

900V 2.5Ω Super Junction Power MOSFET

Description

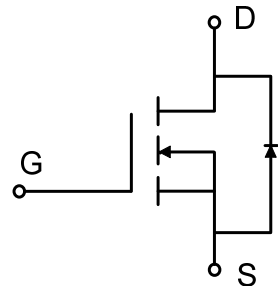
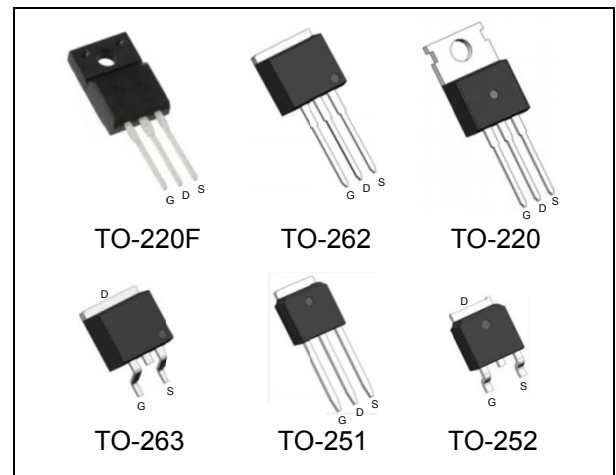
WMOS™ C2 is Wayon's 2nd generation super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS™ C2 is suitable for applications which require superior power density and outstanding efficiency.

Features

- $V_{DS} = 950V @ T_{j,max}$
- Typ. $R_{DS(on)} = 2.5\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

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}	900		V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$)	I_D	4		A
		2.1		A
Pulsed drain current ²⁾	I_{DM}	7		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 ($T_C = 25^\circ C$) - Derate above $25^\circ C$	P_D	45	26	W
		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	4		A
Diode pulse current	$I_{S,pulse}$	7		A

Thermal Characteristics

Parameter	Symbol	WMK/WMM/WMO/WMP/WMN	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 $T_c = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0\text{ V}, I_D=0.25\text{ mA}$	900	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=0.25\text{ mA}$	2.5	3.3	4.5	V
Drain cut-off current	I_{DSS}	$V_{DS}=900\text{ V}, V_{GS}=0\text{ V},$ $T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	-	-	1	μA
Gate leakage current, forward	I_{GSSF}	$V_{GS}=30\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
Gate leakage current, reverse	I_{GSSR}	$V_{GS}=-30\text{ V}, V_{DS}=0\text{ V}$	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=1\text{ A}$ $T_j = 25^\circ\text{C}$	-	2.5	3.1	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{DS}=25\text{ V}, V_{GS}=0\text{ V},$ $f = 1\text{ MHz}$	-	360	-	pF
Output capacitance	C_{oss}		-	28	-	
Reverse transfer capacitance	C_{rss}		-	1.3	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300\text{ V}, I_D=1.5\text{ A}$ $R_G=25\Omega, V_{GS}=10\text{ V}$	-	20	-	ns
Rise time	t_r		-	13	-	
Turn-off delay time	$t_{d(off)}$		-	39	-	
Fall time	t_f		-	11	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	$V_{DD}=480\text{ V}, I_D=1.5\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	1.9	-	nC
Gate to drain charge	Q_{gd}		-	6.6	-	
Gate charge total	Q_g		-	11.2	-	
Gate plateau voltage	$V_{plateau}$		-	5.3	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=1\text{ A}$	-	-	1.2	V
Reverse recovery time	t_{rr}	$V_R=50\text{ V}, I_F=1.5\text{ A},$ $dI_F/dt=100\text{ A}/\mu\text{s}$	-	210	-	ns
Reverse recovery charge	Q_{rr}		-	0.94	-	μC
Peak reverse recovery current	I_{rrm}		-	8.2	-	A

Notes:

- Limited by $T_{j\text{max}}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $I_{AS} = 0.9\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\Omega$, starting $T_j = 25^\circ\text{C}$.

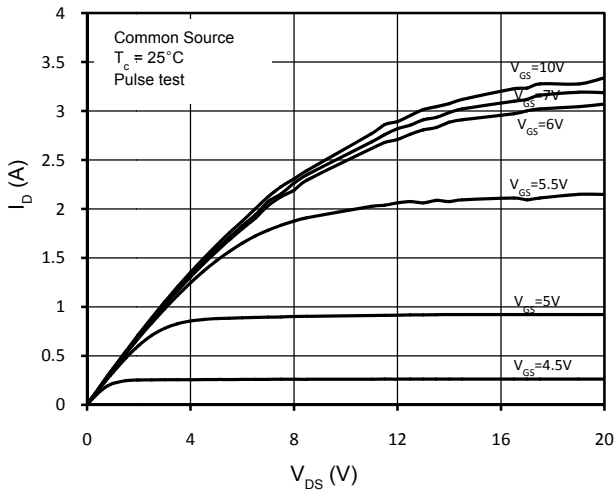


Figure 1. On-Region Characteristics

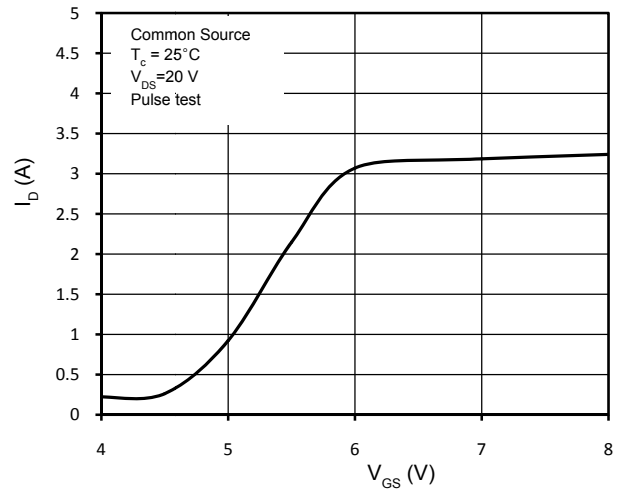


Figure 2. Transfer Characteristics

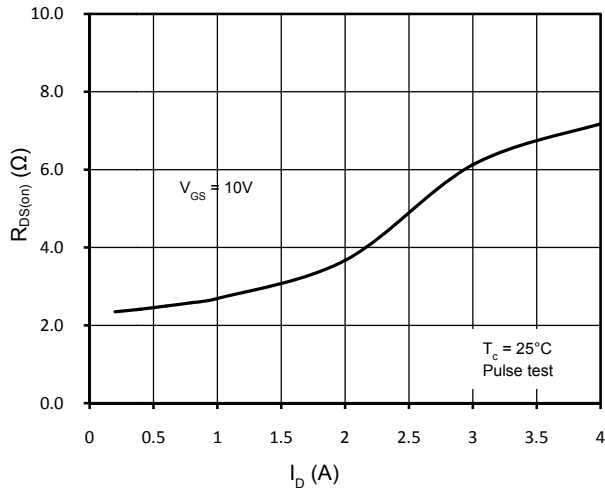


Figure 3. Static Drain-Source On Resistance

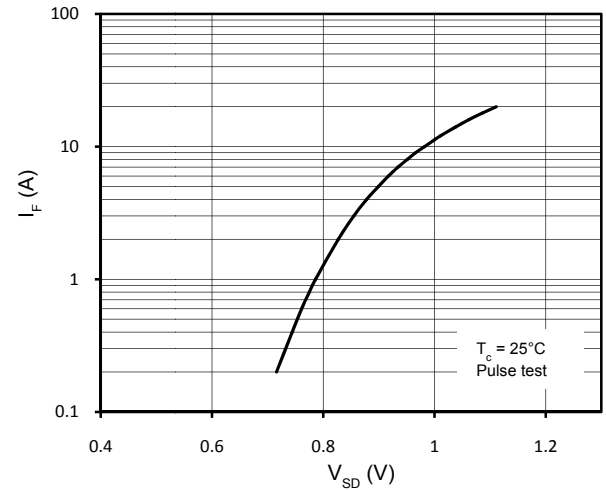


Figure 4. Body-Diode Forward Characteristics

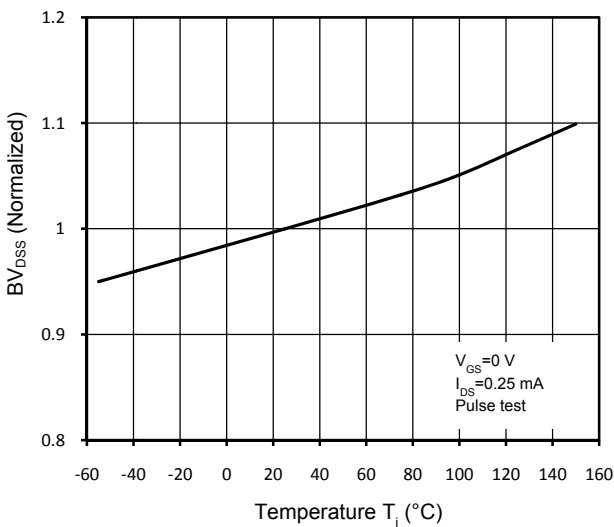


Figure 5. Normalized $BV_{DS(s)}$ vs. Temperature

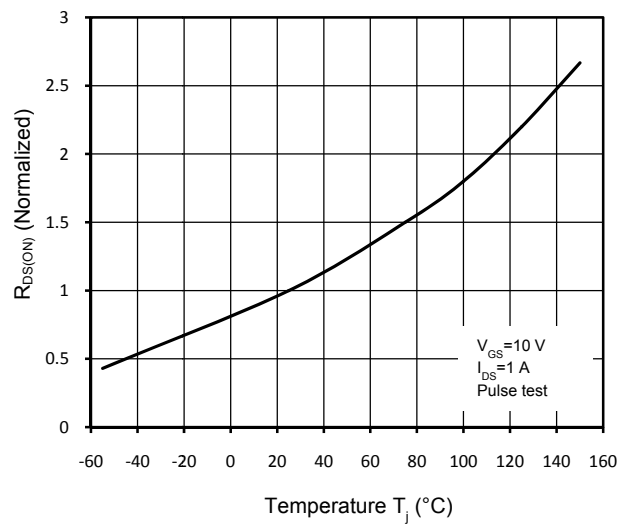


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

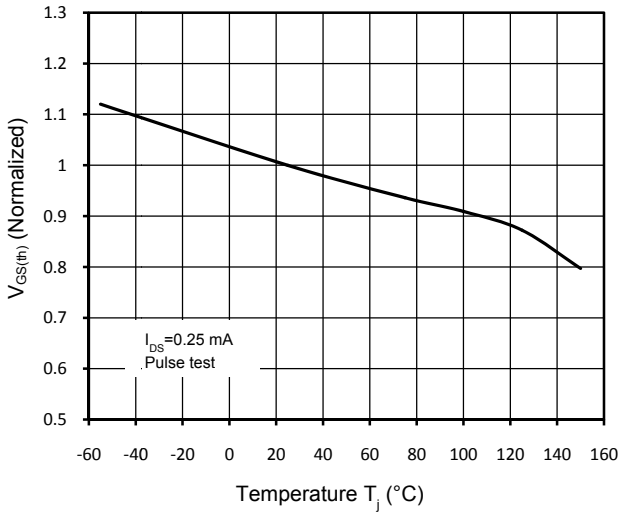


Figure 7. Threshold Voltage vs. Temperature

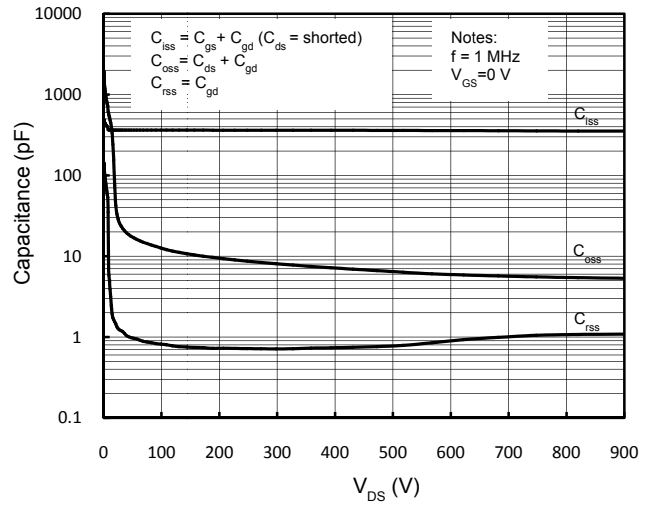


Figure 8. Capacitance Characteristics

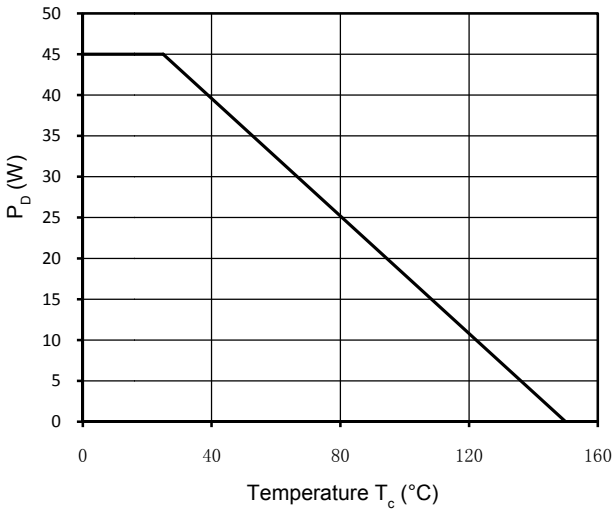


Figure 9. Power Dissipation

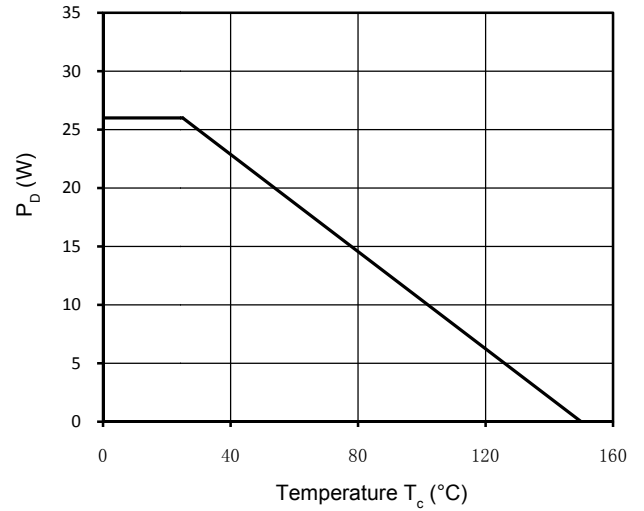


Figure 10. Power Dissipation (TO-220F)

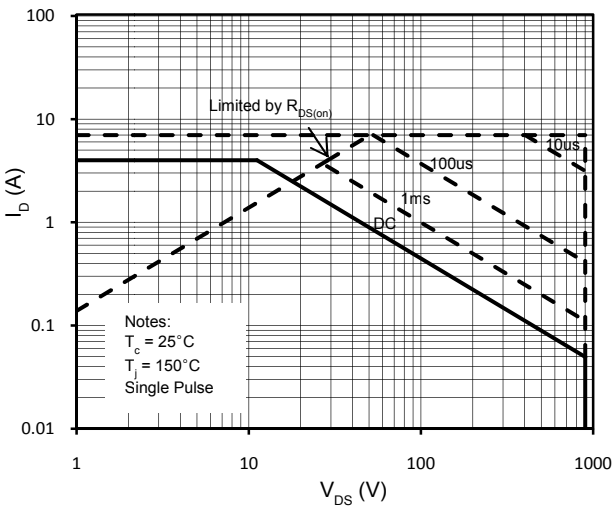


Figure 11. Maximum Safe Operating Area

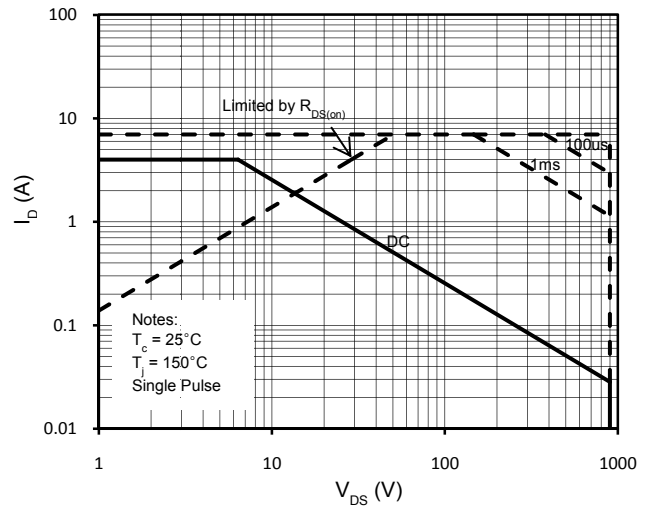


Figure 12. Maximum Safe Operating Area (TO-220F)

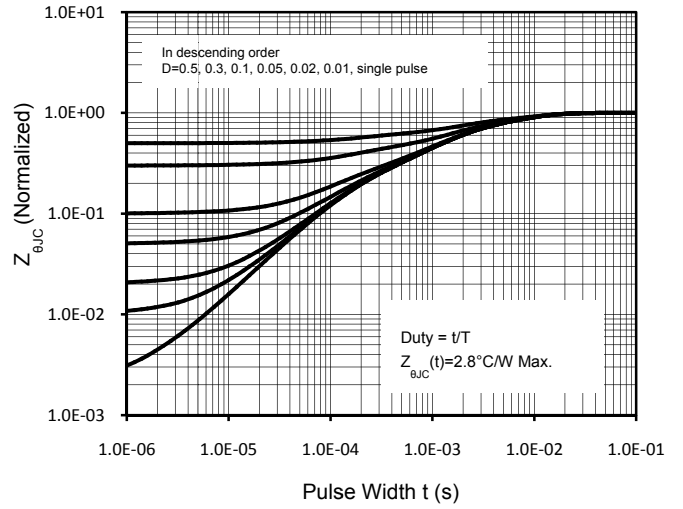
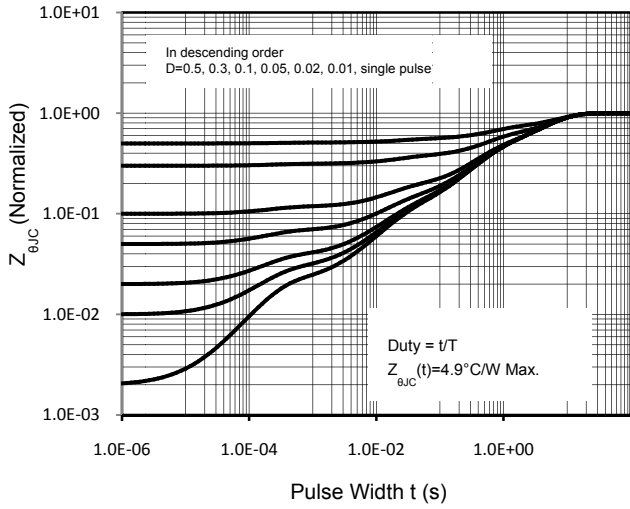


Figure 13. Transient Thermal Response Curve (TO-220F) Figure 14. Transient Thermal Response Curve

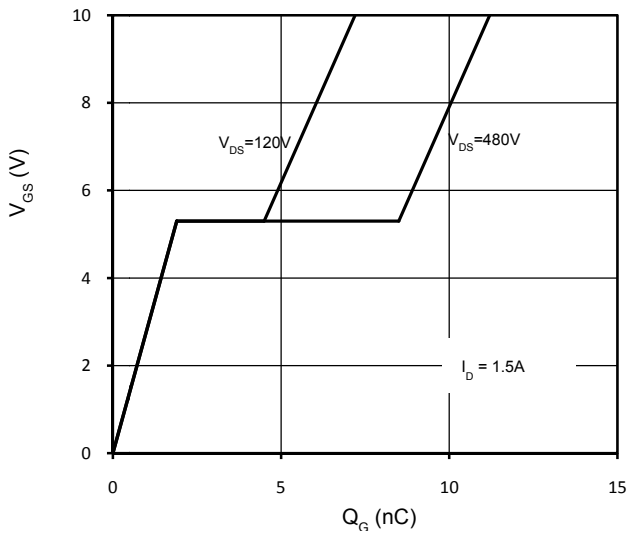
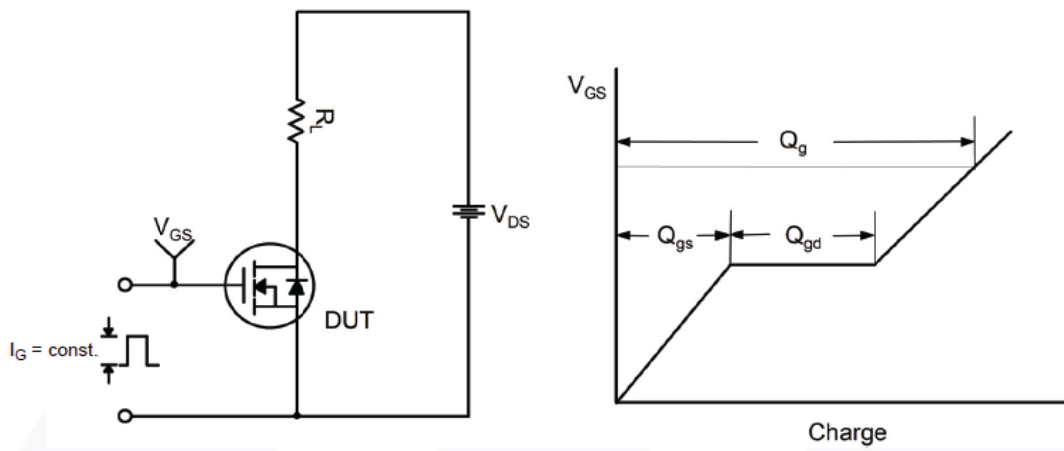
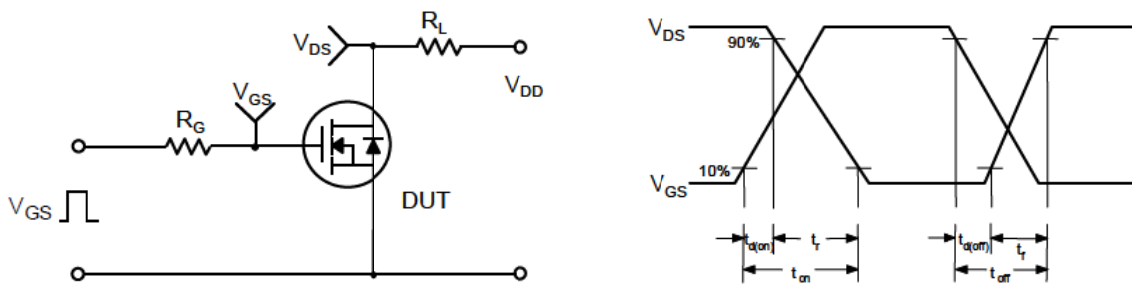


Figure 15. Gate Charge Characteristics

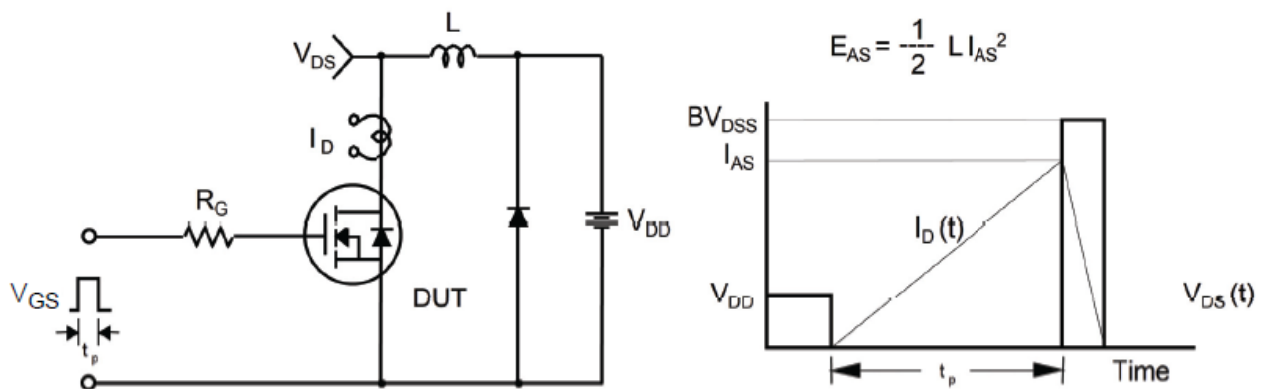
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveforms

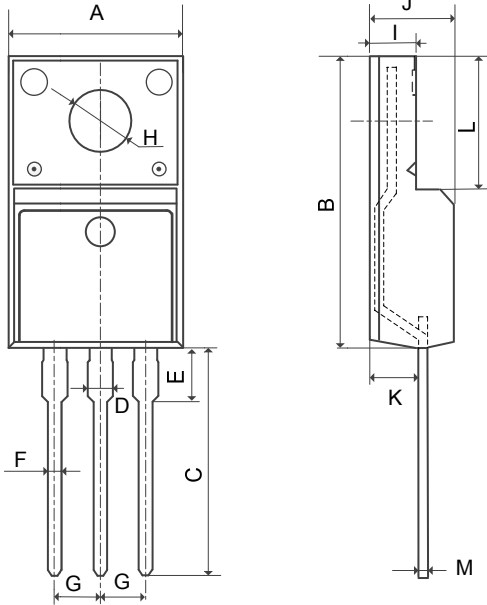


Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for TO-220F

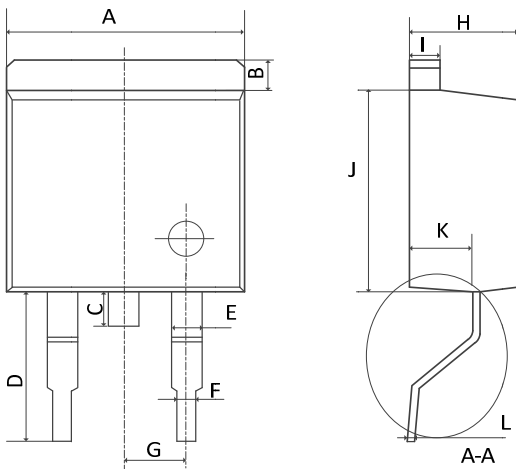
COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	9.96	10.36
B	15.67	16.07
C	12.70	13.30
D	1.12	1.32
E	1.85	2.15
F	0.59	0.79
G	2.39	2.69
H	3.08	3.29
I	2.34	2.74
J	4.50	4.90
K	2.61	2.91
L	6.50	6.90
M	0.40	0.60

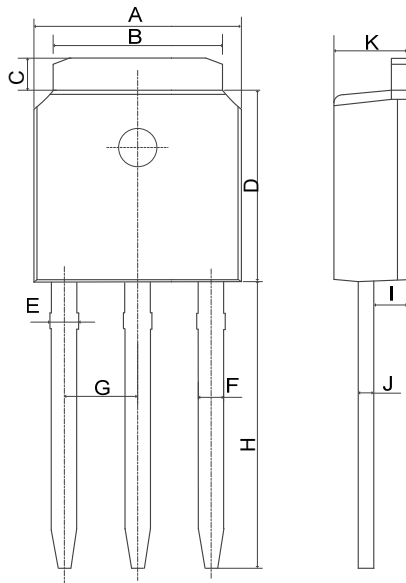
Mechanical Dimensions for TO-263

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	0.92
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

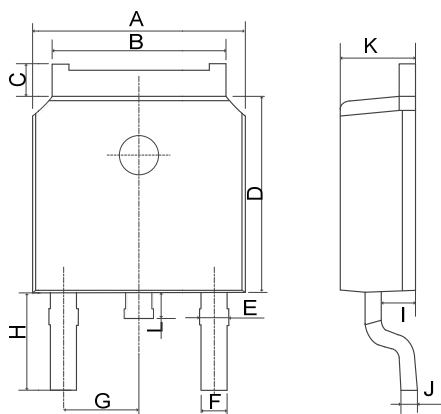
Mechanical Dimensions for TO-251



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

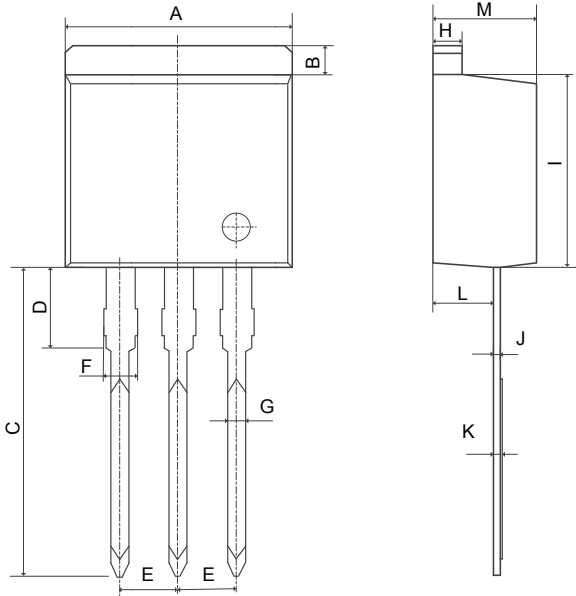
Mechanical Dimensions for TO-252



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

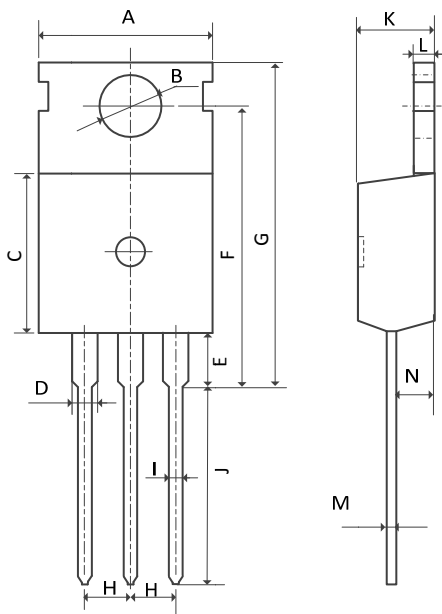
Mechanical Dimensions for TO-262



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



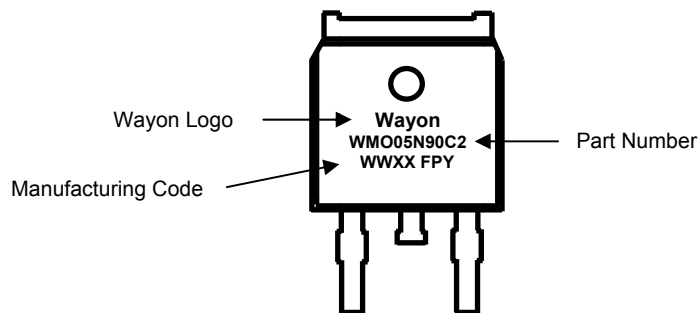
COMMON DIMENSIONS

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
WML05N90C2	TO-220F	WML05N90C2	Tube
WMK05N90C2	TO-220	WMK05N90C2	Tube
WMN05N90C2	TO-262	WMN05N90C2	Tube
WMM05N90C2	TO-263	WMM05N90C2	Tape and Reel
WMO05N90C2	TO-252	WMO05N90C2	Tape and Reel
WMP05N90C2	TO-251	WMP05N90C2	Tube

Marking Information



Contact Information

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

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