

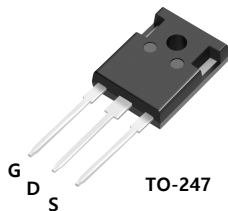
General Description

This Power MOSFET is produced using WPMtek's advanced Super-Junction MOSFET technology.

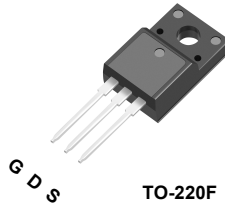
This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies.

Features

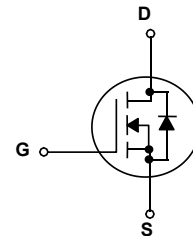
- 650V@ $T_J=150^{\circ}\text{C}$
- 30A, 650V, $R_{DS(on)typ} = 121\text{m}\Omega @ V_{GS} = 10\text{V}$
- Low gate charge (typ. $Q_g = 46\text{nC}$)
- High ruggedness
- Ultra fast switching
- 100% avalanche tested
- Improved dv/dt capability



TO-247



TO-220F



Absolute Maximum Ratings

$T_C = 25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	WTM30N65FMP/WTM30N65FF	Units
V_{DSS}	Drain-Source Voltage	650	V
I_D	Drain Current * - Continuous ($T_C = 25^{\circ}\text{C}$) - Continuous ($T_C = 100^{\circ}\text{C}$)	30	A
		15	A
I_{DM}	Drain Current * - Pulsed (Note 1)	72	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	455	mJ
P_D	Power Dissipation ($T_C = 25^{\circ}\text{C}$) - Derate above 25°C	192	W
		1.54	W/ $^{\circ}\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	260	$^{\circ}\text{C}$

* Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	WTM30N65FMP/WTM30N65FF	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.65	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
--------	-----------	-----------------	-----	-----	-----	-------

Off Characteristics

BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μ A	650	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0 V	--	--	10	μ A
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	-100	--	--	nA

On Characteristics

V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μ A	2.5	--	4.5	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = 10V, I _D = 12A	--	121	137	m Ω

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 100 V, V _{GS} = 0 V, f = 100KHz	--	2072	--	pF
C _{oss}	Output Capacitance		--	101	--	pF
C _{rss}	Reverse Transfer Capacitance		--	1.3	--	pF

Switching Characteristics

t _{d(on)}	Turn-On Delay Time	V _{DS} = 400V, I _D = 12A, R _G = 4.7 Ω , V _{GS} = 10V (Note3)	--	21	--	ns
t _r	Turn-On Rise Time		--	40	--	ns
t _{d(off)}	Turn-Off Delay Time		--	56	--	ns
t _f	Turn-Off Fall Time		--	14	--	ns
Q _g	Total Gate Charge	V _{DS} = 400V, I _D = 12A, V _{GS} = 10V (Note3)	--	46	--	nC
Q _{gs}	Gate-Source Charge		--	8	--	nC
Q _{gd}	Gate-Drain Charge		--	15	--	nC
R _G	Gate Resistance	f = 1MHz	--	1.9	--	Ω

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current		--	--	30	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	72	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 30A	--	--	1.4	V
t _{rr}	Reverse Recovery Time	V _{DS} =400 V, I _S = 12A, dI _F / dt = 130A/us	--	110	--	ns
Q _{rr}	Reverse Recovery Charge		--	0.79	--	uC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J = 25°C, V_{DD} = 50V, V_G = 10V, L = 10mH,
3. Pulse Test: Pulse Width $\leq$ 300 μ s, Duty Cycle $\leq$ 0.5%

Typical Characteristics

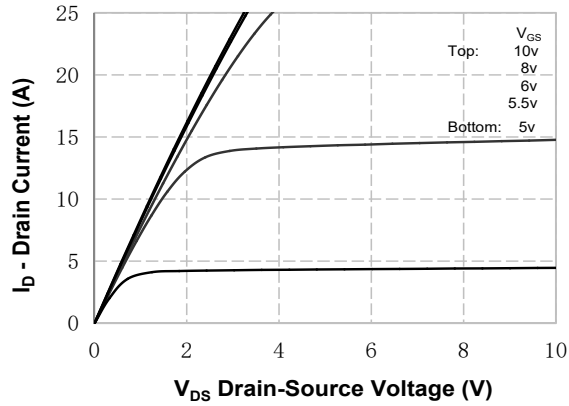


Figure 1. On-Region Characteristics

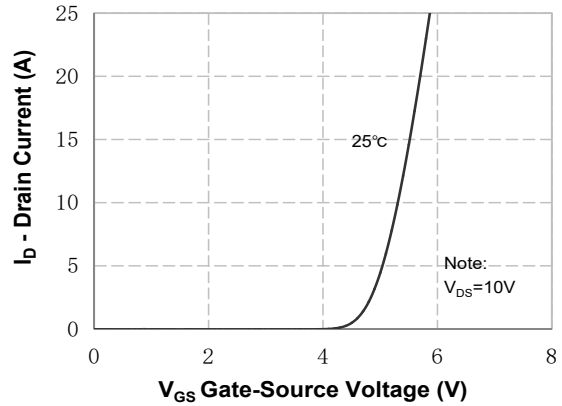


Figure 2. Transfer Characteristics

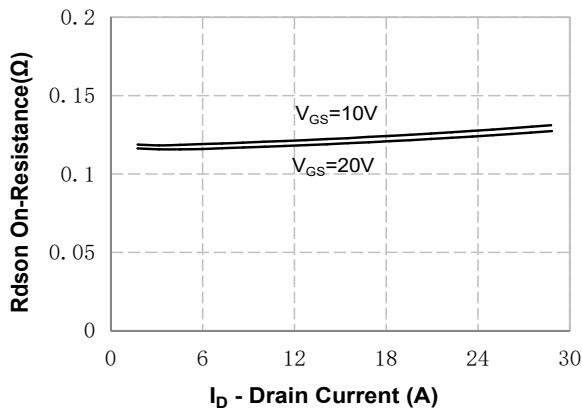


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

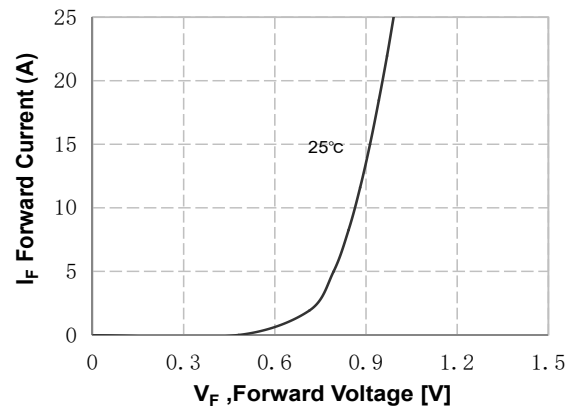


Figure 4. Body Diode Forward Voltage Variation with Source Current

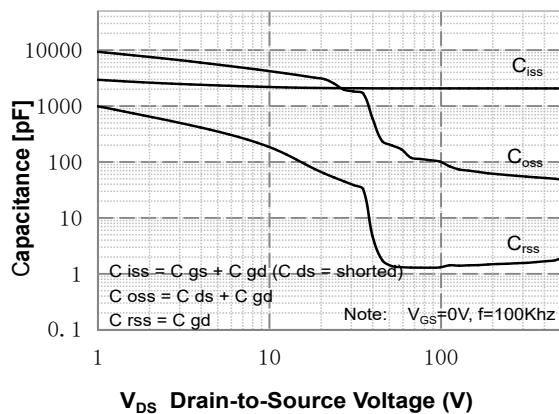


Figure 5. Capacitance Characteristics

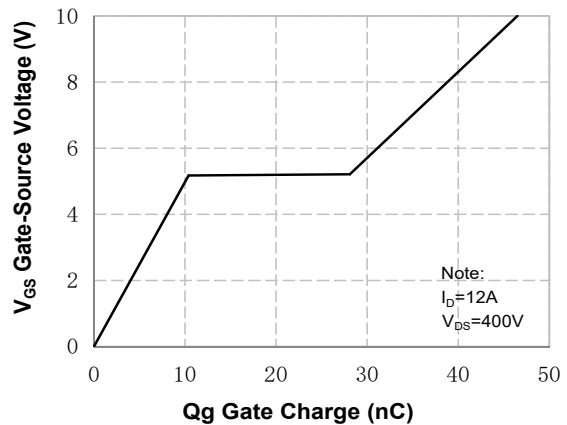


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

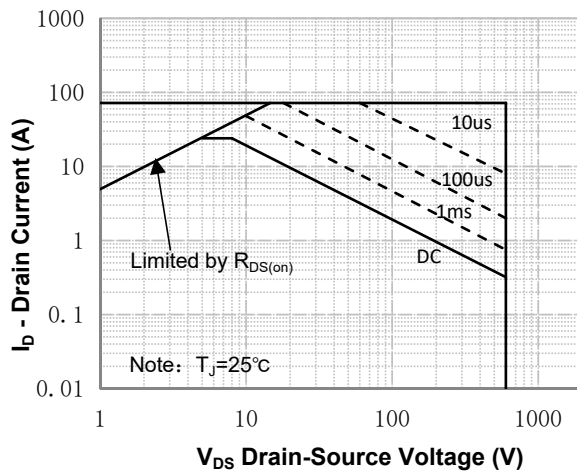


Figure 7. Maximum Safe Operating Area

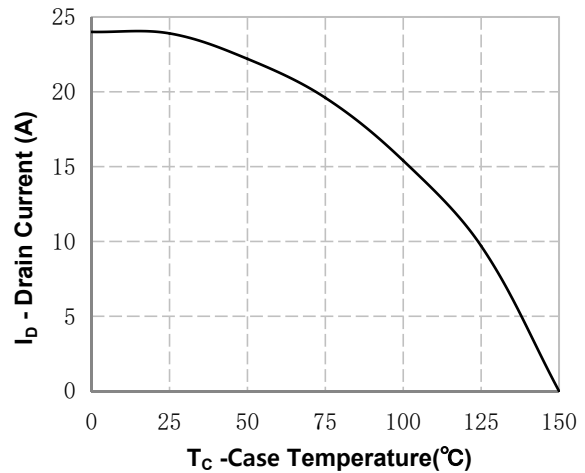


Figure 8. Maximum Drain Current vs Case Temperature

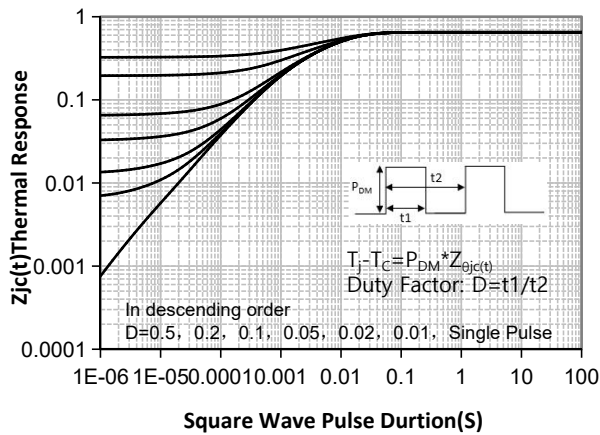
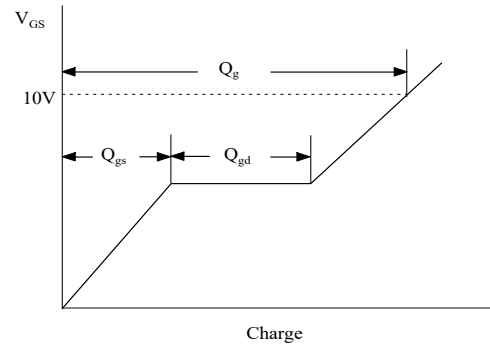
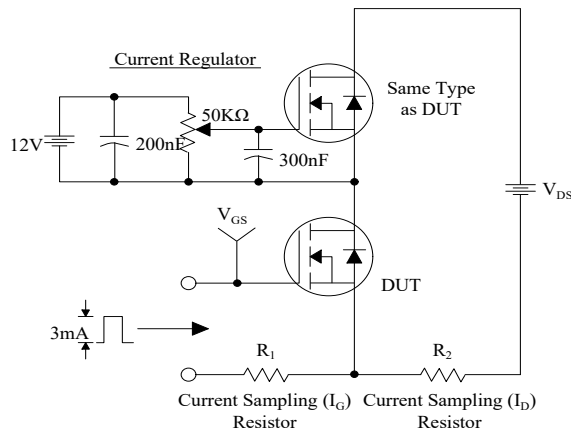
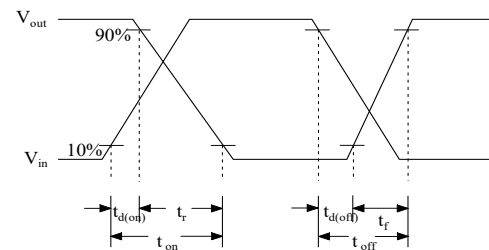
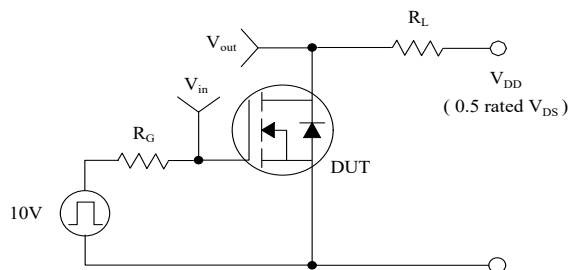


Figure 9. Transient Thermal Response Curve

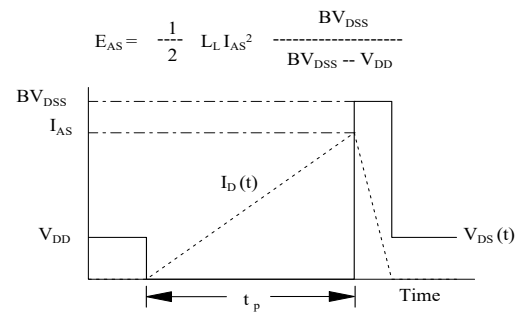
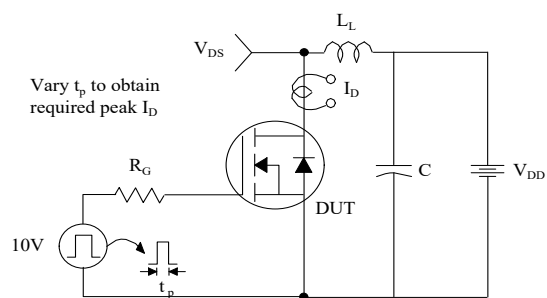
Gate Charge Test Circuit & Waveform



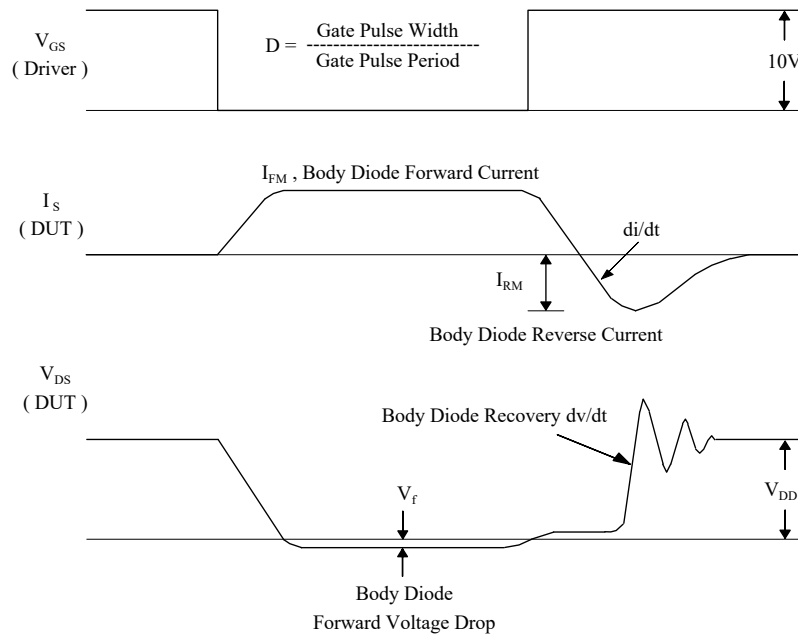
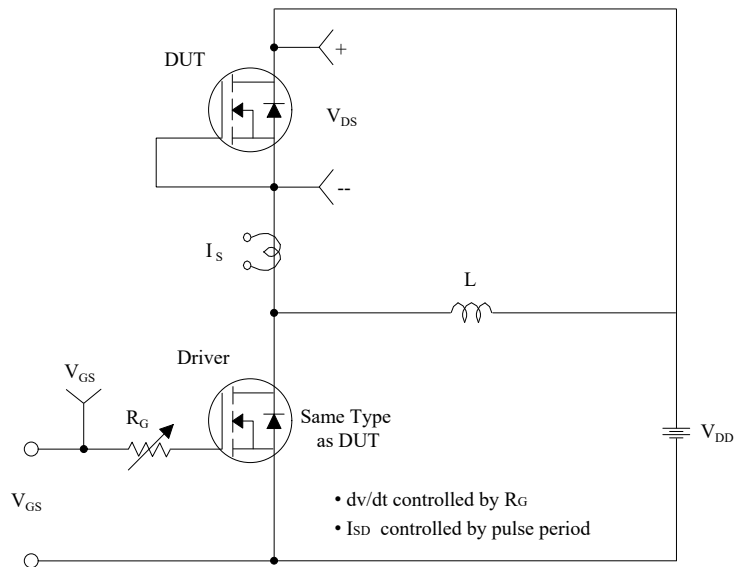
Resistive Switching Test Circuit & Waveforms



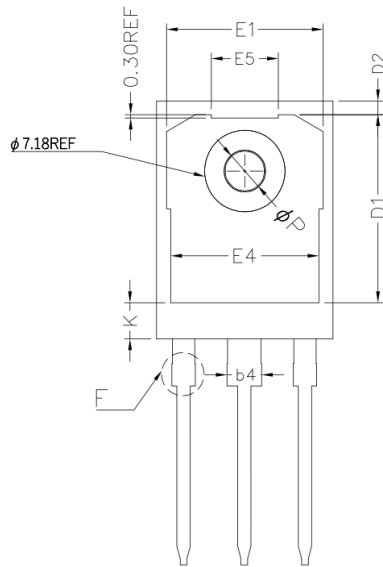
Unclamped Inductive Switching Test Circuit & Waveforms



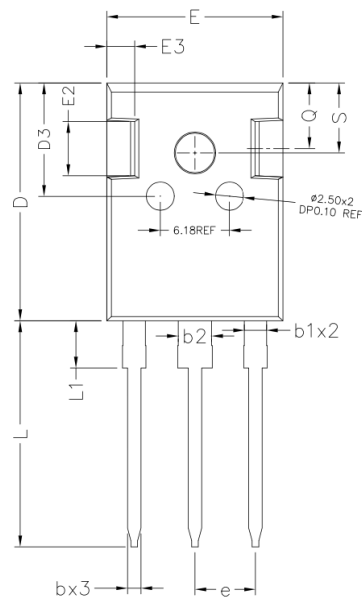
Peak Diode Recovery dv/dt Test Circuit & Waveforms



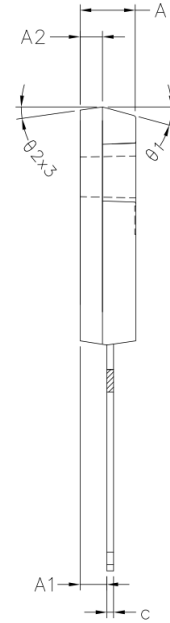
TO-247 Outline



BOTTOM VIEW



TOP VIEW

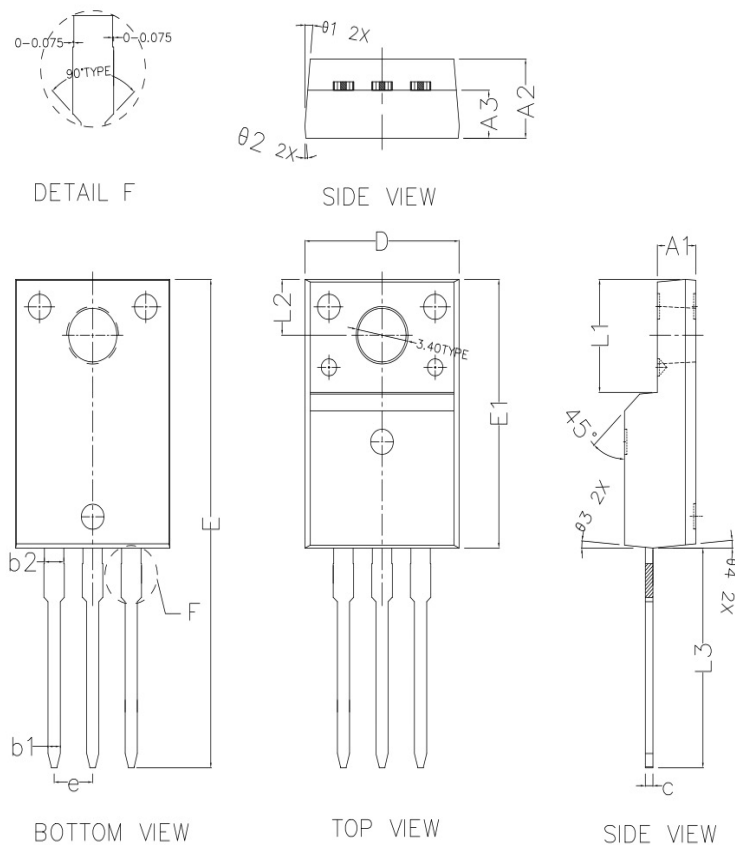


SIDE VIEW

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	4.900	5.000	5.100
A1	2.300	2.400	2.500
A2	1.900	2.000	2.100
b	1.070	1.200	1.330
b1	1.910	2.000	2.160
b2	2.870	3.000	3.160
b3	1.910	2.100	2.410
b4	2.870	3.000	3.380
c	0.550	0.600	0.680
D	20.000	21.000	21.100
D1	16.250	16.950	17.650
D2	1.200REF		
D3	10.000REF		
E	15.700	15.800	15.900
E1	13.100	14.020	14.150
E2	3.680	—	5.100
E3	1.000	—	1.900
E4	12.380	13.260	13.430
E5	5.990REF		
e	5.440BSC		
L	19.810	19.950	20.320
L1	4.100	—	4.400
phi P	3.500	—	3.650
Q	5.490	—	6.000
S	6.040	—	6.300
theta 1	15.0°REF		
theta 2	8.0°REF		
theta 3	8.0°REF		
K	3.190REF		

Package Outline

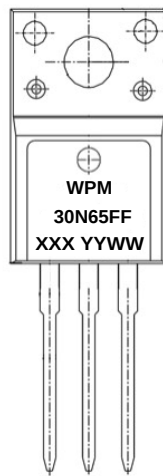
TO-220F Outline



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	2.440	2.540	2.640
A2	4.600	4.700	4.800
A3	2.730	2.830	2.930
b1	0.750	0.800	0.850
b2	1.230	1.280	1.330
c	0.450	0.500	0.550
D	10.060	10.160	10.260
E	28.650	28.850	29.050
E1	15.770	15.870	15.970
e	2.54TYPE		
L1	6.68REF		
L2	3.30REF		
L3	12.830	12.980	13.130
θ1	5° TYPE		
θ2	5° TYPE		
θ3	5° TYPE		
θ4	5° TYPE		

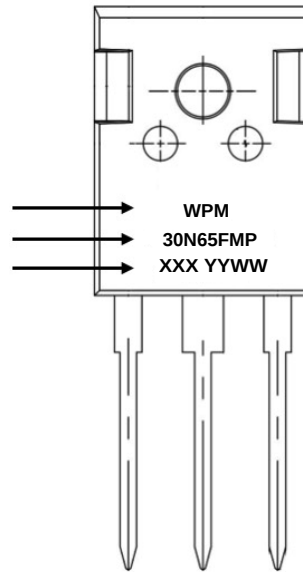
Marking Information

TO-220F



**WPM Logo
Marking
Date Code**

TO-247



WPMtek reserves the right to make changes to the product specification and data in this document without notice. WPMtek makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does WPMtek assume any liability arising from the application or use of any products or circuits, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Any enquiry, please write to sales@wpmtek.com for further information.