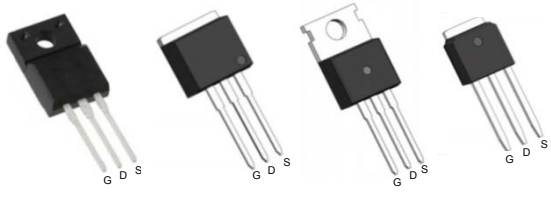
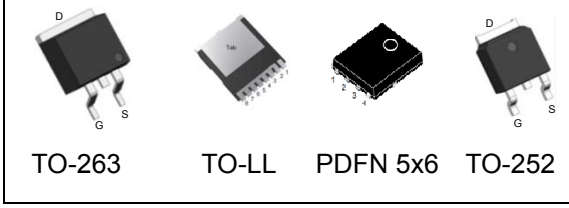
N-channel 250V 83mΩ Power MOSFET

Description

WMOS™ JN is suitable for applications which require superior power density and outstanding efficiency.

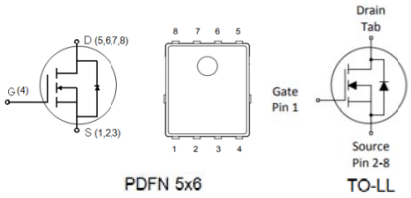




Features

- Gate charge minimized
- Typ. $R_{DS(on)}$ =83mΩ
- 100% UIS tested
- Pb-free plating, Halogen free

RoHS compliant



Applications

Switching applications

Absolute Maximum Ratings

Parameter	Symbol	WMx30N25JN	WML30N25JN	Unit
Drain-source voltage	V_{DSS}	250		V
Continuous drain current[1] (T_C = 25°C)	I_D	23		A
(T_C = 100°C)		12		A
Pulsed drain current[2]	I_{DM}	63		A
Gate-source voltage	V_{GS}	±20		V
Avalanche energy, single pulse[3]	E_{AS}	90		mJ
Avalanche energy, repetitive[2]	E_{AR}	0.15		mJ
Avalanche current, repetitive[2]	I_{AR}	2		A
Power dissipation (T_C = 25°C)	P_D	59	27	W
- Derate above 25°C		0.47	0.22	W/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to +150		°C
Continuous diode forward current	I_S	23		A
Diode pulse current	$I_{S,pulse}$	63		A

Thermal Characteristics

Parameter	Symbol	WMx30N25JN	WML30N25JN	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	2.1	4.5	°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	250	-	-	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}=250 V, V_{GS}=0V,				μA
		T_j = 25°C	-	-	1	
		T_j = 125°C	-	30	-	
Gate leakage current, forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V	-	-	500	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=5A	-			
		T_j = 25°C	-	83	99	mΩ
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}= 100V, V_{GS}= 0V,	-	572	-	pF
Output capacitance	C_{oss}	f = 1 MHz	-	19	-	
Reverse transfer capacitance	C_{rss}		-	2.8	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 100V, I_D = 20A	-	5	-	ns
Rise time	t_r	R_G = 4.7Ω, V_{GS}=10V	-	6	-	
Turn-off delay time	$t_{d(off)}$		-	16	-	
Fall time	t_f		-	3	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=160V, I_D=20A,	-	4.2	-	nC
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10V	-	2.1	-	
Gate charge total	Q_g		-	9.8	-	
Gate plateau voltage	$V_{plateau}$		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=10A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=50V, I_F=20A,	-	133	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100A/μs	-	0.6	-	μC
Peak reverse recovery current	I_{rrm}		-	9.5	-	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} = 2A, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C.

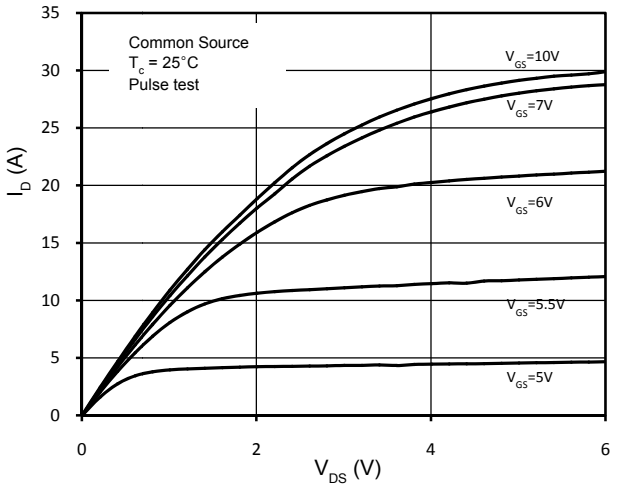


Figure 1.On-Region Characteristics

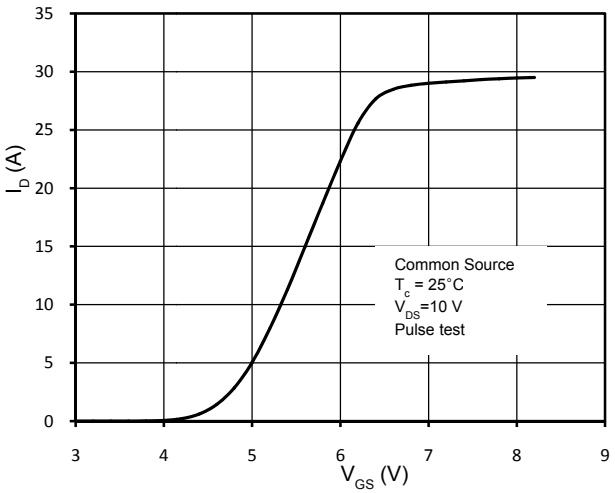


Figure 2. Transfer Characteristics

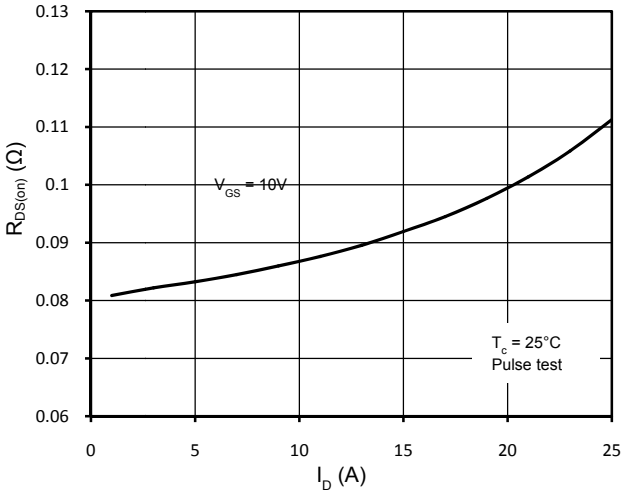


Figure 3. Static Drain-Source On Resistance

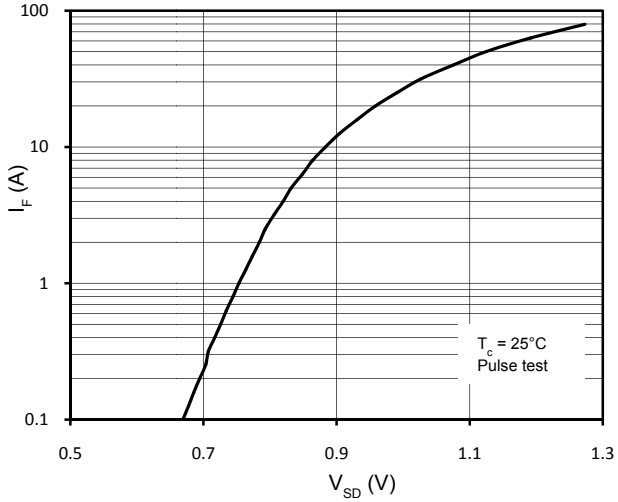


Figure 4. Body- Diode Forward Characteristics

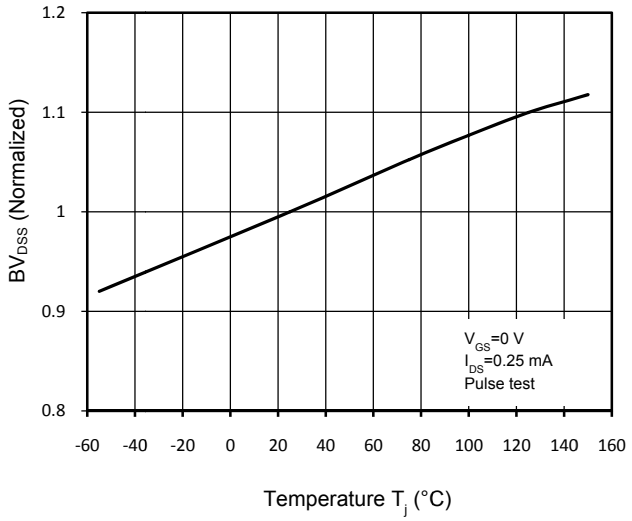


Figure 5. Normalized BV_{DSS} vs. Temperature

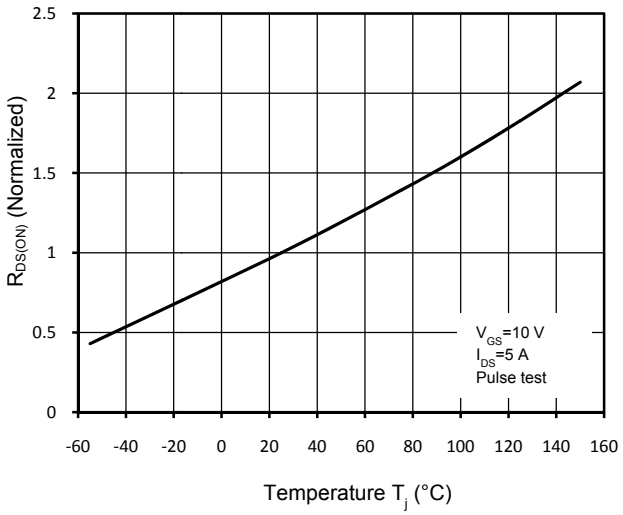


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

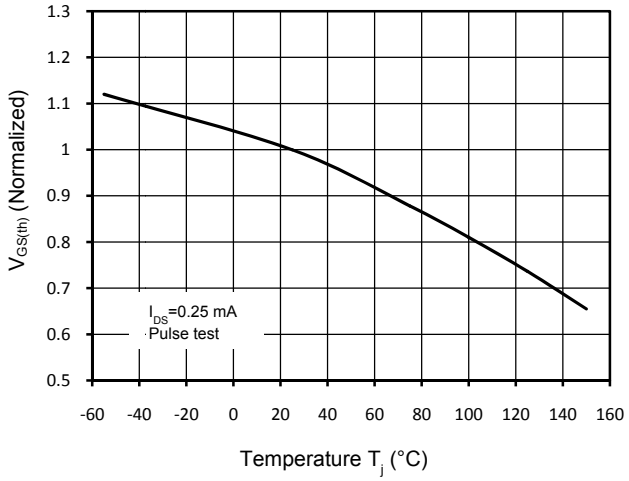


Figure 7. Threshold Voltage vs. Temperature

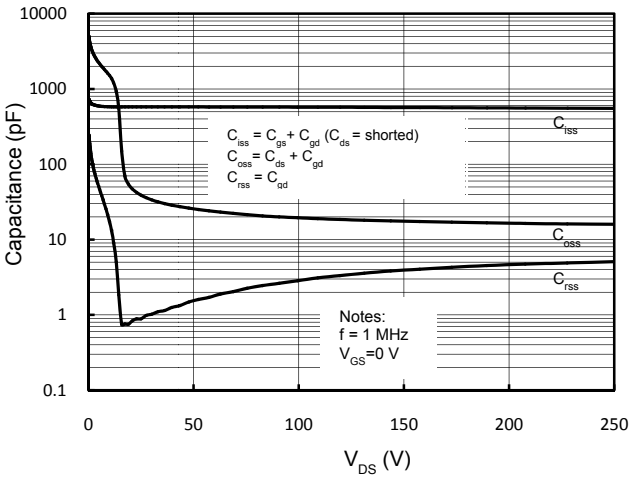


Figure 8. Capacitance Characteristics

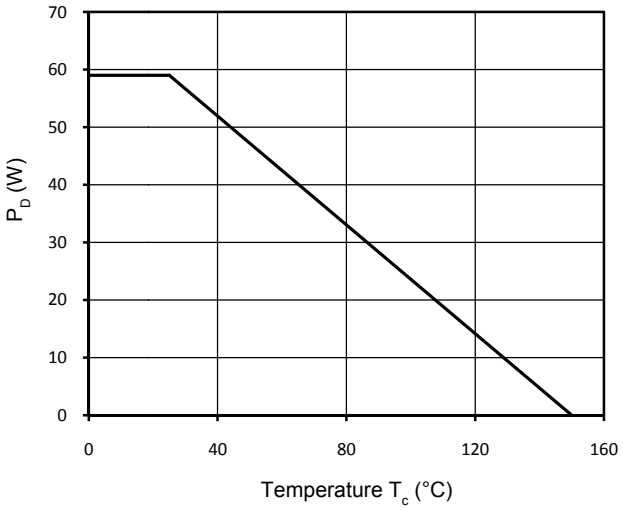


Figure 9. Power Dissipation

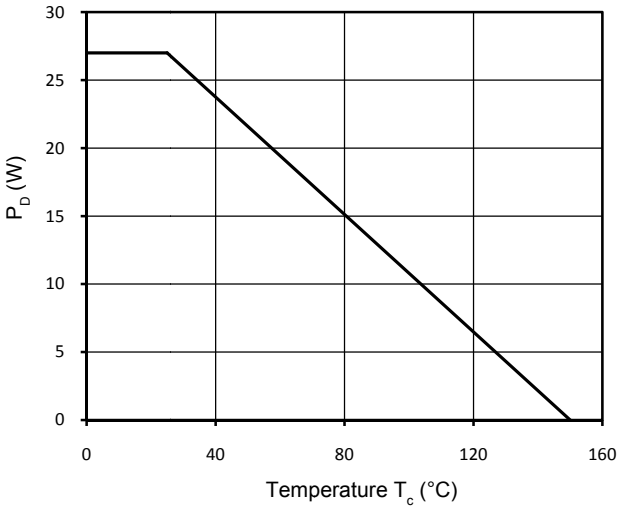


Figure 10. Power Dissipation (TO-220F)

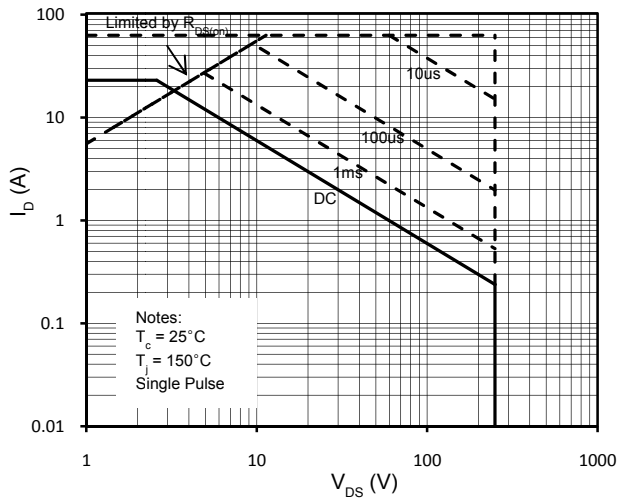


Figure 11. Maximum Safe Operating Area

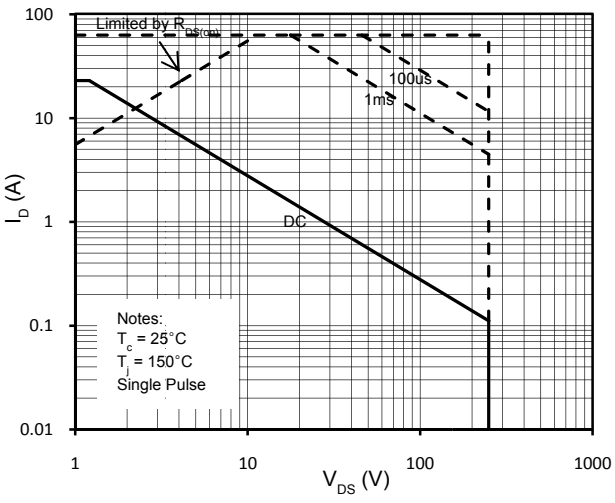


Figure 12. Maximum Safe Operating Area(TO-220F)

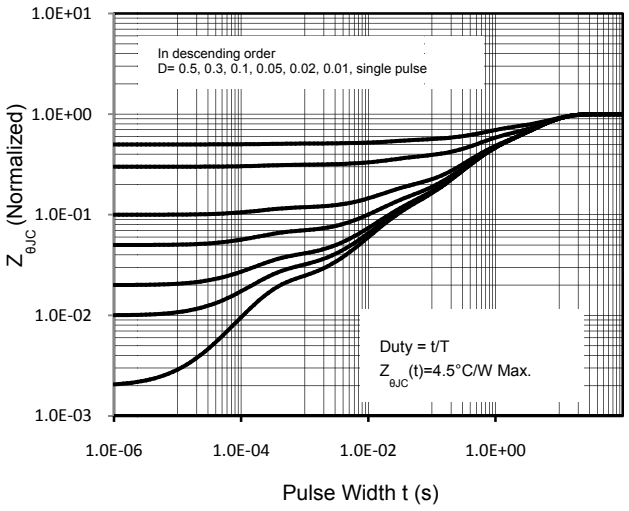


Figure 13. Transient Thermal Response Curve (TO-220F)

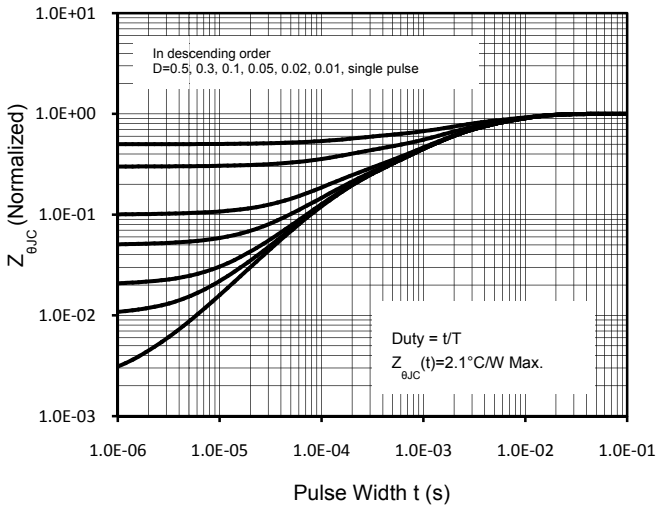


Figure 14. Transient Thermal Response Curve

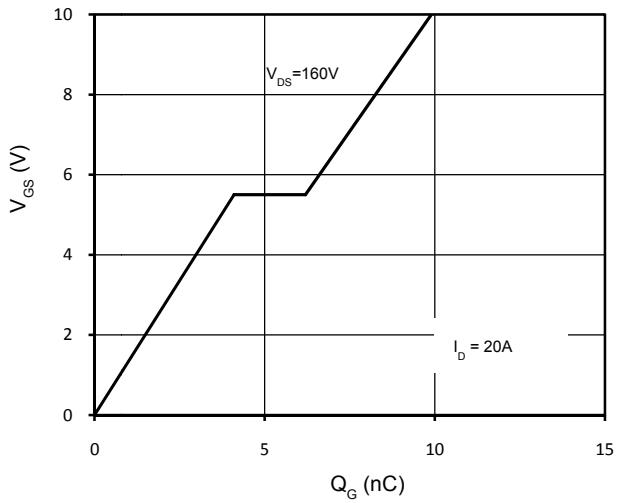
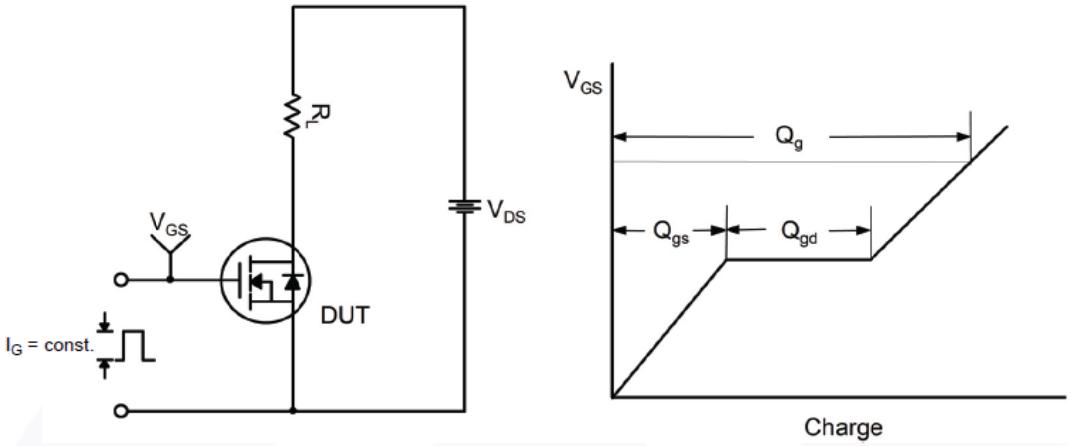
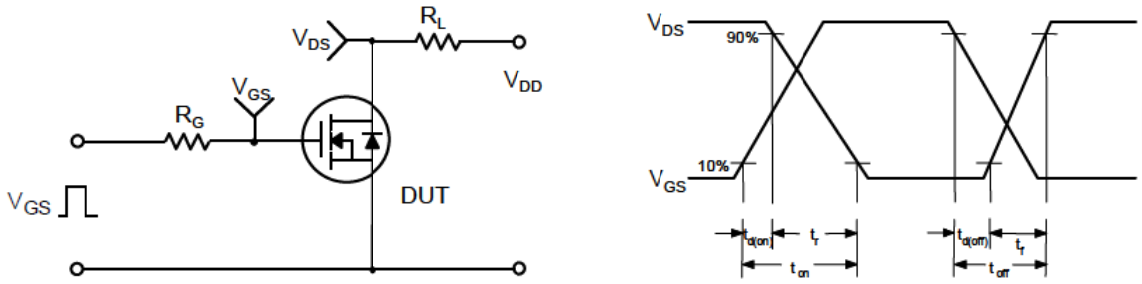


Figure 15. Gate Charge Characteristics

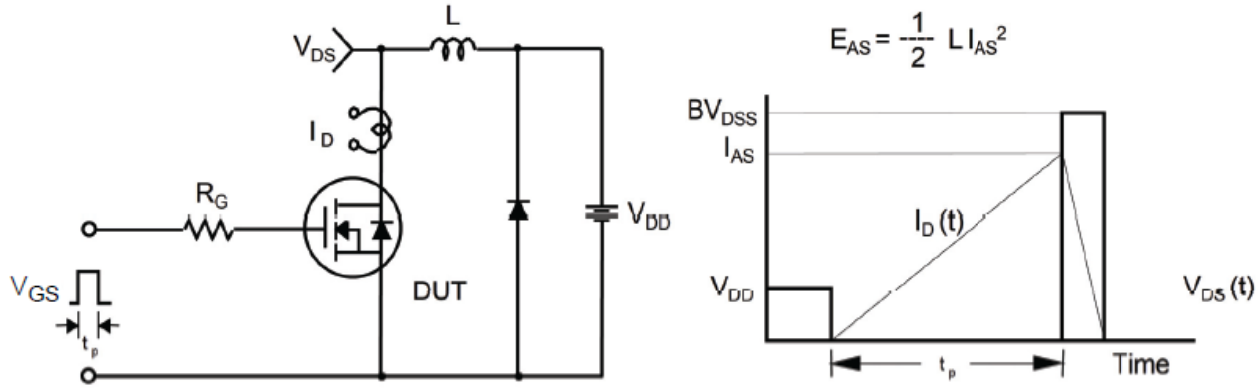
Gate Charge Test Circuit & Waveform



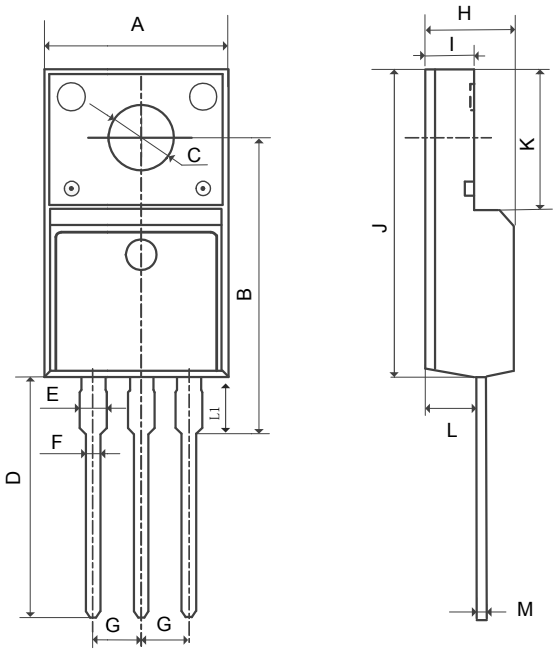
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



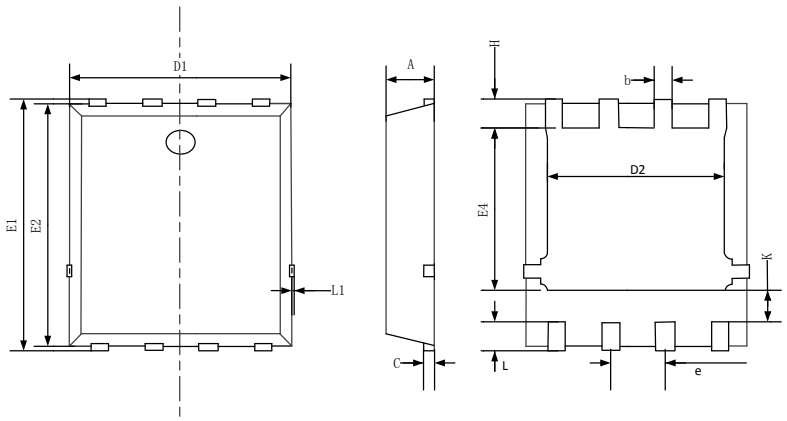
Mechanical Dimensions for TO-220F



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

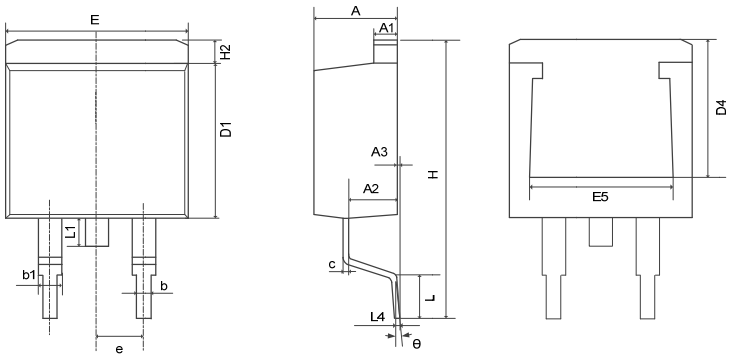
Mechanical Dimensions for PDFN 5x6



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	1.0	1.2
b	0.3	0.5
C	0.15	0.35
D1	5.0	5.4
D2	3.8	4.3
E1	5.95	6.35
E2	5.66	6.06
E4	3.52	3.92
e	1.17	1.37
H	0.4	0.6
K	1.15	1.6
L	0.3	0.7
L1		0.12

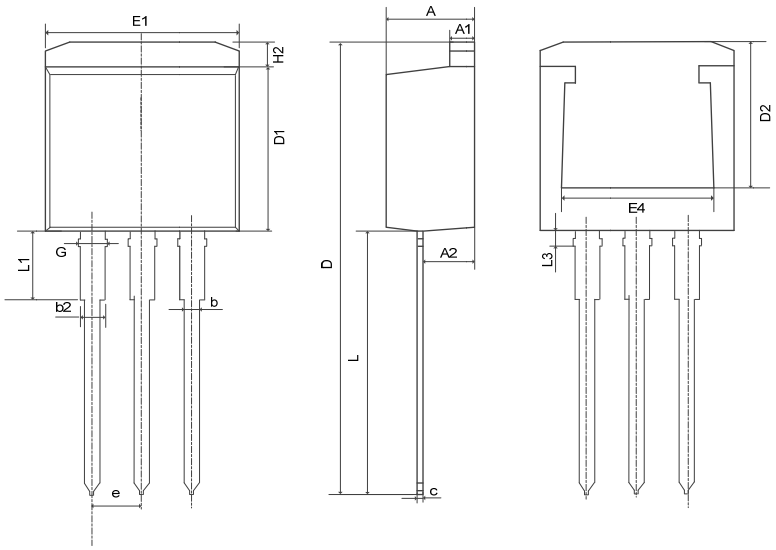
Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.19	2.89
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°

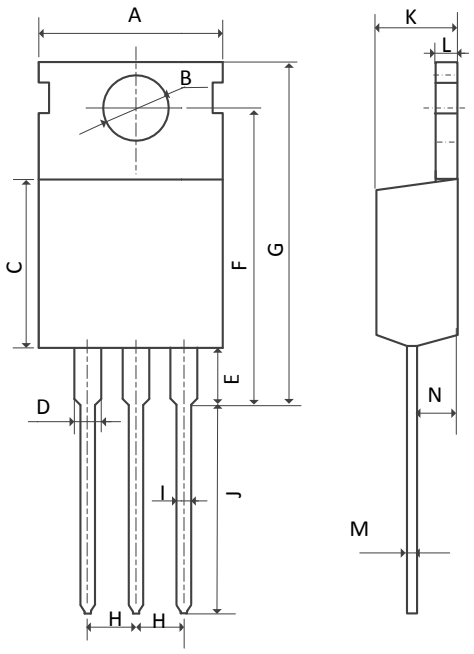
Mechanical Dimensions for TO-262



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.90
A1	1.17	1.42
A2	2.49	2.89
b	0.71	0.96
b2	1.07	1.47
c	0.28	0.53
D	23.20	24.02
D1	8.45	8.90
D2	6.00	—
E1	9.86	10.40
E4	7.06	—
e	2.54BSC	
G	1.25	1.50
H2	—	1.50
L	13.33	14.16
L1	3.50	4.00
L3	1.28	1.58

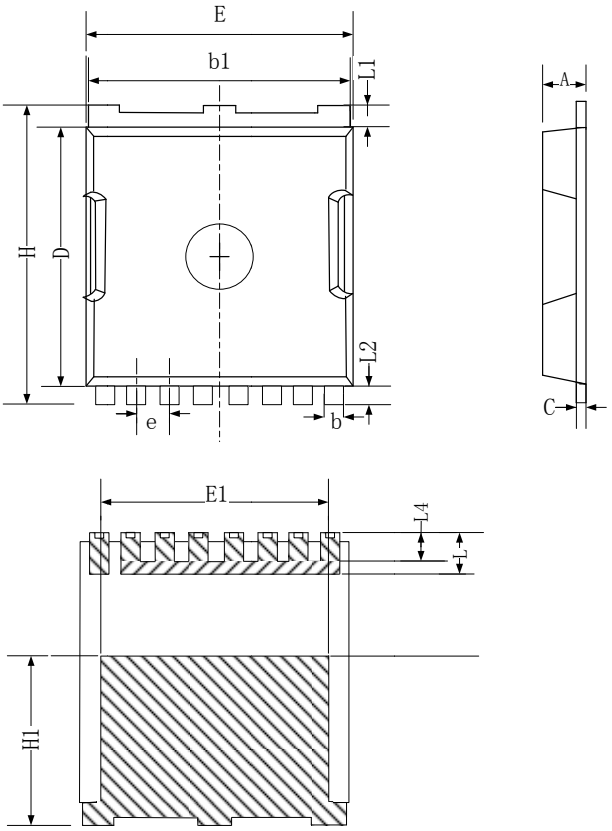
Mechanical Dimensions for TO-220



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

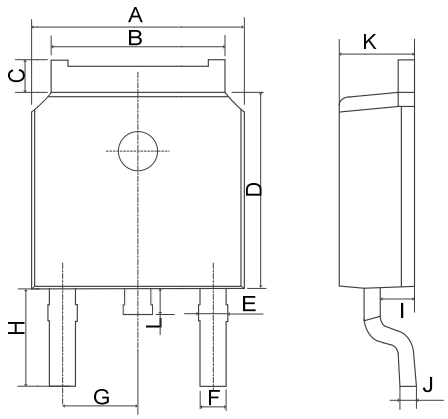
Mechanical Dimensions for TO-LL



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	2.15	2.45
b	0.7	0.95
b1	9.6	9.95
C	0.4	0.6
D	10.1	10.6
E	9.6	10.1
E1	7.9	8.5
e	1.20BSC	
H	11.38	11.88
H1	6.65	7.2
L	1.4	2
L1	0.5	0.9
L2	0.48	0.72
L4	1	1.3

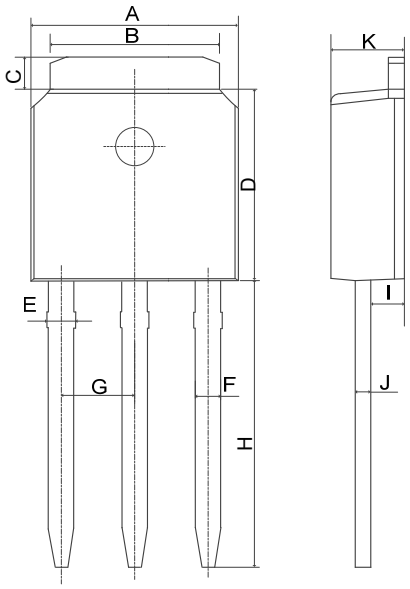
Mechanical Dimensions for TO-252



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-251



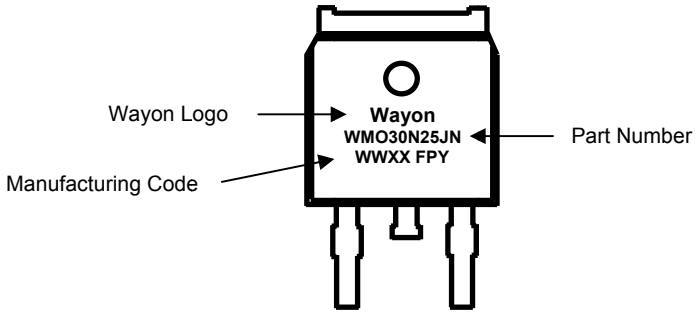
COMMON DIMENSIONS

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

Ordering Information

Part	Package	Marking	Packing method
WML30N25JN	TO-220F	WML30N25JN	Tube
WMK30N25JN	TO-220	WMK30N25JN	Tube
WMN30N25JN	TO-262	WMN30N25JN	Tube
WMM30N25JN	TO-263	WMM30N25JN	Tape and Reel
WMO30N25JN	TO-252	WMO30N25JN	Tape and Reel
WMLL30N25JN	TO-LL	WMLL30N25JN	Tape and Reel
WMB30N25JN	PDFN 5x6	WMB30N25JN	Tape and Reel
WMP30N25JN	TO-251	WMP30N25JN	Tube

Marking Information



Contact Information

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For additional information, please contact your local Sales Representative.

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