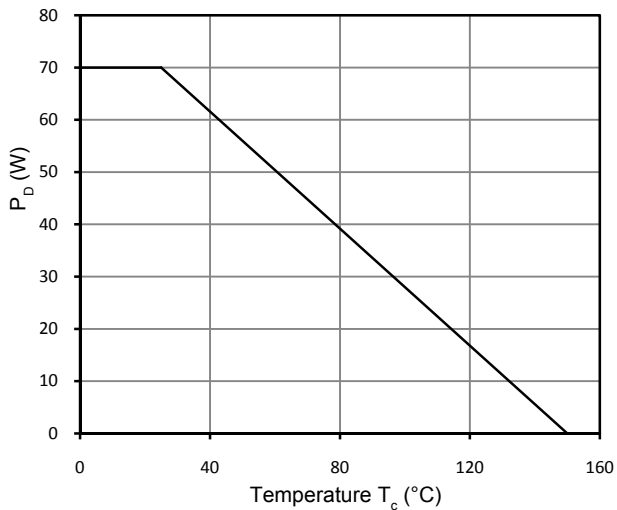


Figure 9. Power Dissipation

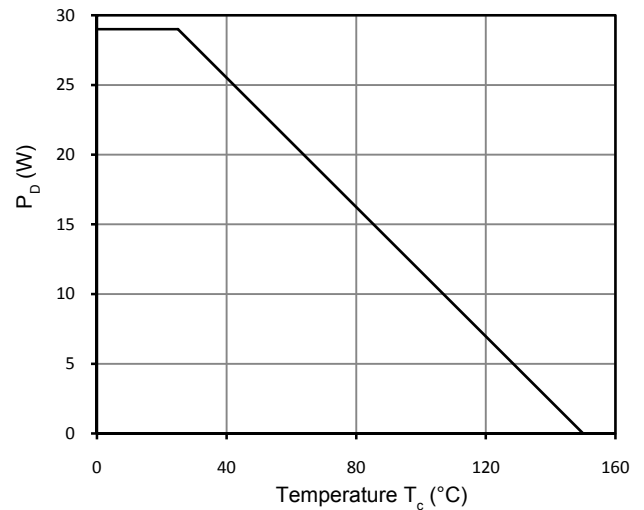


Figure 10. Power Dissipation (TO-220F)

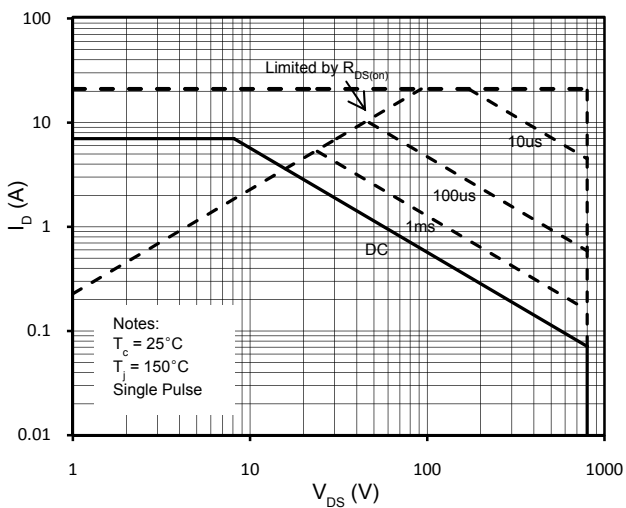


Figure 11. Maximum Safe Operating Area

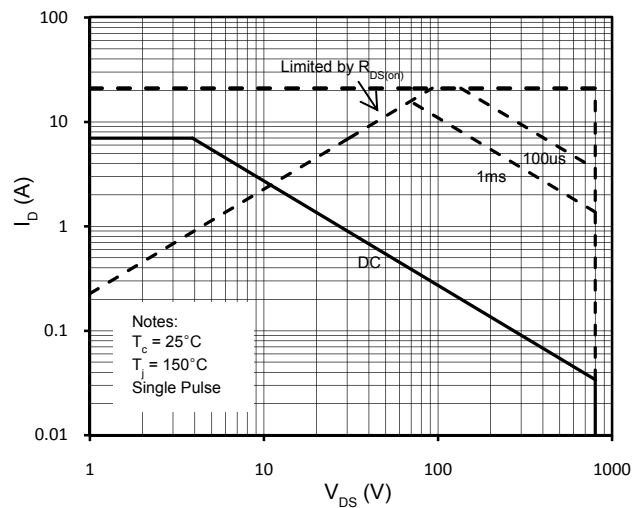


Figure 12. Maximum Safe Operating Area (TO-220F)

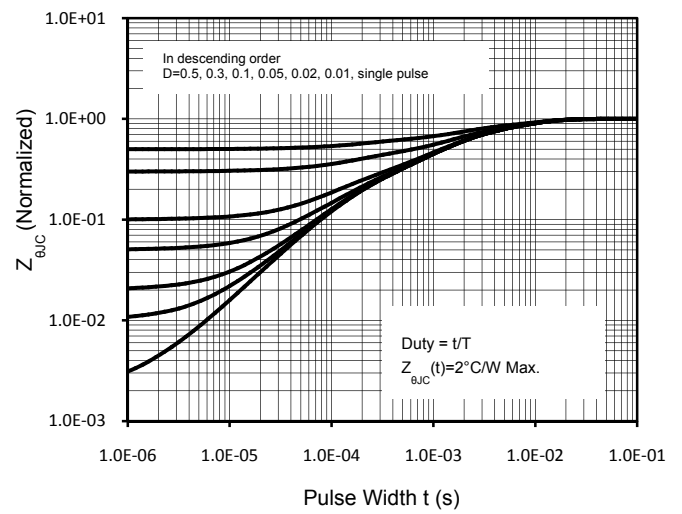
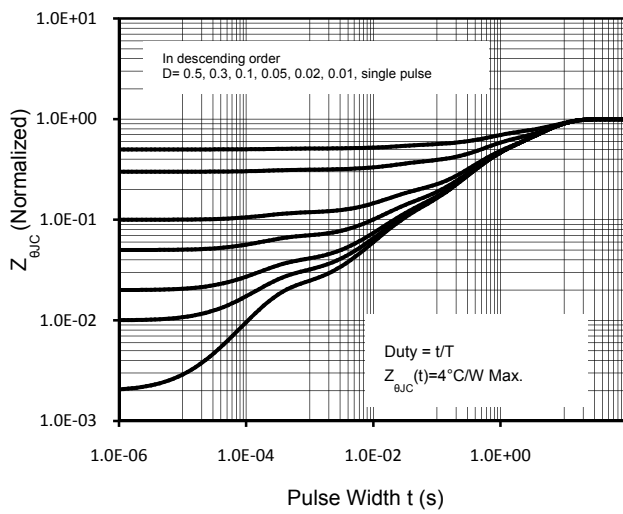


Figure 13. Transient Thermal Response Curve (TO-220F)    Figure 14. Transient Thermal Response Curve

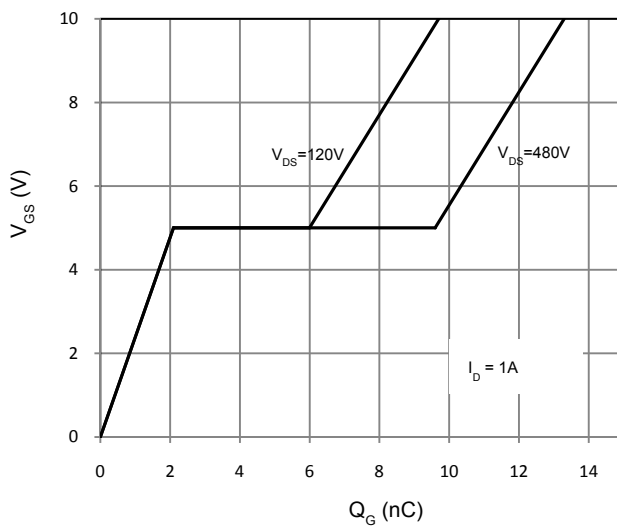
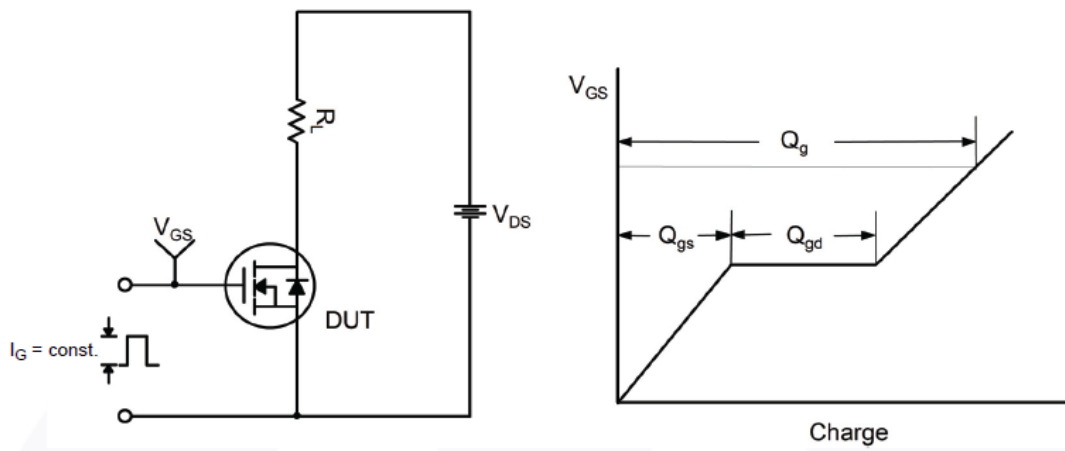
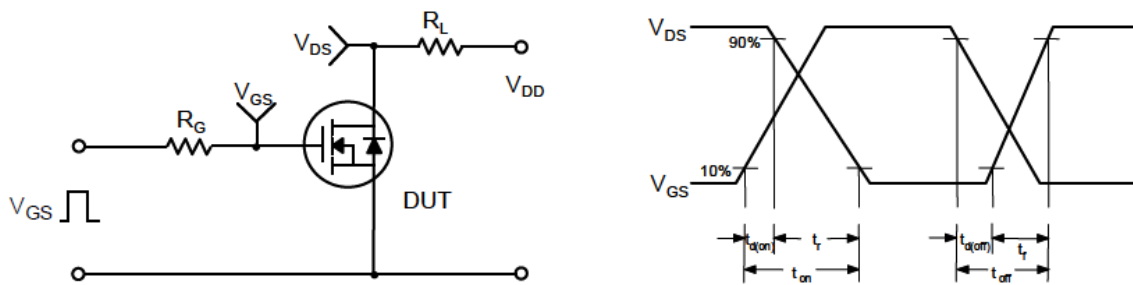


Figure 15. Gate Charge Characteristics

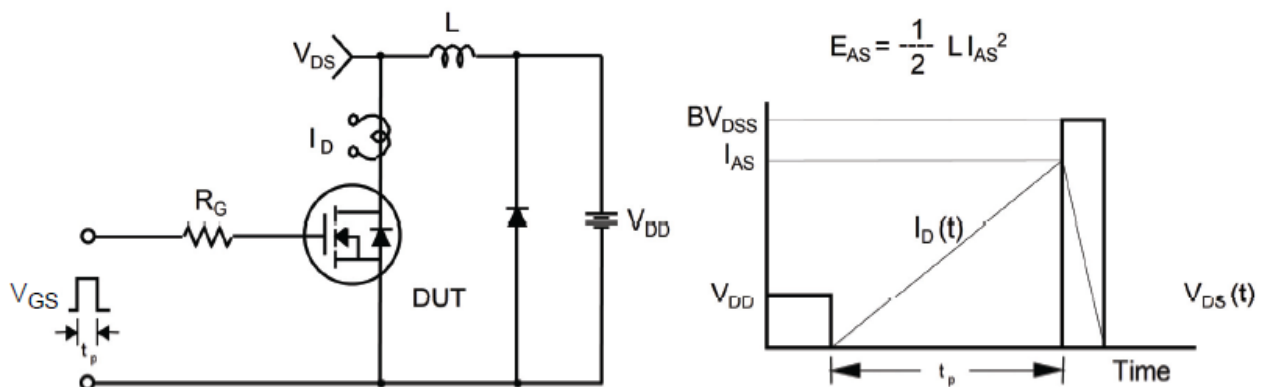
### Gate Charge Test Circuit & Waveform

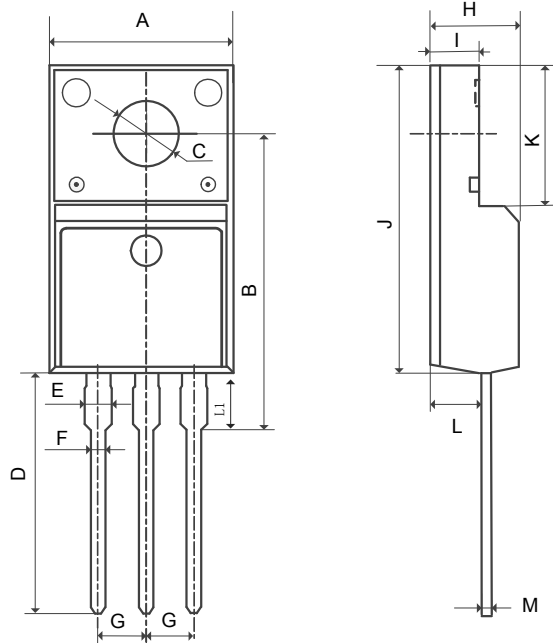


### Switching Test Circuit & Waveforms

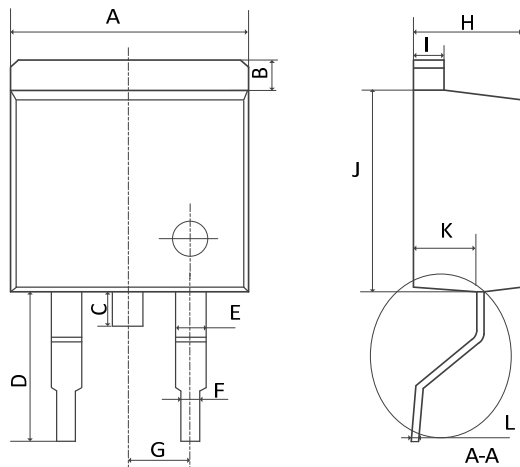


### Unclamped Inductive Switching Test Circuit & Waveforms

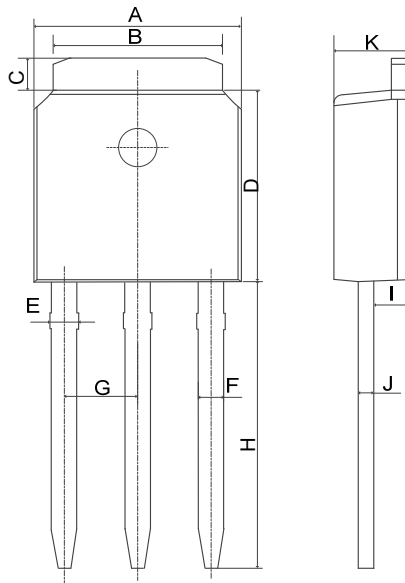


**Mechanical Dimensions for TO-220F**

**COMMON DIMENSIONS**

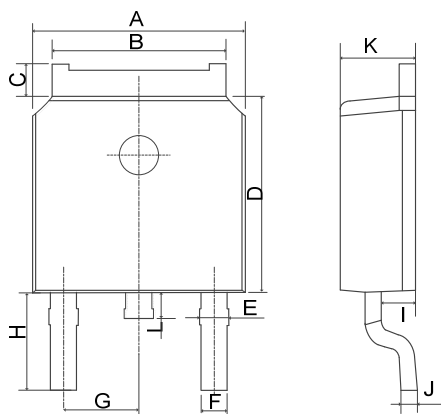
SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
B	15.10	16.10
C	3.03	3.38
D	12.64	13.28
E	1.18	1.58
F	0.70	0.95
G	2.54REF	
H	4.50	4.90
I	2.34	2.74
J	15.57	16.17
K	6.70REF	
L	2.56	2.96
M	0.40	0.65
L1	2.85	3.45

**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

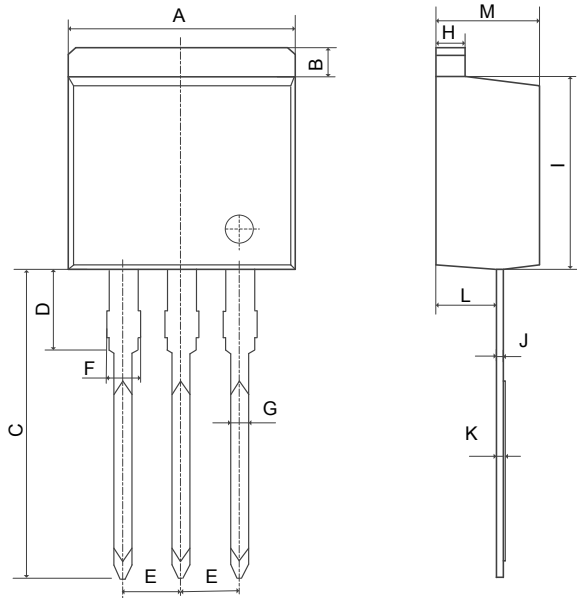
**Mechanical Dimensions for TO-251**

**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

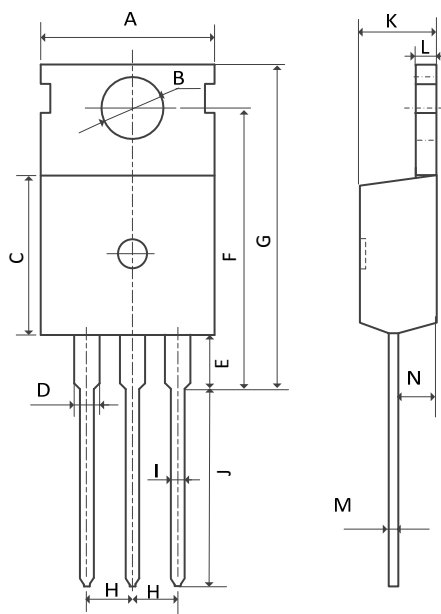
**Mechanical Dimensions for TO-252**

**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

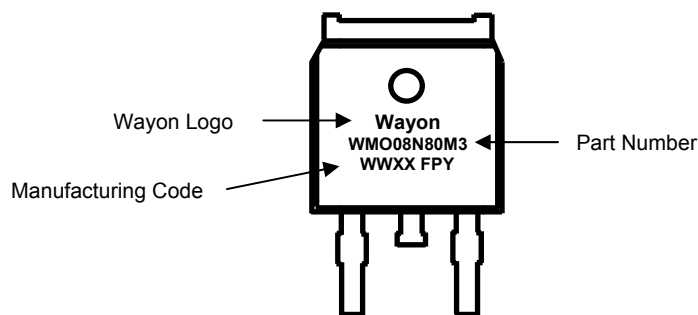
**Mechanical Dimensions for TO-220**

**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

## Ordering Information

Part	Package	Marking	Packing method
WML08N80M3	TO-220F	WML08N80M3	Tube
WMM08N80M3	TO-263	WMM08N80M3	Tape and Reel
WMO08N80M3	TO-252	WMO08N80M3	Tape and Reel
WMP08N80M3	TO-251	WMP08N80M3	Tube
WMK08N80M3	TO-220	WMK08N80M3	Tube
WMN08N80M3	TO-262	WMN08N80M3	Tube

## Marking Information



## Contact Information

### CYG WAYON CIRCUIT PROTECTION CO., LTD.

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201202

Tel: 86-21-50310888 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: <http://www.way-on.com>

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