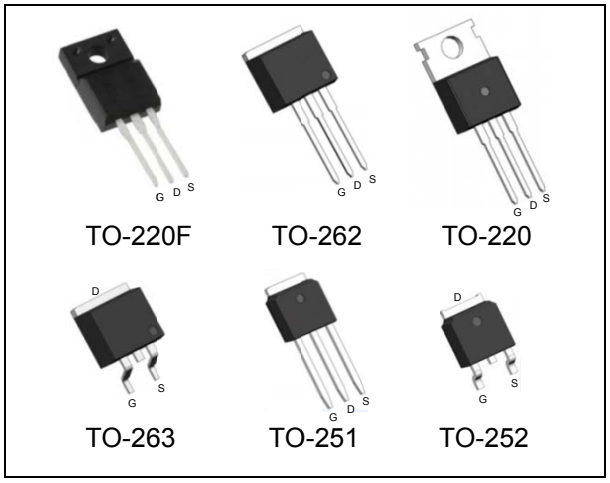
650V 0.29Ω Super Junction Power MOSFET

Description

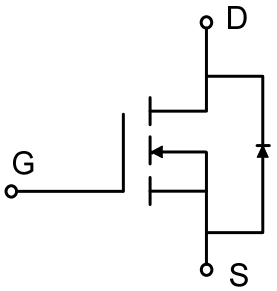
WMOS™ XJD is Wayon's new generation super junction MOSFET family with fast body diode. XJD series provide all benefits of a fast switching SJ-MOSFET while offering an extremely fast body diode. WMOS™ XJD makes especially resonant switching applications more reliable.



Features

- V_{DS} =700V @ $T_{j,max}$
- Typ. $R_{DS(on)}$ =0.29Ω
- 100% UIS tested
- Pb-free plating, Halogen free

RoHS compliant



Applications

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

Absolute Maximum Ratings

Parameter	Symbol	WMK/WMM/WMO/WMP/WMN	WML	Unit
Drain-source voltage	V_{DSS}	650		V
Continuous drain current[1] (T_C = 25°C)	I_D	12		A
(T_C = 100°C)		7.5		A
Pulsed drain current[2]	I_{DM}	26		A
Gate-source voltage	V_{GS}	±30		V
Avalanche energy, single pulse[3]	E_{AS}	125		mJ
Avalanche energy, repetitive[2]	E_{AR}	0.18		mJ
Avalanche current, repetitive[2]	I_{AR}	2		A
Power dissipation (T_C = 25°C)	P_D	78	31	W
- Derate above 25°C		0.63	0.25	W/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150		°C
Continuous diode forward current	I_S	12		A
Diode pulse current	$I_{S,pulse}$	26		A

Thermal Characteristics

Parameter	Symbol	WMK/WMM/WMO/WMP/WMN	WML	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	1.6	4	°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=1 mA	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	3	4	5	V
Drain cut-off current	I_{DSS}	V_{DS}=650 V, V_{GS}=0 V,				μA
		T_j = 25°C	-	-	10	
		T_j = 125°C	-	80	-	
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=2 A	-			
		T_j = 25°C	-	0.29	0.32	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}= 100 V, V_{GS}= 0 V,	-	564	-	
Output capacitance	C_{oss}	f = 1 MHz	-	22	-	pF
Reverse transfer capacitance	C_{rss}		-	1.1	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 300V, I_D = 5A	-	31	-	
Rise time	t_r	R_G = 25Ω, V_{GS}=10V	-	26	-	ns
Turn-off delay time	$t_{d(off)}$		-	62	-	
Fall time	t_f		-	9	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=480 V, I_D=5A,	-	4.7	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	4.3	-	nC
Gate charge total	Q_g		-	13.8	-	
Gate plateau voltage	$V_{plateau}$		-	6.3	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=2A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=5A,	-	95	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	0.4	-	μC
Peak reverse recovery current	I_{rrm}		-	9	-	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} = 2 A, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C.

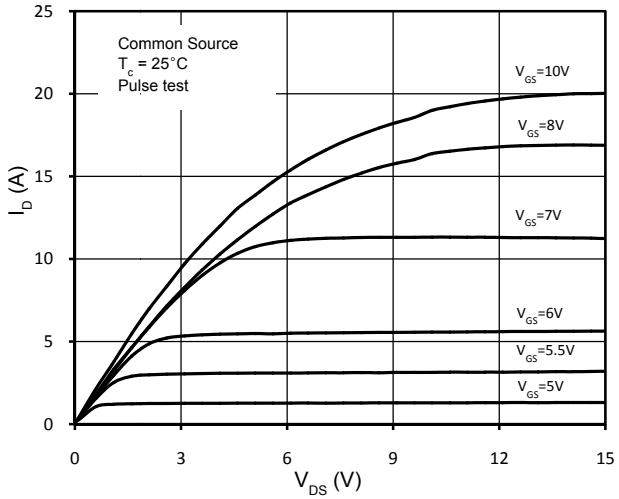


Figure 1.On-Region Characteristics

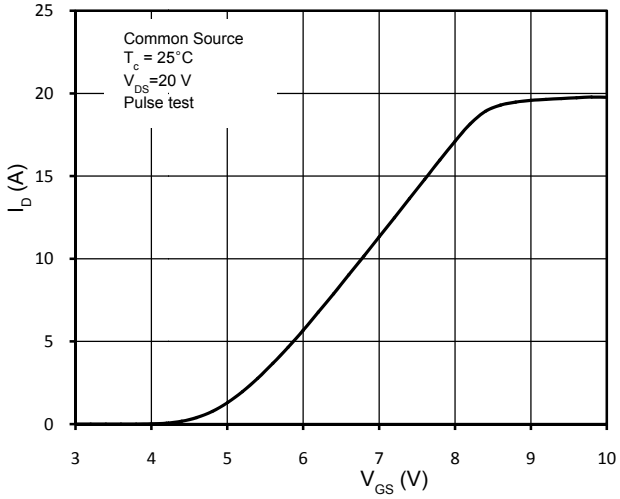


Figure 2. Transfer Characteristics

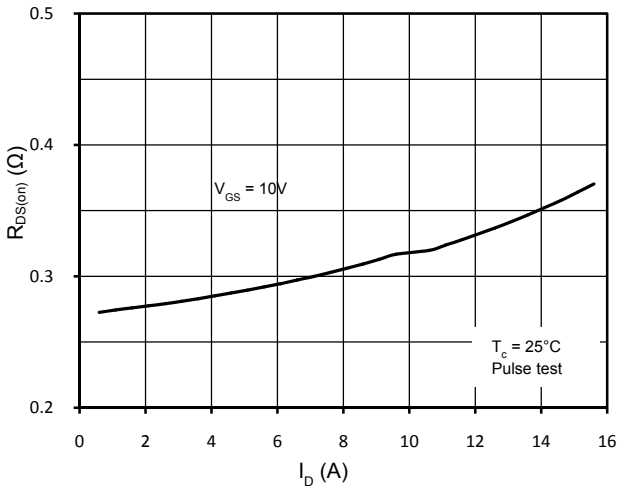


Figure 3. Static Drain-Source On Resistance

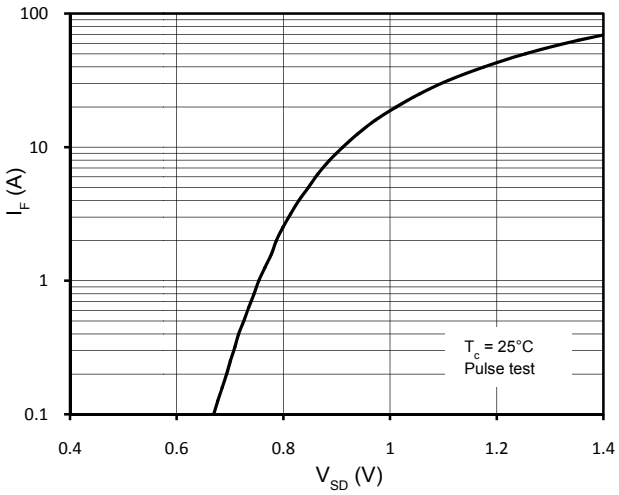


Figure 4. Body- Diode Forward Characteristics

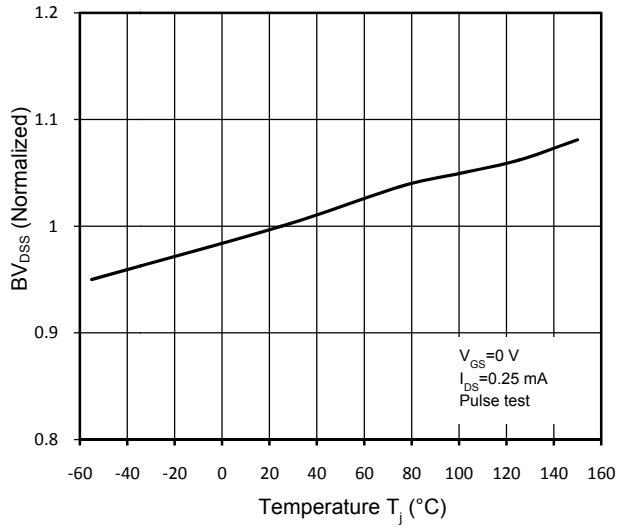


Figure 5. Normalized BV_{DSS} vs. Temperature

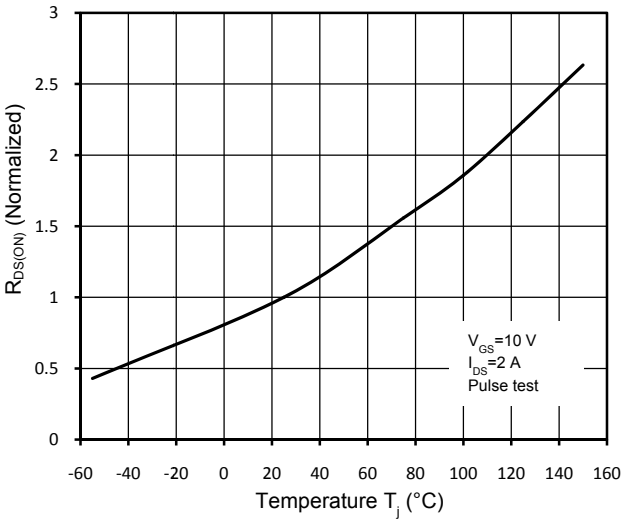


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

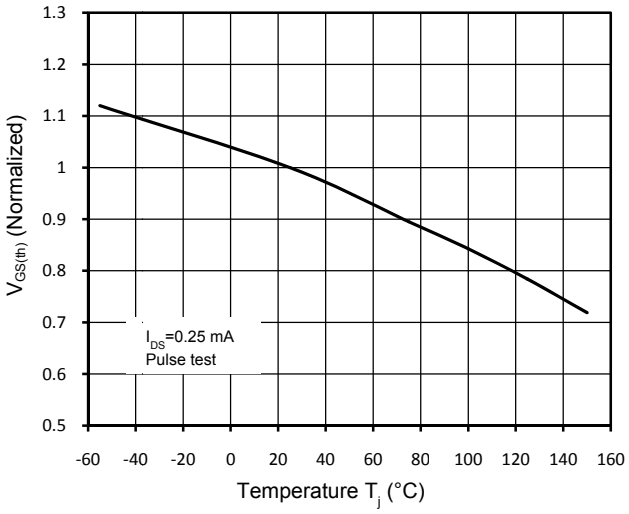


Figure 7. Threshold Voltage vs. Temperature

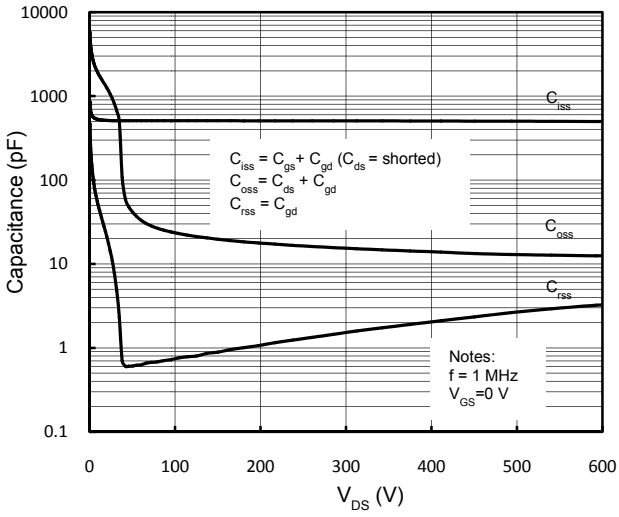


Figure 8. Capacitance Characteristics

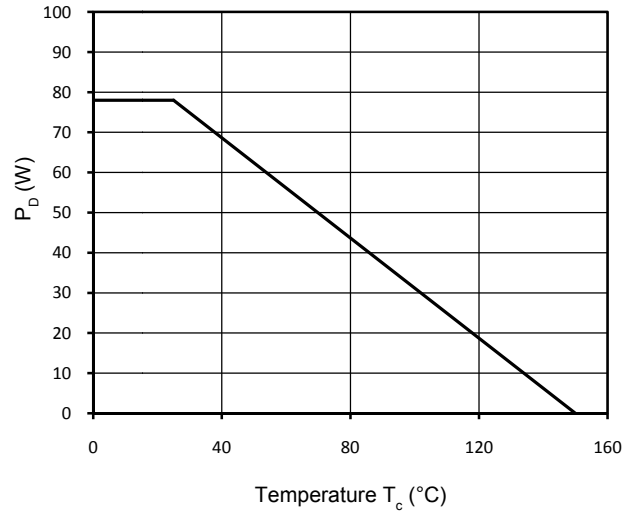


Figure 9. Power Dissipation

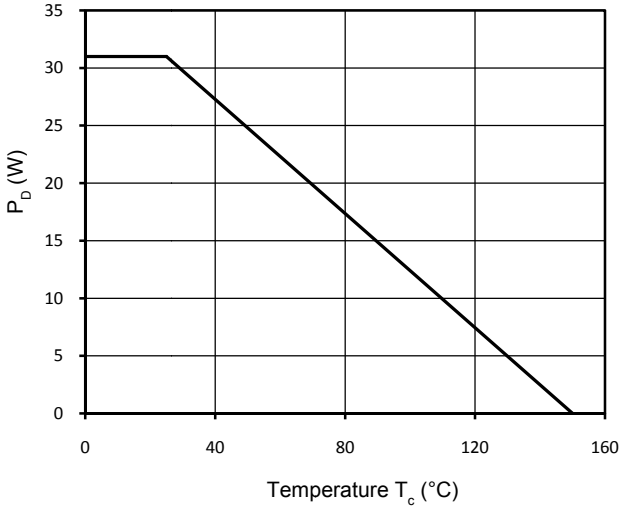


Figure 10. Power Dissipation (TO-220F)

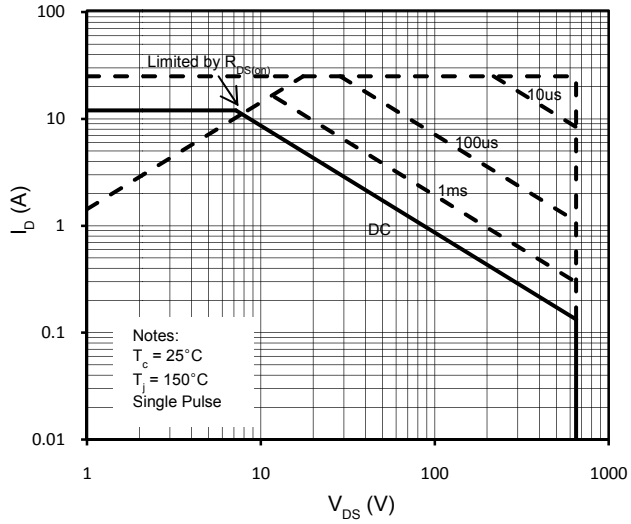


Figure 11. Maximum Safe Operating Area

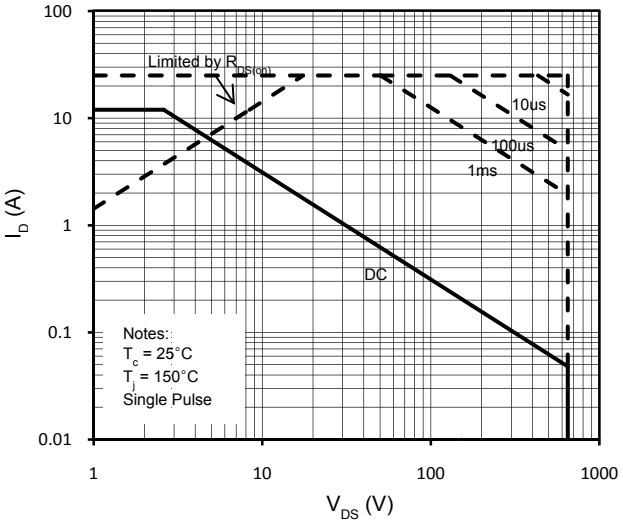


Figure 12. Maximum Safe Operating Area(TO-220F)

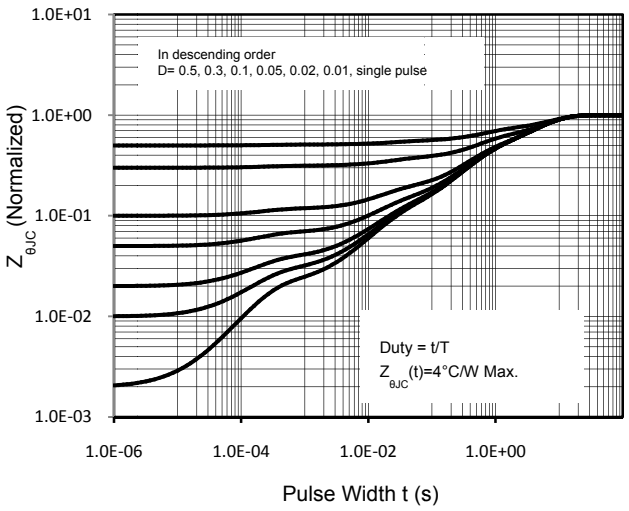


Figure 13. Transient Thermal Response Curve (TO-220F)

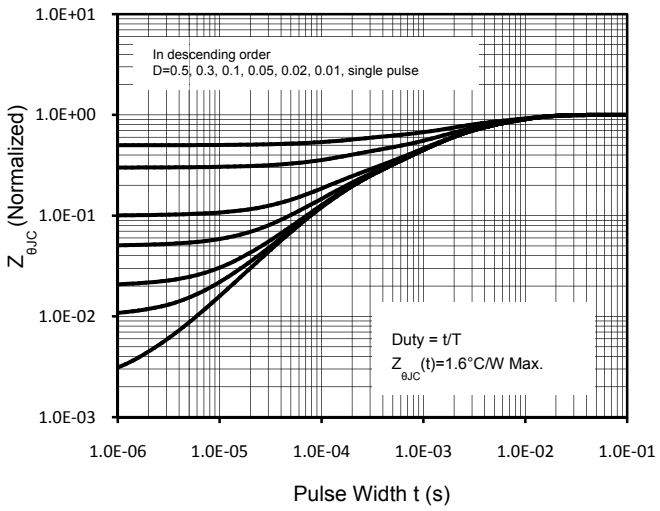


Figure 14. Transient Thermal Response Curve

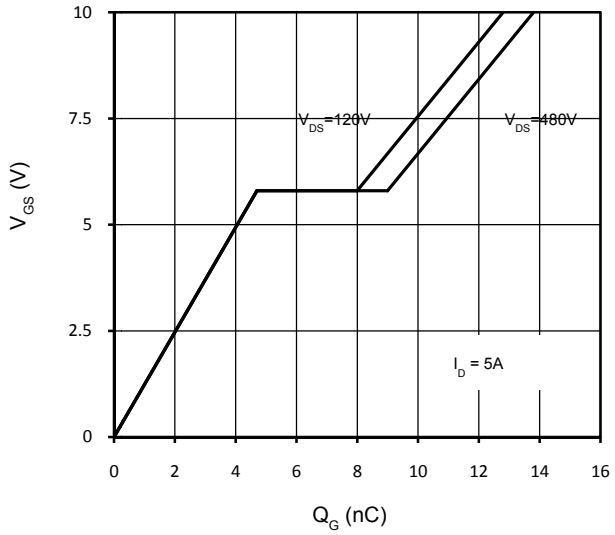
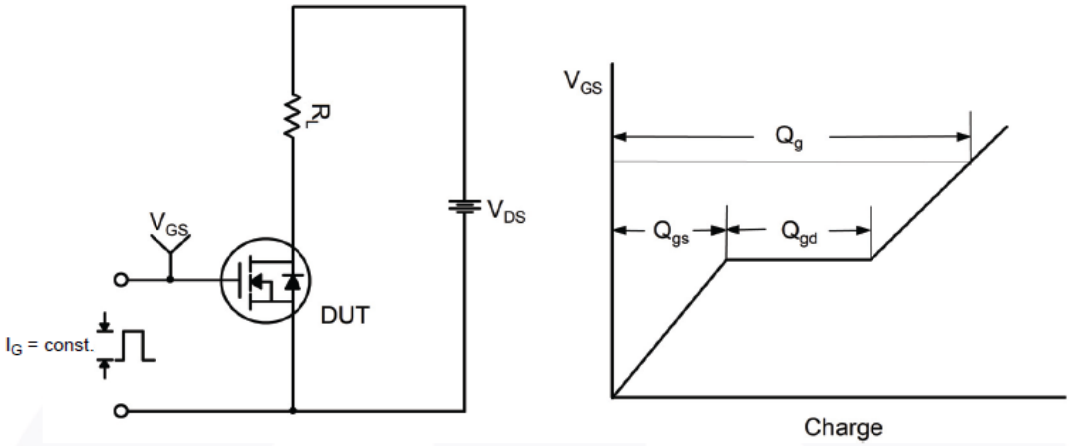
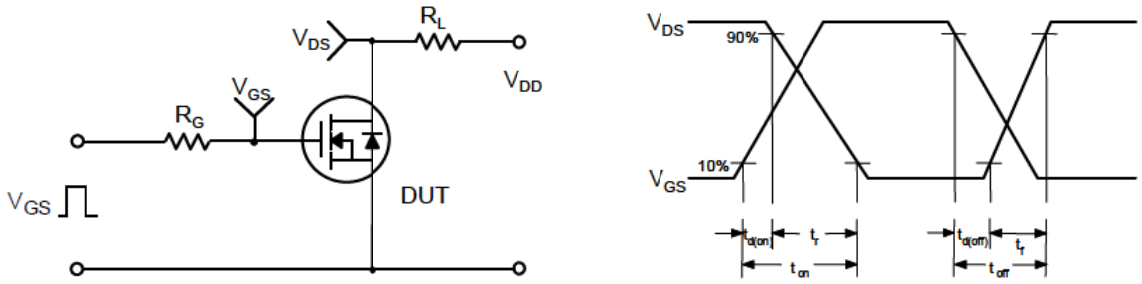


Figure 15. Gate Charge Characteristics

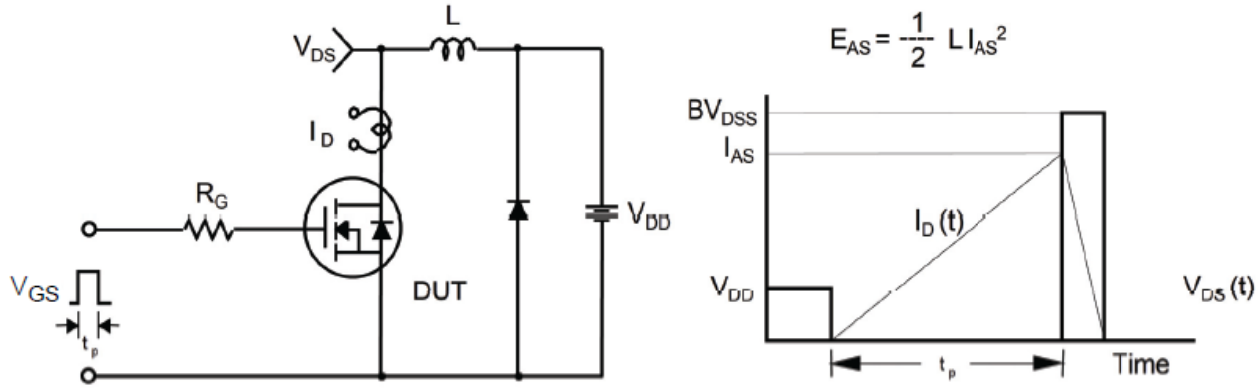
Gate Charge Test Circuit & Waveform



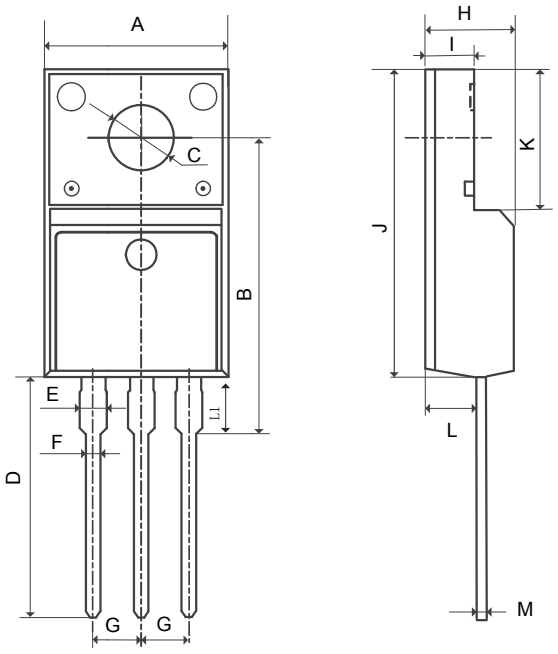
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



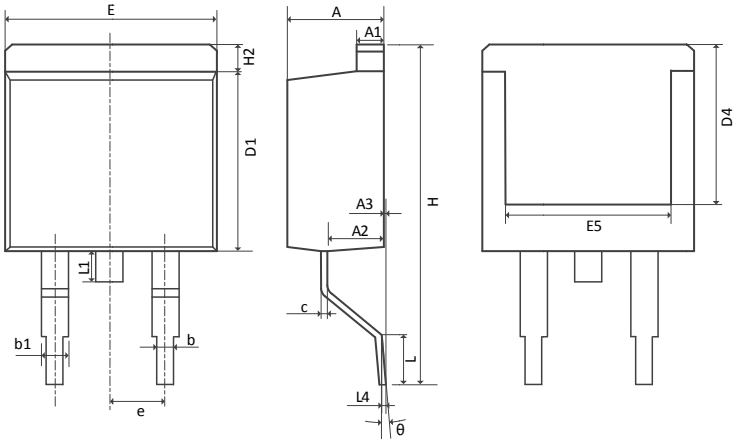
Mechanical Dimensions for TO-220F



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

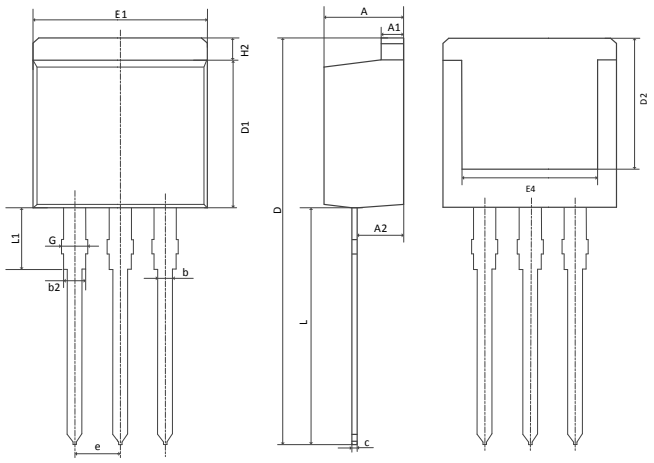
Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.19	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.60
D1	8.45	9.35
D4	6.60	—
E	9.80	10.40
E5	7.06	—
e	2.54BSC	
H	14.70	16.00
H2	1.07	1.47
L	2.00	2.70
L1	1.15	1.75
L4	0.25BSC	
θ	0°	9°

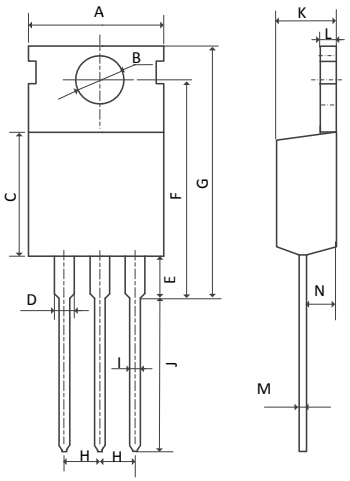
Mechanical Dimensions for TO-262



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.90
A1	1.17	1.42
A2	2.20	2.89
b	0.71	0.96
b2	1.07	1.47
c	0.28	0.60
D	22.00	24.02
D1	8.45	9.30
D2	6.00	—
E1	9.80	10.40
E4	7.06	—
e	2.54BSC	
G	1.23	1.50
H2	—	1.50
L	12.90	14.16
L1	2.80	4.00

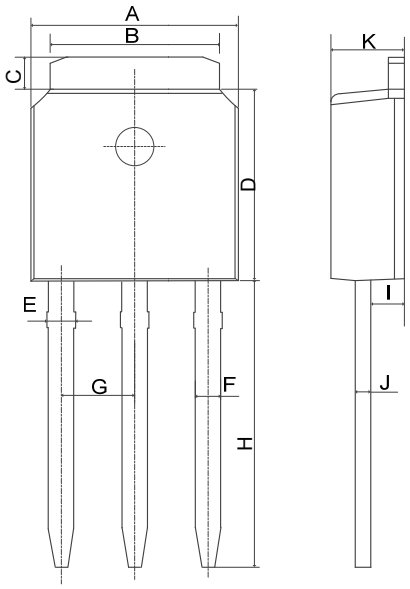
Mechanical Dimensions for TO-220



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.50
F	15.10	16.90
G	19.60MAX	
H	2.54REF	
I	0.70	0.95
J	9.25	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60

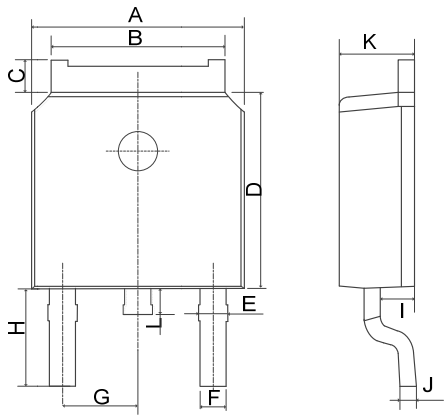
Mechanical Dimensions for TO-251



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	9.00	9.65
I	0.85	1.17
J	0.40	0.61
K	2.10	2.50

Mechanical Dimensions for TO-252



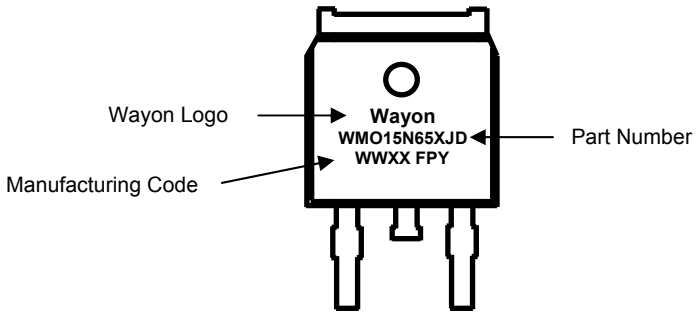
COMMON DIMENSIONS

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

Ordering Information

Part	Package	Marking	Packing method
WML15N65XJD	TO-220F	WML15N65XJD	Tube
WMK15N65XJD	TO-220	WMK15N65XJD	Tube
WMN15N65XJD	TO-262	WMN15N65XJD	Tube
WMM15N65XJD	TO-263	WMM15N65XJD	Tape and Reel
WMO15N65XJD	TO-252	WMO15N65XJD	Tape and Reel
WMP15N65XJD	TO-251	WMP15N65XJD	Tube

Marking Information



Contact Information

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**
For additional information, please contact your local Sales Representative.

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