

N-channel 250V 36mΩ Power MOSFET

Description

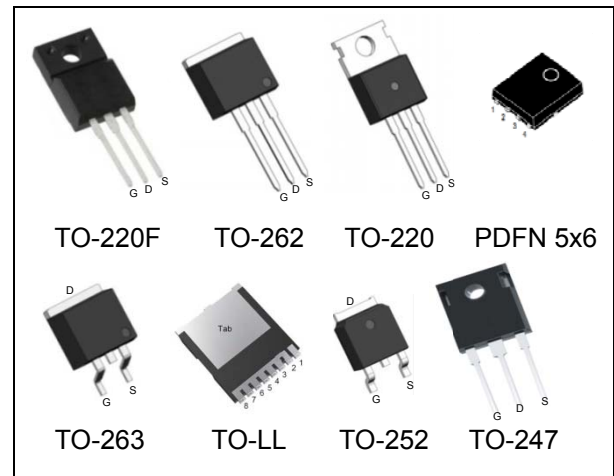
WMOS™ JN is suitable for applications which require superior power density and outstanding efficiency.

Features

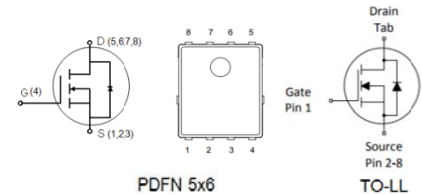
- Gate charge minimized
- Typ. $R_{DS(on)} = 36m\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

Switching applications



RoHS
compliant



Absolute Maximum Ratings

Parameter	Symbol	WMx75N25JN	WML75N25JN	Unit
Drain-source voltage	V_{DS}	250		V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$)	I_D	35		A
($T_C = 100^\circ C$)		21		A
Pulsed drain current ²⁾	I_{DM}	105		A
Gate-source voltage	V_{GS}	± 20		V
Avalanche energy, single pulse ³⁾	E_{AS}	110		mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.1		mJ
Avalanche current, repetitive ²⁾	I_{AR}	2		A
Power dissipation ($T_C = 25^\circ C$)	P_D	90	31	W
- Derate above $25^\circ C$		0.72	0.25	W/°C
Operating and storage temperature range	T_i, T_{stg}	-55 to +150		°C
Continuous diode forward current	I_S	35		A
Diode pulse current	$I_{S,pulse}$	105		A

Thermal Characteristics

Parameter	Symbol	WMx75N25JN	WML75N25JN	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	1.38	4	°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 V, I _D =1 mA	250	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =0.25mA	2.2	3.2	4.2	V
Drain cut-off current	I _{DSS}	V _{DS} =250 V, V _{GS} =0V, T _J = 25°C T _J = 125°C	- -	- 30	1 -	μA
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 =20A T _J = 25°C	- -	 36	 43	 mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1 MHz	-	1560	-	pF
Output capacitance	C _{oss}		-	45	-	
Reverse transfer capacitance	C _{rss}		-	7	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 100V, I _D = 30A R _G = 4.7Ω, V _{GS} =10V	-	8	-	ns
Rise time	t _r		-	6	-	
Turn-off delay time	t _{d(off)}		-	31	-	
Fall time	t _f		-	4	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =160V, I _D =30A, V _{GS} =0 to 10V	-	10	-	nC
Gate to drain charge	Q _{gd}		-	6.5	-	
Gate charge total	Q _g		-	28	-	
Gate plateau voltage	V _{plateau}		-	5.7	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =30A	-	-	1.2	V
Reverse recovery time	t _{rr}	V _R =50V, I _F =30A, dI _F /dt=100A/μs	-	170	-	ns
Reverse recovery charge	Q _{rr}		-	0.9	-	μC
Peak reverse recovery current	I _{rrm}		-	10.5	-	A

Notes:

- Limited by $T_{j\max}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $I_{AS} = 2\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega$, starting $T_j = 25^\circ\text{C}$.

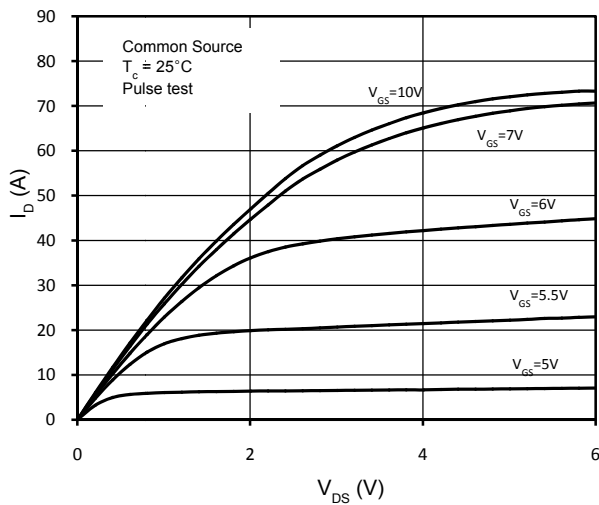


Figure 1. On-Region Characteristics

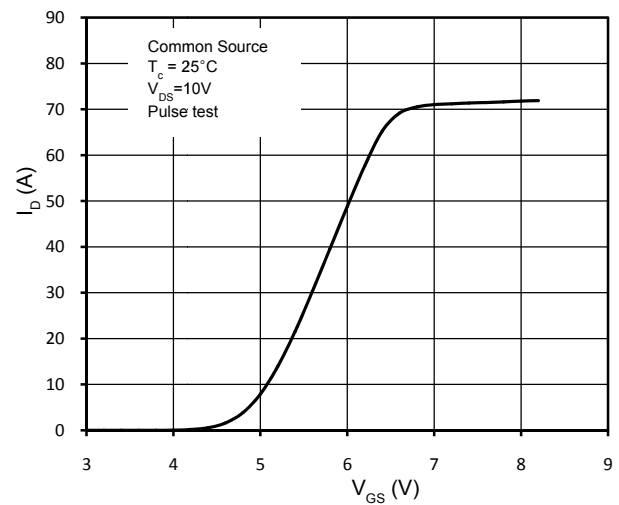


Figure 2. Transfer Characteristics

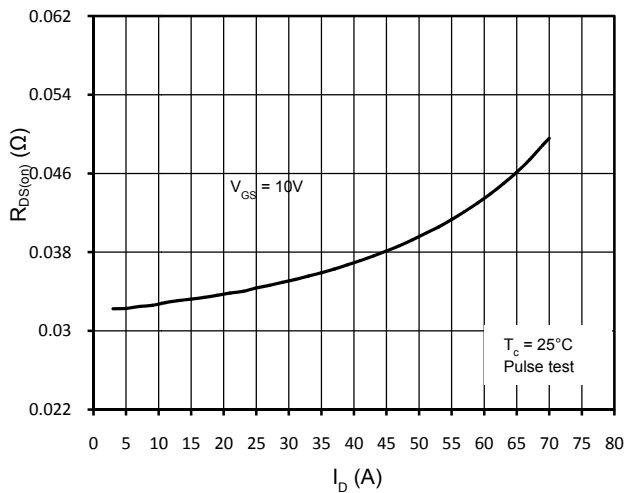


Figure 3. Static Drain-Source On Resistance

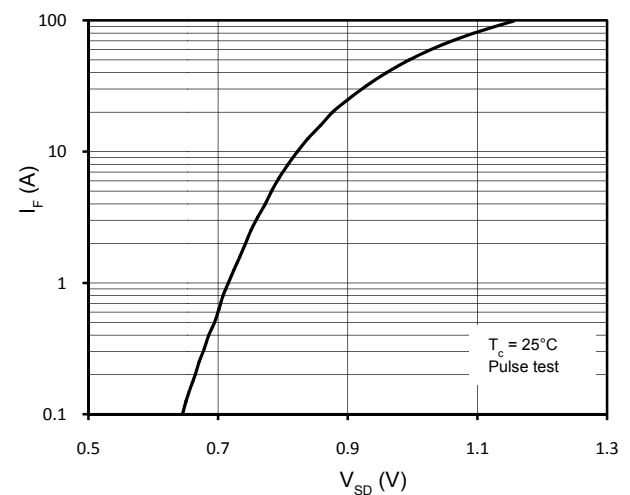
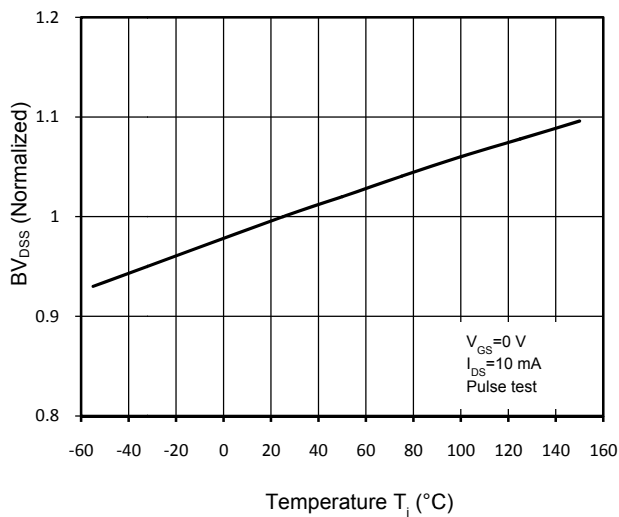
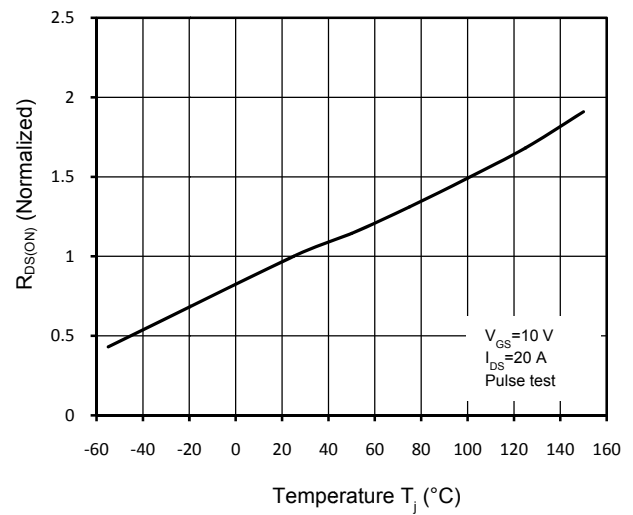


Figure 4. Body-Diode Forward Characteristics

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

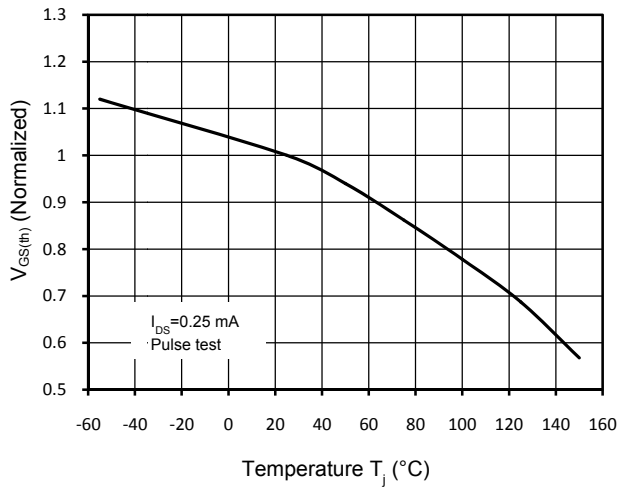


Figure 7. Threshold Voltage vs. Temperature

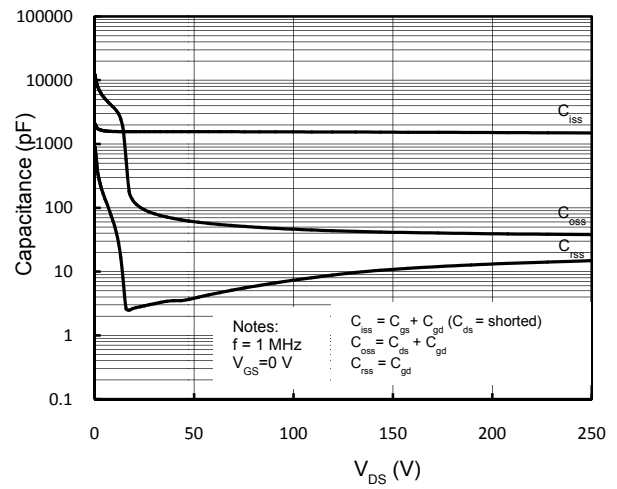


Figure 8. Capacitance Characteristics

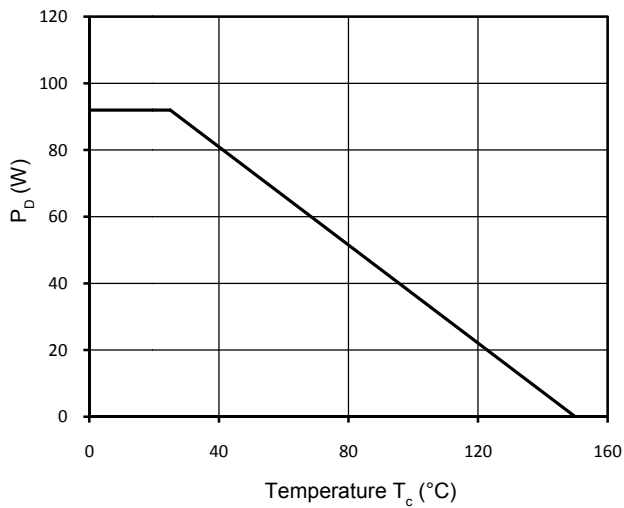


Figure 9. Power Dissipation

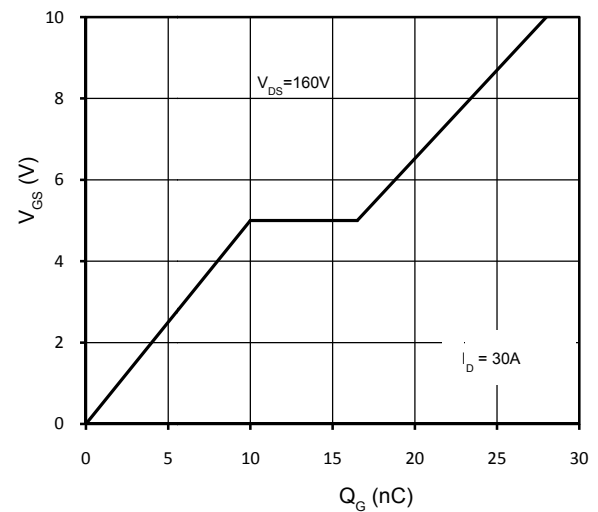


Figure 10. Gate Charge Characteristics

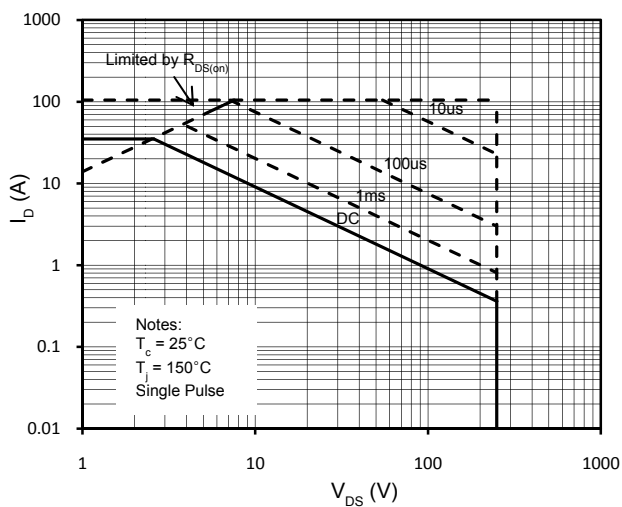


Figure 11. Maximum Safe Operating Area

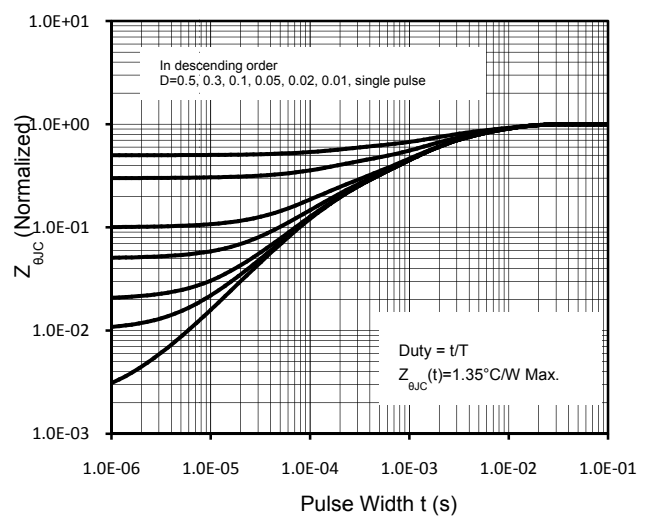


Figure 12. Transient Thermal Response Curve

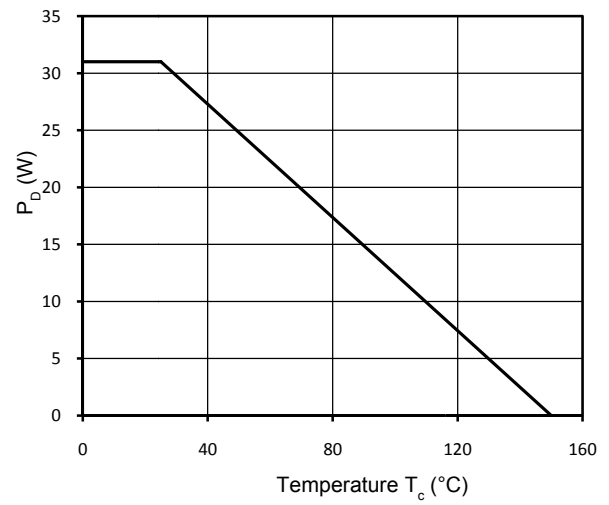
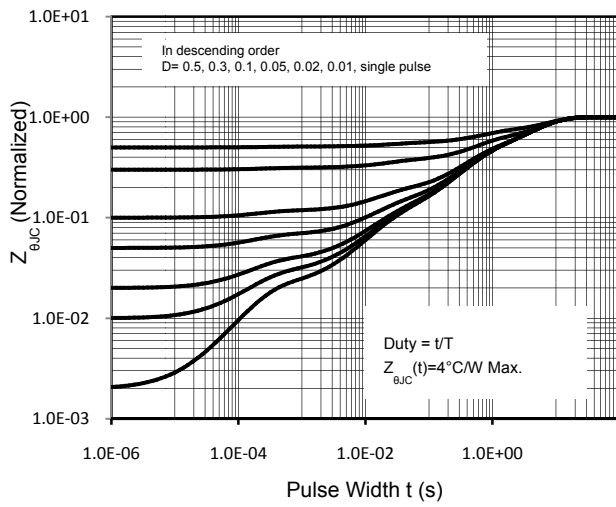


Figure 13. Transient Thermal Response Curve (TO-220F) Figure 14. Power Dissipation (TO-220F)

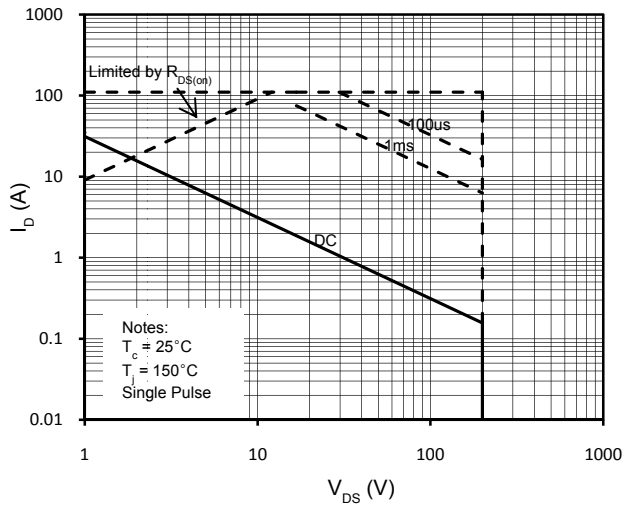
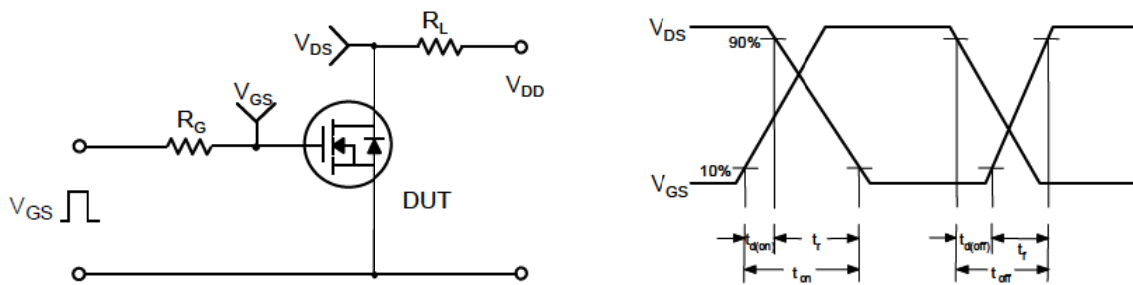


Figure 15. Maximum Safe Operating Area (TO-220F)

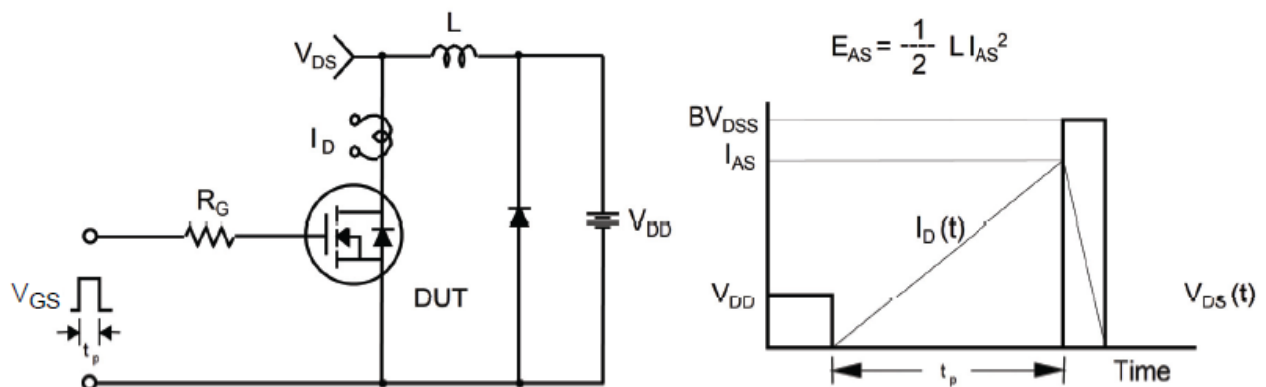
Gate Charge Test Circuit & Waveform



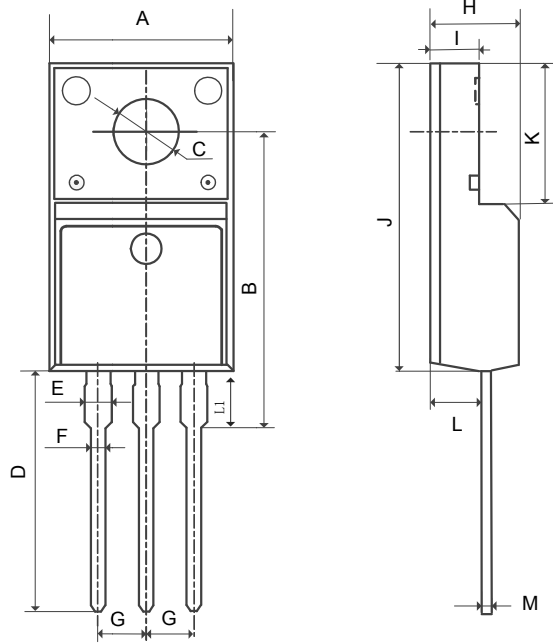
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for TO-220F

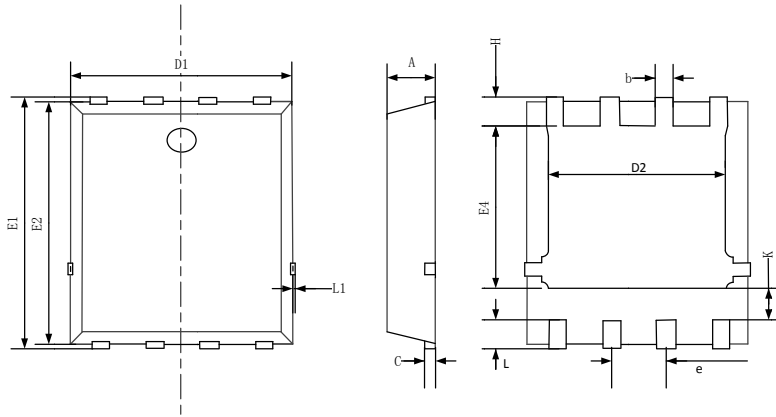


COMMON DIMENSIONS

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

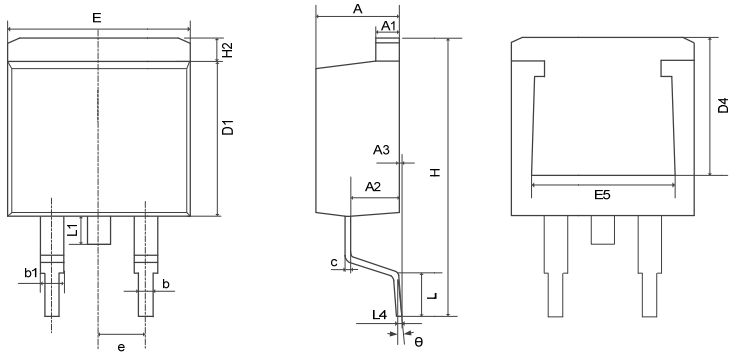
COMMON DIMENSIONS



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

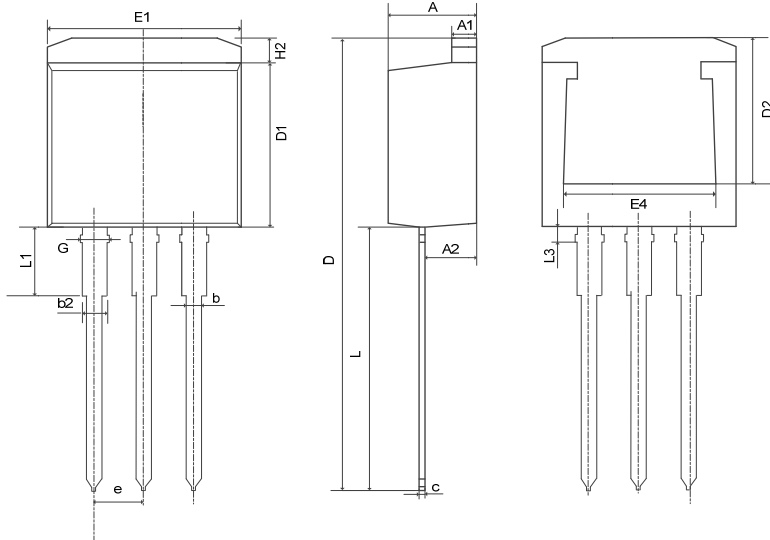
COMMON DIMENSIONS



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

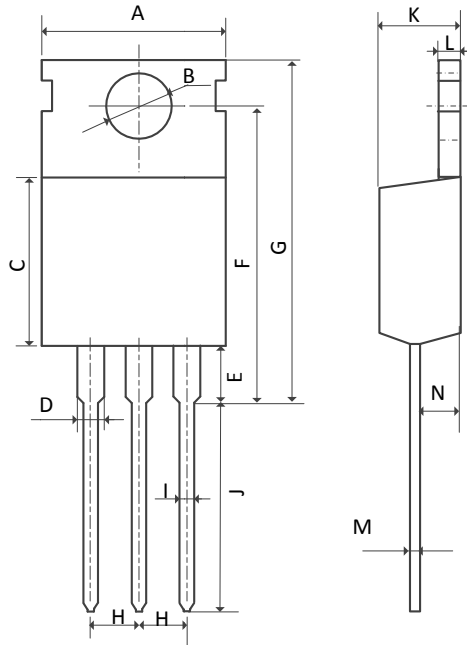
COMMON DIMENSIONS



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

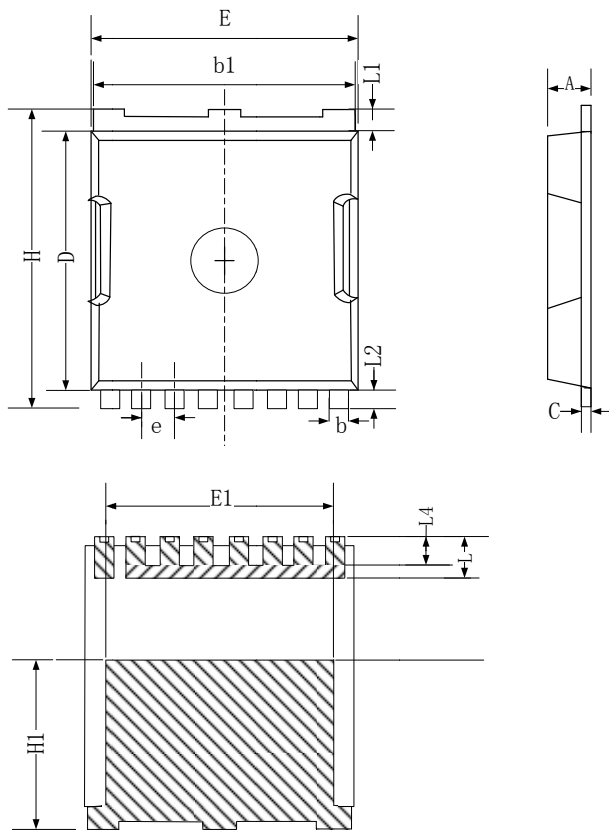
Mechanical Dimensions for TO-220

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

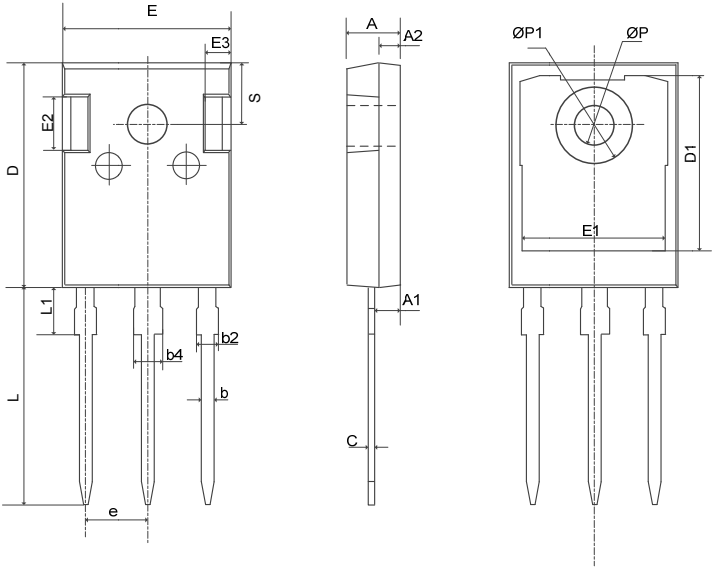


COMMON DIMENSIONS

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

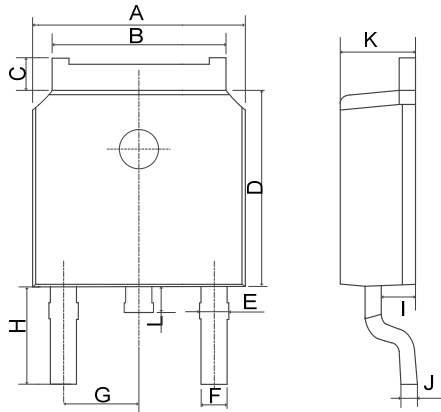
Mechanical Dimensions for TO-247

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	4.80	5.21
A1	2.21	2.61
A2	1.85	2.16
b	1.07	1.36
b2	1.91	2.41
b4	2.87	3.38
c	0.51	0.75
D	20.70	21.30
D1	16.25	17.65
E	15.50	16.13
E1	12.38	13.60
E2	3.68	5.20
E3	1.00	2.70
e	5.44BSC	
L	19.62	20.32
L1	—	4.40
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	

Mechanical Dimensions for TO-252



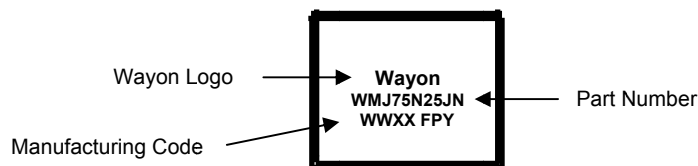
COMMON DIMENSIONS

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
WML75N25JN	TO-220F	WML75N25JN	Tube
WMB75N25JN	PDFN 5x6	WMB75N25JN	Tape and Reel
WMO75N25JN	TO-252	WMO75N25JN	Tape and Reel
WMK75N25JN	TO-220	WMK75N25JN	Tube
WMN75N25JN	TO-262	WMN75N25JN	Tube
WMM75N25JN	TO-263	WMM75N25JN	Tape and Reel
WMLL75N25JN	TO-LL	WMLL75N25JN	Tape and Reel
WMJ75N25JN	TO-247	WMJ75N25JN	Tube

Marking Information



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

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