

N-channel 200V 12mΩ Power MOSFET

Description

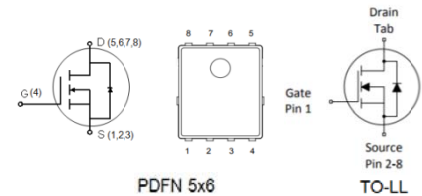
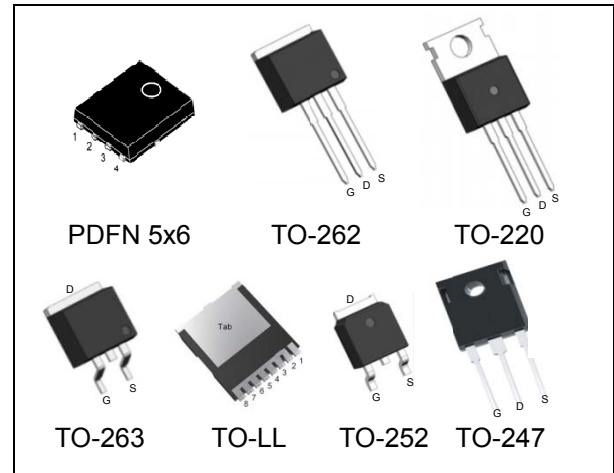
WMOSTM JNM is suitable for applications which require superior power density and outstanding efficiency.

Features

- Gate charge minimized
- Typ. $R_{DS(on)} = 12m\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

Switching applications



Absolute Maximum Ratings

Parameter	Symbol	WMK/WMM/WMN/WMJ/WMLL/WMB/WMO	Unit
Drain-source voltage	V_{DS}	200	V
Continuous drain current ¹⁾ ($T_C = 25^\circ C$)	I_D	84	A
($T_C = 100^\circ C$)		50	A
Pulsed drain current ²⁾	I_{DM}	320	A
Gate-source voltage	V_{GS}	± 20	V
Avalanche energy, single pulse ³⁾	E_{AS}	240	mJ
Avalanche energy, repetitive ²⁾	E_{AR}	0.15	mJ
Avalanche current, repetitive ²⁾	I_{AR}	3	A
Power dissipation ($T_C = 25^\circ C$)	P_D	180	W
- Derate above $25^\circ C$		1.44	W/ $^\circ C$
Operating and storage temperature range	T_j, T_{stg}	-55 to +150	$^\circ C$
Continuous diode forward current	I_S	84	A
Diode pulse current	$I_{S,pulse}$	320	A

Thermal Characteristics

Parameter	Symbol	WMK/WMM/WMN/WMJ/WMLL/WMB/WMO	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	0.7	$^\circ C/W$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	62	$^\circ C/W$

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 _{DSS}	V _{GS} =0 V, I _D =1 mA	200	-	-	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} =200 V, V _{GS} =0V, T _J = 25°C T _J = 125°C	- -	- 100	10 -	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 =30A T _J = 25°C	- -	 12	 14	 mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1 MHz	-	3350	-	pF
Output capacitance	C _{oss}		-	121	-	
Reverse transfer capacitance	C _{rss}		-	29	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 100V, I _D = 30A R _G = 4.7Ω, V _{GS} =10V	-	13	-	ns
Rise time	t _r		-	23	-	
Turn-off delay time	t _{d(off)}		-	77	-	
Fall time	t _f		-	8	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =160V, I _D =30A, V _{GS} =0 to 10V	-	21	-	nC
Gate to drain charge	Q _{gd}		-	13	-	
Gate charge total	Q _g		-	64	-	
Gate plateau voltage	V _{plateau}		-	5.0	-	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	-	105	-	ns
Reverse recovery charge	Q _{rr}		-	0.41	-	μC
Peak reverse recovery current	I _{rrm}		-	6.5	-	A

Notes:

- Limited by $T_{j\max}$. Maximum duty cycle $D=0.5$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $I_{AS}=3\text{A}, V_{DD}=50\text{V}, R_G=25\Omega$, starting $T_j=25^\circ\text{C}$.

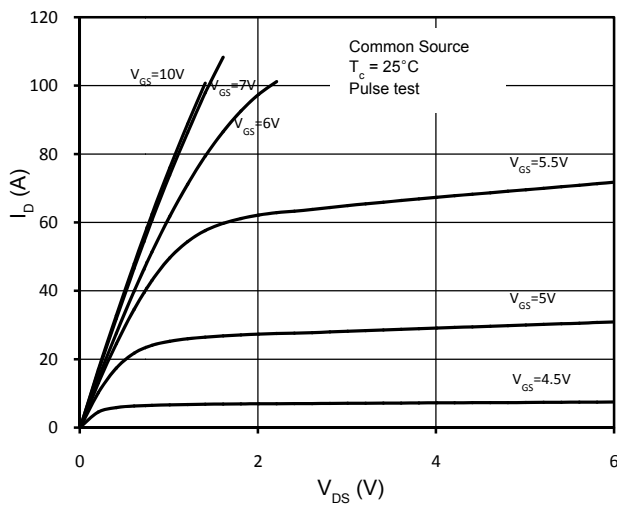


Figure 1. On-Region Characteristics

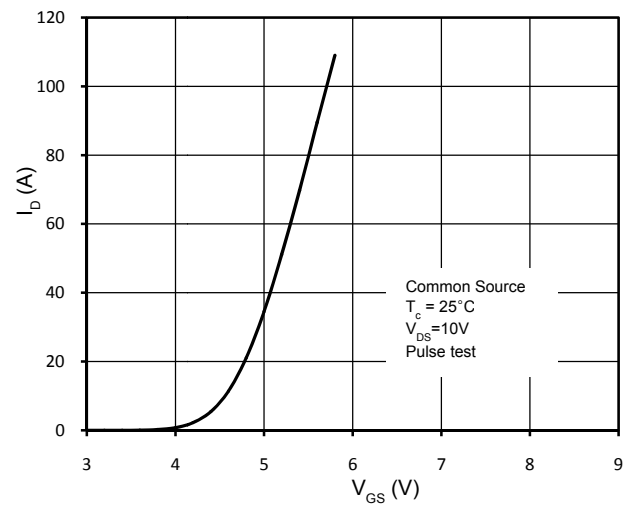


Figure 2. Transfer Characteristics

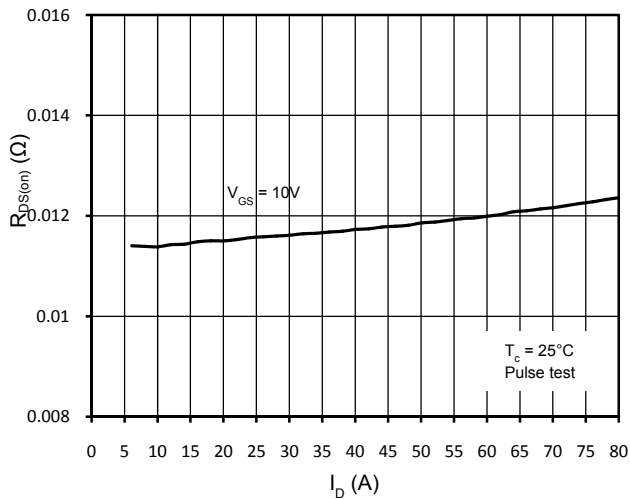


Figure 3. Static Drain-Source On Resistance

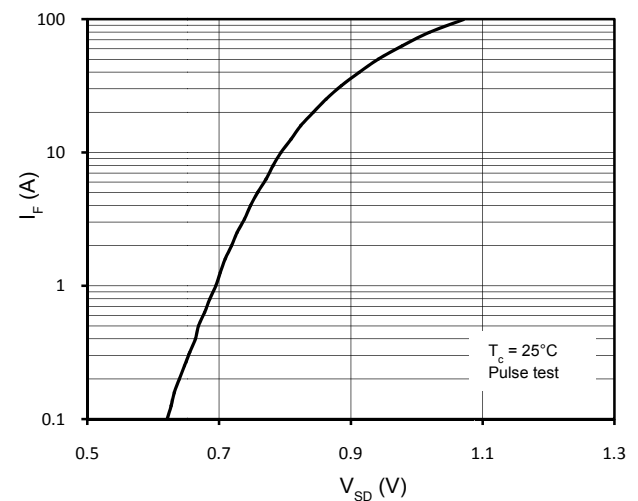
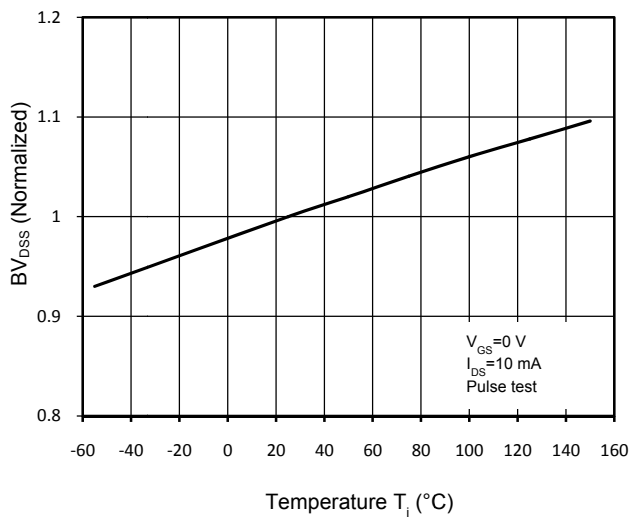
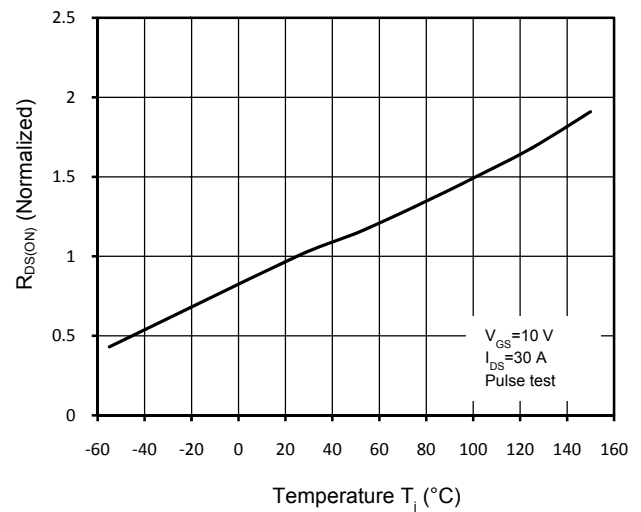


Figure 4. Body-Diode Forward Characteristics

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

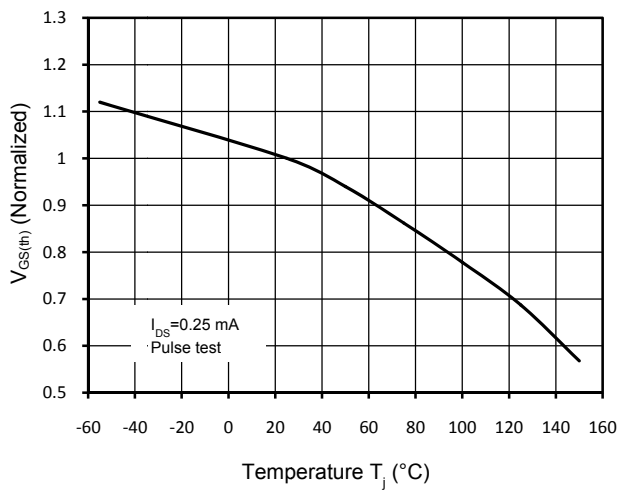


Figure 7. Threshold Voltage vs. Temperature

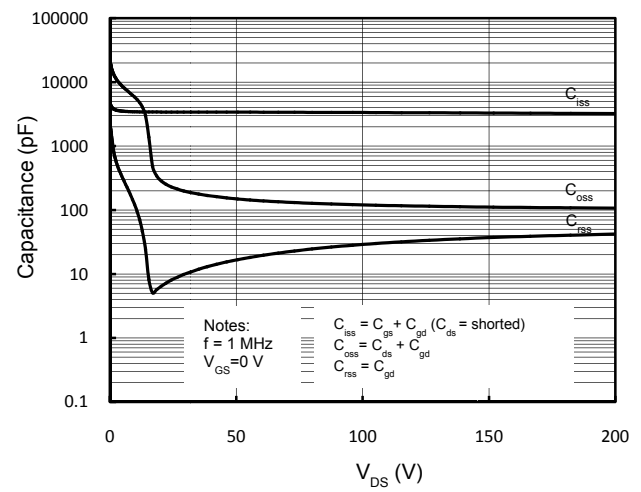


Figure 8. Capacitance Characteristics

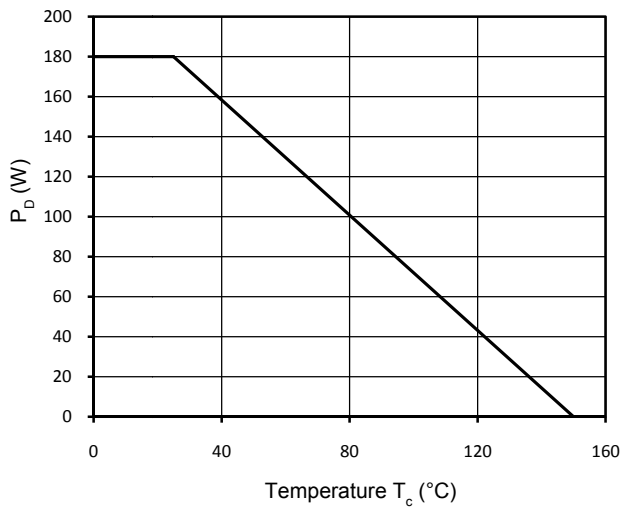


Figure 9. Power Dissipation

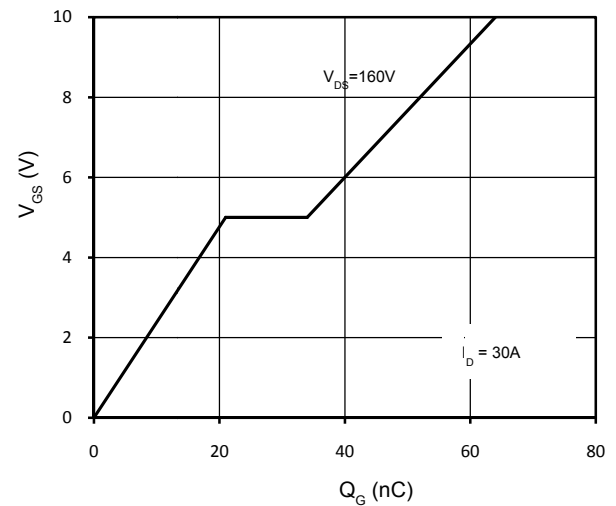


Figure 10. Gate Charge Characteristics

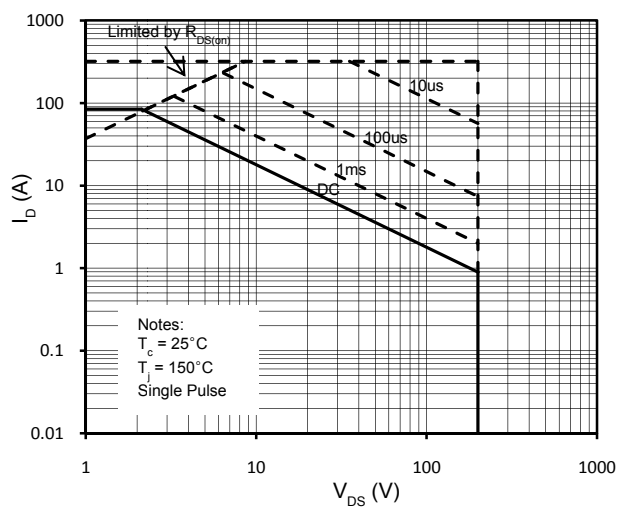


Figure 11. Maximum Safe Operating Area

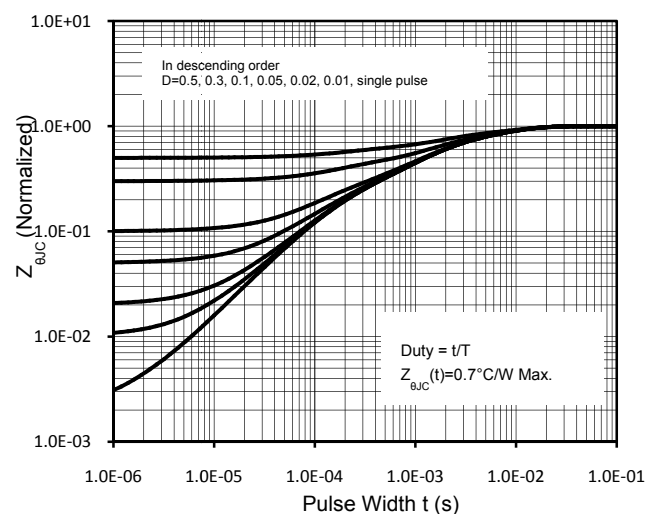
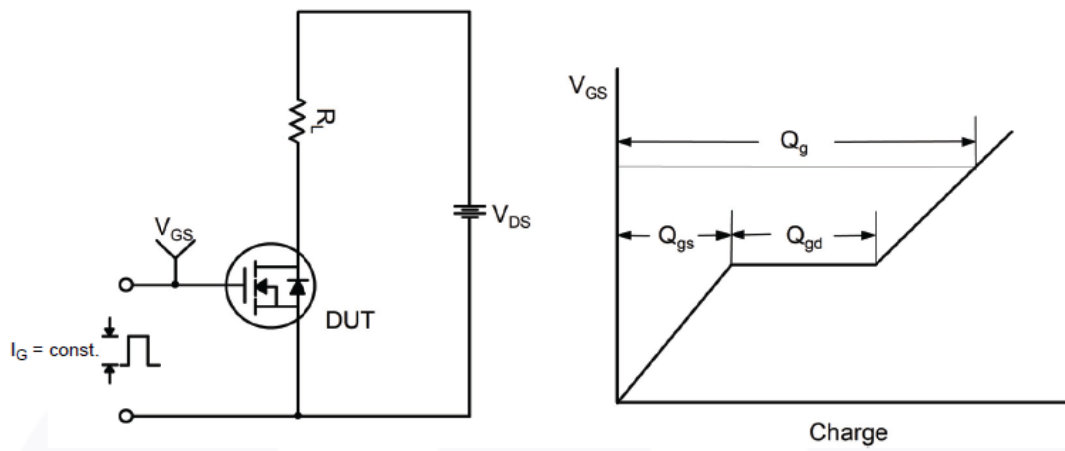
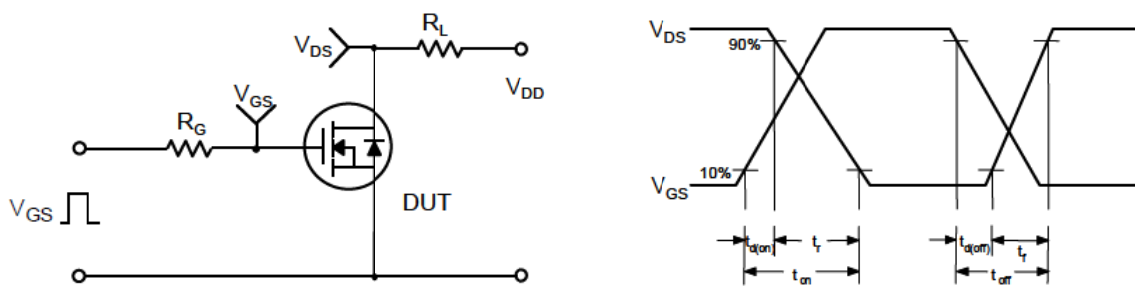


Figure 12. Transient Thermal Response Curve

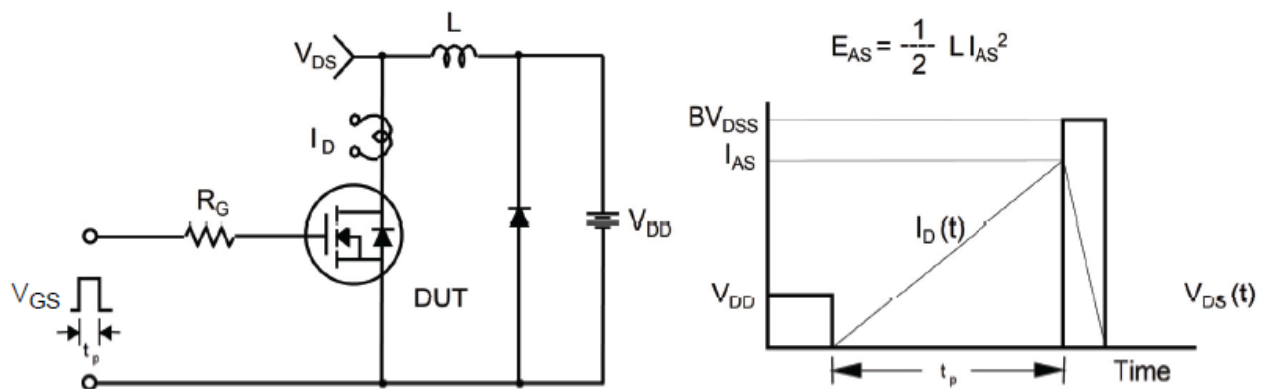
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveforms

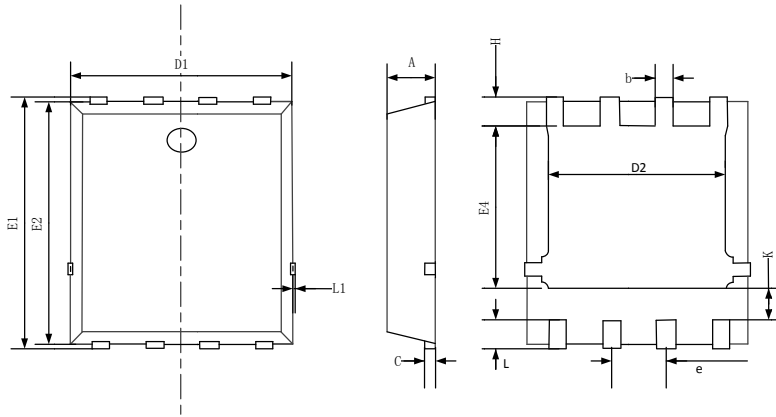


Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for PDFN 5x6

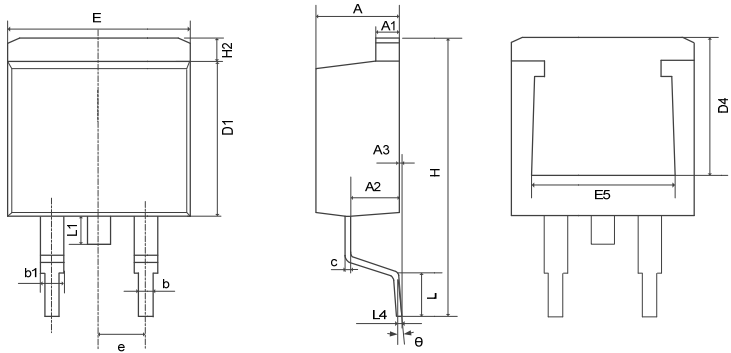
COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	0.9	1.2
b	0.25	0.51
C	0.15	0.35
D1	4.8	5.4
D2	3.7	4.4
E1	5.95	6.35
E2	5.65	6.06
E4	3.3	3.92
e	1.17	1.37
H	0.38	0.71
K	1.1	1.6
L	0.3	0.71
L1		0.12

Mechanical Dimensions for TO-263

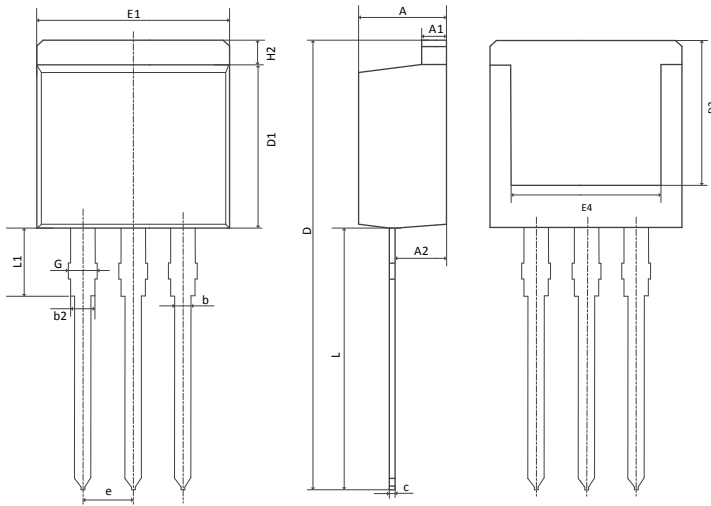
COMMON DIMENSIONS



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°

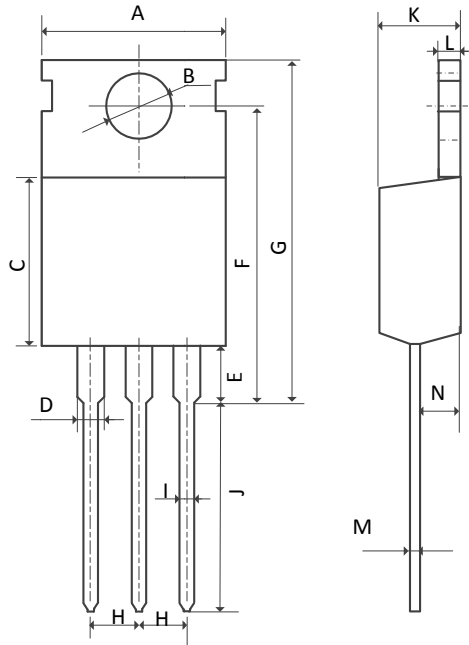
Mechanical Dimensions for TO-262

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	4.37	4.90
A1	1.17	1.42
A2	2.2	2.89
b	0.71	0.96
b2	1.07	1.47
c	0.28	0.6
D	22.00	24.02
D1	8.45	9.3
D2	6.00	—
E1	9.8	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

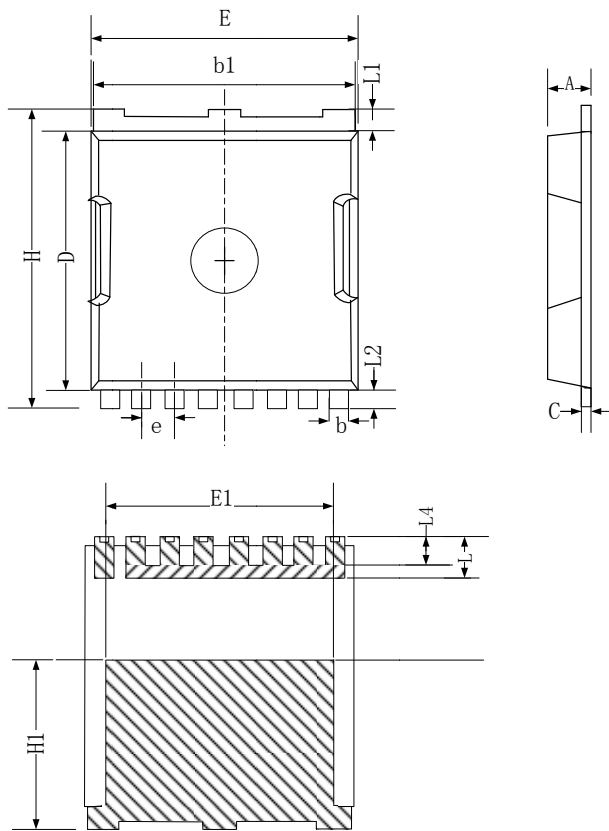
Mechanical Dimensions for TO-220



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-LL

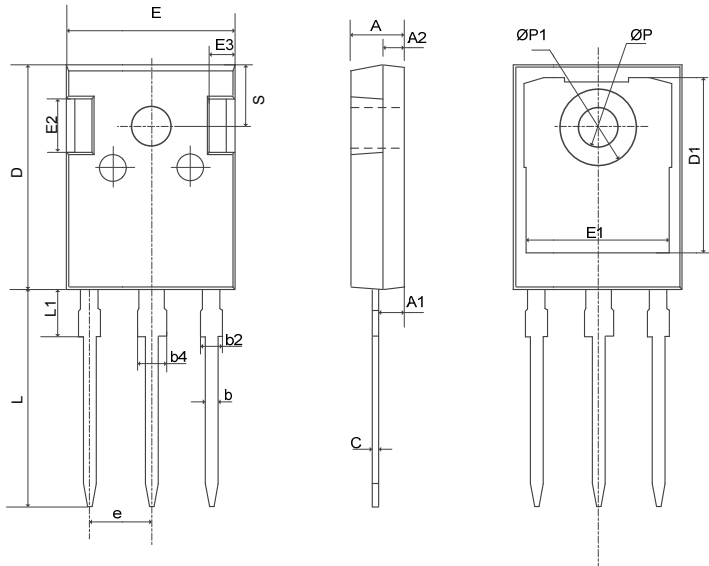


COMMON DIMENSIONS

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

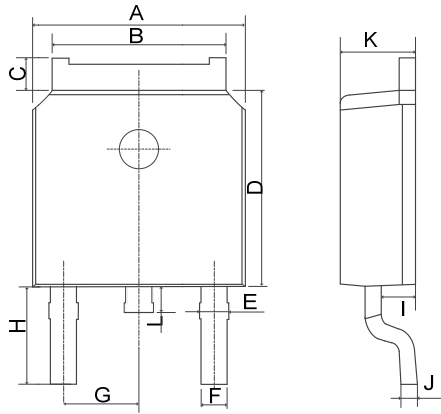
COMMON DIMENSIONS



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

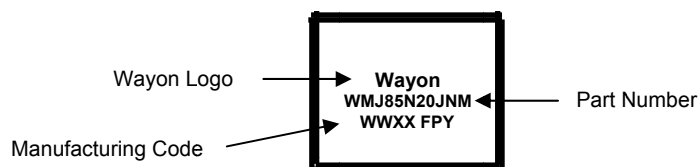


SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
F	0.68	0.91
G	2.29REF	
H	2.90REF	
I	0.85	1.17
J	0.51REF	
K	2.10	2.50
L	0.40	1.00

Ordering Information

Part	Package	Marking	Packing method
WMB85N20JNM	PDFN 5x6	WMB85N20JNM	Tape and Reel
WMO85N20JNM	TO-252	WMO85N20JNM	Tape and Reel
WMK85N20JNM	TO-220	WMK85N20JNM	Tube
WMN85N20JNM	TO-262	WMN85N20JNM	Tube
WMM85N20JNM	TO-263	WMM85N20JNM	Tape and Reel
WMLL85N20JNM	TO-LL	WMLL85N20JNM	Tape and Reel
WMJ85N20JNM	TO-247	WMJ85N20JNM	Tube

Marking Information



Contact Information

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