WTM47N65FMP

650V N-Channel Super Junction MOSFET
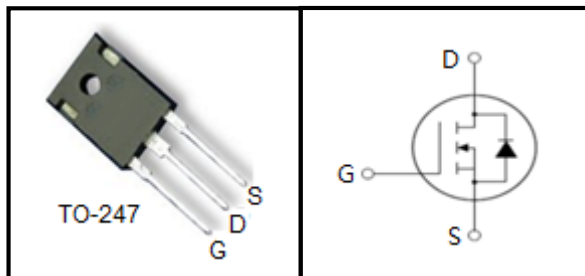
FEATURES

- BV_{DSS}=650 V, I_D=47A
- $R_{DS(on)}$:0.092Ω (Max) @ V_{GS}=10V
- Very low FOM $R_{DS(on)} \times Q_g$
- 100% avalanche tested
- RoHS compliant
- Ultra-fast body diode
- Very high commutation ruggdness

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Device Marking and Package Information

Device	Package	Marking
WTM47N65FMP	TO-247	47N65FMP XXX YYWW

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)		V_{DSS}	650	V
Continuous Drain Current		I_D	47	A
Pulsed Drain Current	(note1)	I_{DM}	141	A
Gate-Source Voltage		V_{GSS}	±30	V
Single Pulse Avalanche Energy	(note2)	E_{AS}	1280	mJ
Avalanche Current	(note1)	I_{AR}	10.5	A
Repetitive Avalanche Energy	(note1)	E_{AR}	1.7	mJ
MOSFET dv/dt ruggedness, V_{DS}=0…400 V		dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}=0…400 V, I_{SD}≤I_D		dv/dt	50	V/ns
Power Dissipation (T_C = 25ºC)		P_D	391	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case, Max.	R_{thJC}	0.32	K/W
Thermal Resistance, Junction-to-Ambient, Max.	R_{thJA}	62	

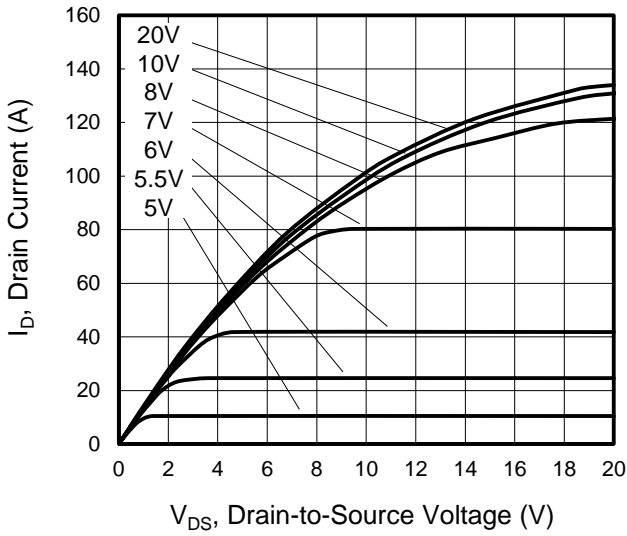## Specifications $T_J = 25^oC$, unless otherwise noted

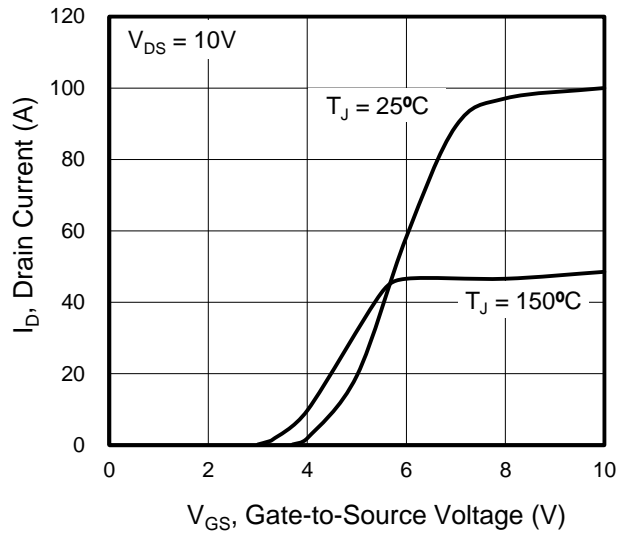| Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V$, $I_D = 250\mu A$	600	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650V$, $V_{GS} = 0V$, $T_J = 25^oC$	--	--	5	μA
		$V_{DS} = 650V$, $V_{GS} = 0V$, $T_J = 150^oC$	--	--	1000	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm30V$	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 0.25mA$	3.0	--	5.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 23.5A$	--	0.080	0.092	Ω
Gate Resistance	R_G	$f = 1.0MHz$, open drain	--	1.95	--	Ω
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V$, $V_{DS} = 50V$, $f = 1.0MHz$	--	3680	--	pF
Output Capacitance	C_{oss}		--	390	--	
Reverse Transfer Capacitance	C_{rss}		--	15	--	
Effective output capacitance, energy related	$C_{o(er)}$	$V_{GS}=0V$, $V_{DS}=0...400V$	--	131	--	
Effective output capacitance, time related	$C_{o(tr)}$	I_D=constant, $V_{GS}=0V$, $V_{DS}=0...400V$	--	675	--	
Total Gate Charge	Q_g	$V_{DD} = 480V$, $I_D = 47A$, $V_{GS} = 10V$	--	72	--	nC
Gate-Source Charge	Q_{gs}		--	14	--	
Gate-Drain Charge	Q_{gd}		--	24	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 400V$, $I_D = 25.8A$, $V_{GS} = 10V$, $R_G = 1.9\Omega$	--	15	--	ns
Turn-on Rise Time	t_r		--	12	--	
Turn-off Delay Time	$t_{d(off)}$		--	80	--	
Turn-off Fall Time	t_f		--	6	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^oC$	--	--	47	A
Pulsed Diode Forward Current	I_{SM}		--	--	141	
Body Diode Voltage	V_{SD}	$T_J = 25^oC$, $I_{SD} = 47A$, $V_{GS} = 0V$	--	0.9	1.2	V
Reverse Recovery Time	t_{rr}	$V_R = 400V$, $I_F = 47A$, $di_F/dt = 100A/\mu s$	--	140	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.7	--	μC
Peak Reverse Recovery Current	I_{rrm}		--	11	--	A

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. $I_{AS} = 10.5A$, $V_{DD} = 50V$, $R_G = 25\Omega$, Starting $T_J = 25°C$

3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

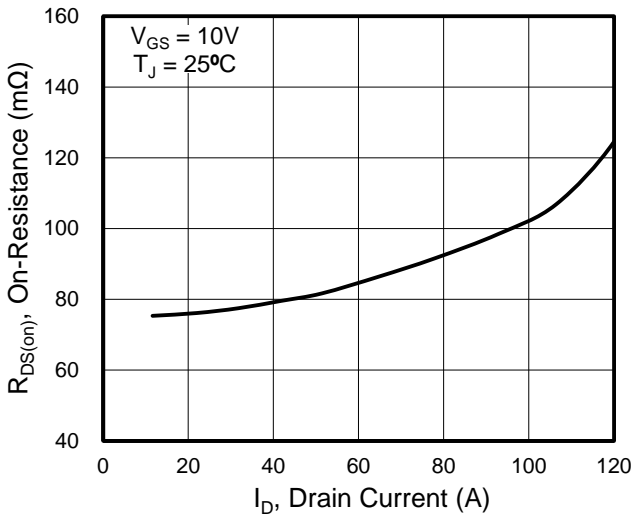## Typical Characteristics $T_J = 25^oC$, unless otherwise noted
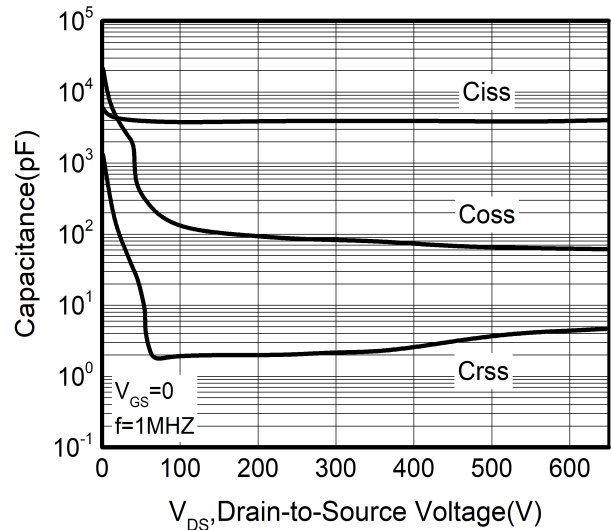
Figure 1. Output Characteristics
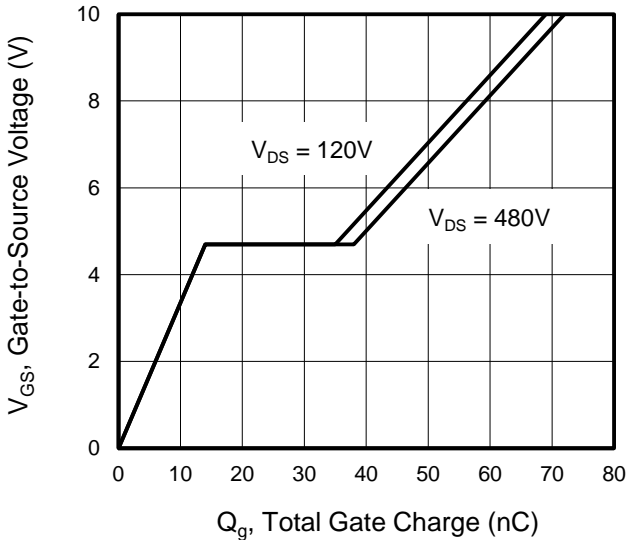

Figure 2. Transfer Characteristics

Figure 3. On-Resistance vs. Drain Current

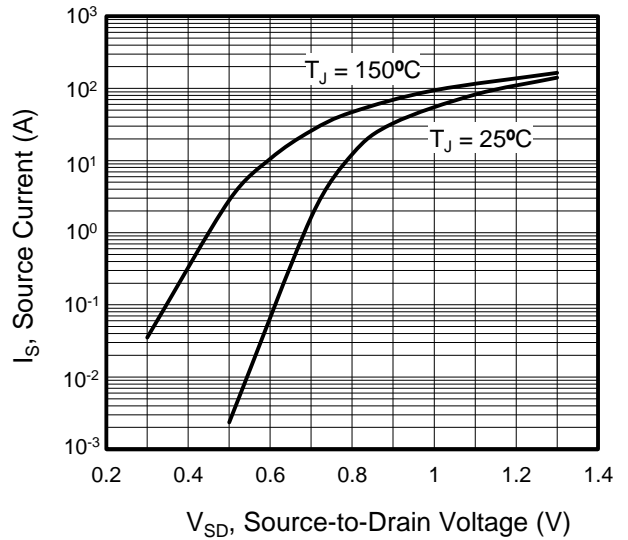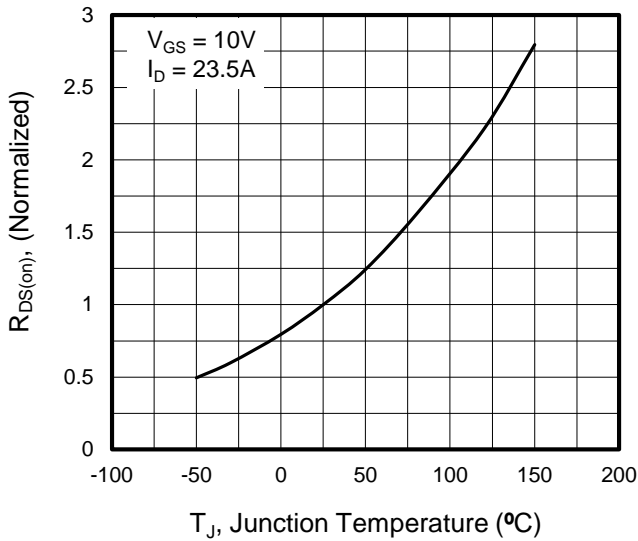### Figure 4. Capacitance

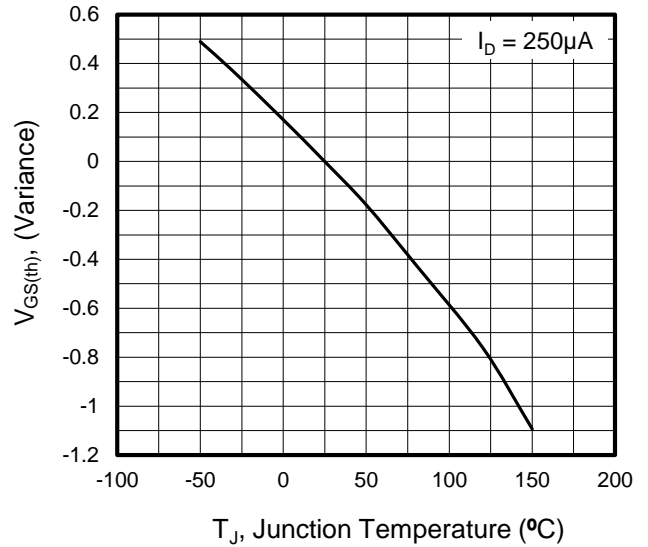### Figure 5. Gate Charge

Figure 6. Body Diode Forward Voltage

Typical Characteristics $T_J = 25^oC$, unless otherwise noted

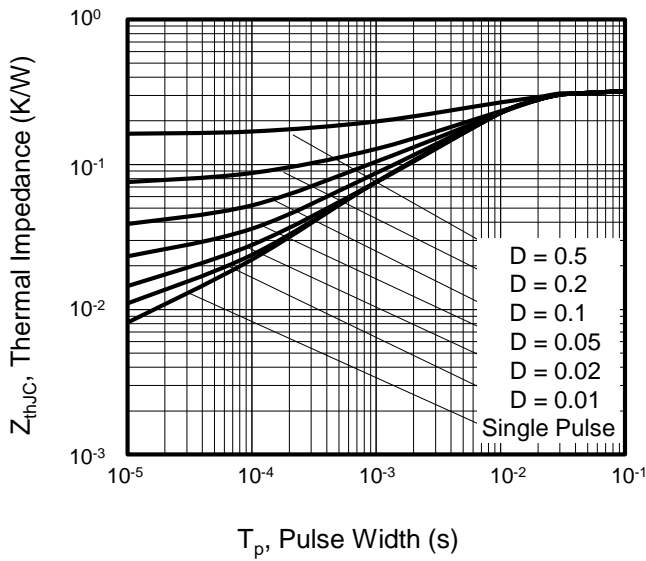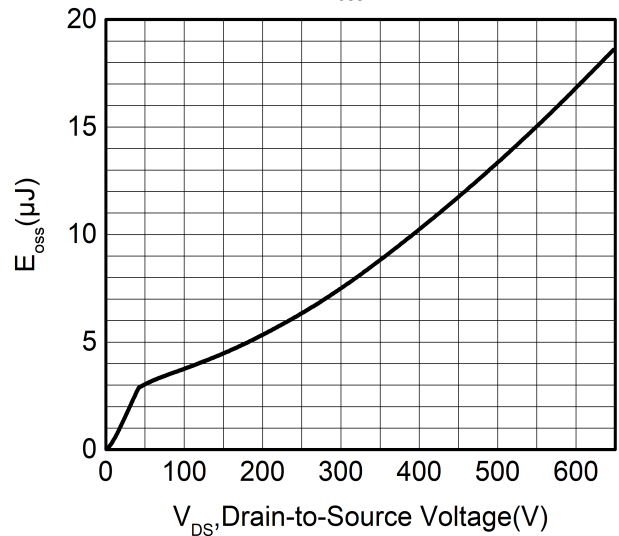### Figure 7. On-Resistance vs. Temperature

$V_{GS} = 10V$
$I_D = 23.5A$

$R_{DS(on)}$, (Normalized)

T_J, Junction Temperature (°C)

Figure 8. Threshold Voltage vs. Temperature

$I_D = 250\mu A$

$V_{GS(th)}$, (Variance)

T_J, Junction Temperature (°C)

Figure 9. Transient Thermal Impedance

Z_{thJC}; Thermal Impedance (K/W)

D = 0.5
D = 0.2
D = 0.1
D = 0.05
D = 0.02
D = 0.01
Single Pulse

T_p, Pulse Width (s)

Figure 10. C_{oss} stored energy

$E_{oss} (\mu J)$

V_{DS},Drain-to-Source Voltage(V)

Figure 11. Safe Operating Area

$I_D(A)$

10μs
100μs
1ms
DC

1. T_C=25℃
2. $T_{J(max)}$=150℃
3. Single Pulse

V_{DS},Drain-to-Source Voltage(V)
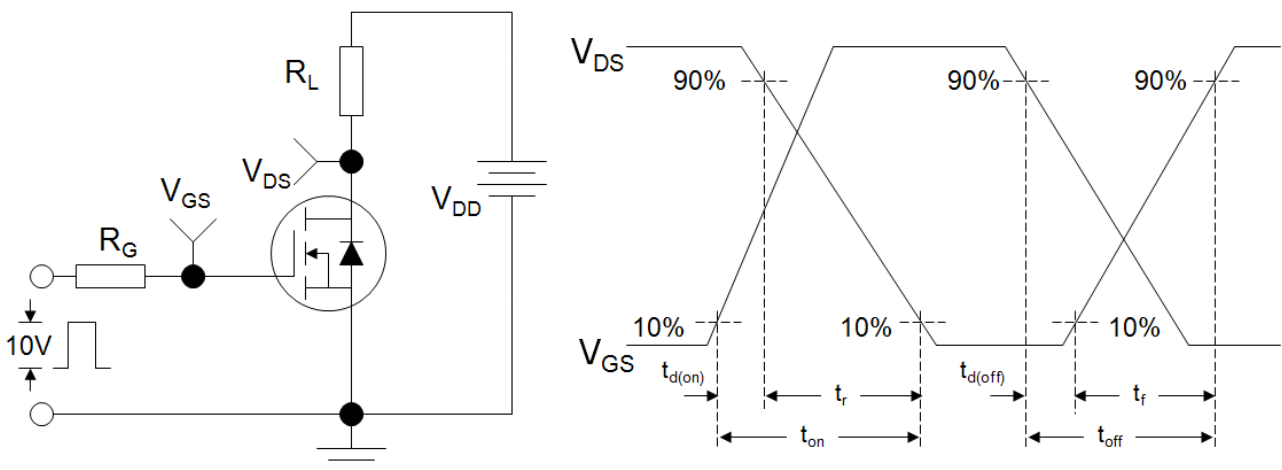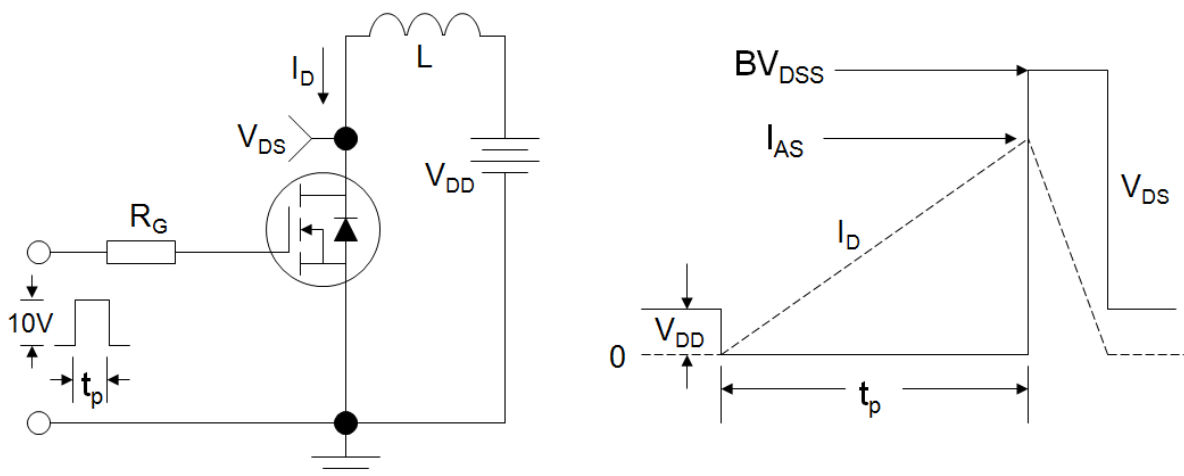
Figure A：Gate Charge Test Circuit and Waveform
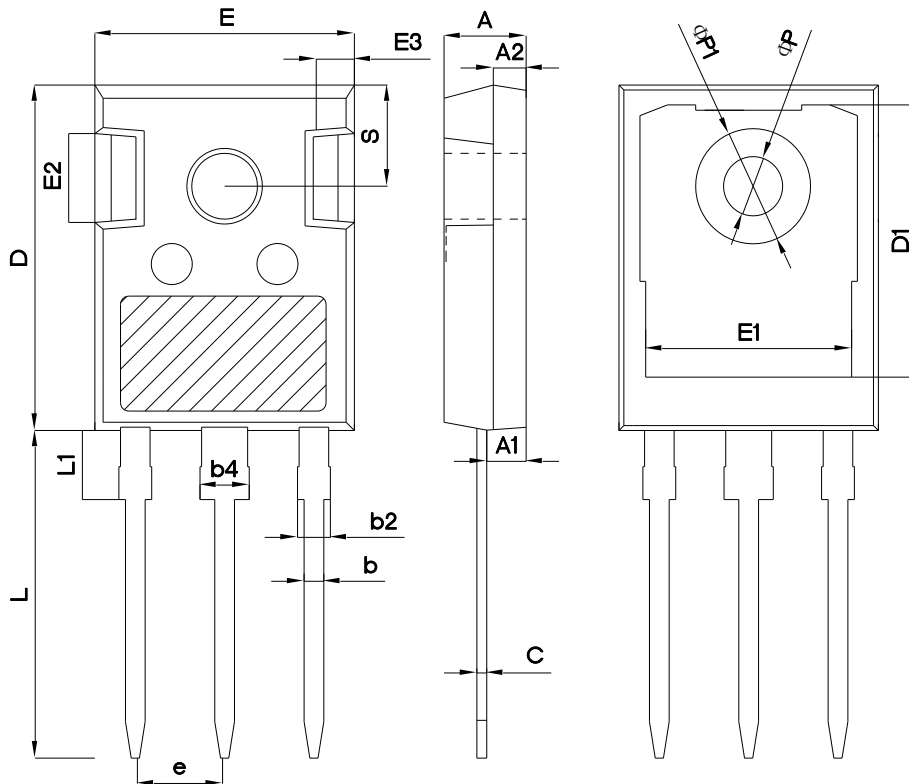

Figure B：Resistive Switching Test Circuit and Waveform

Figure C：Unclamped Inductive Switching Test Circuit and Waveform

TO-247

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.82	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET *category:*

Click to view products by WPMtek *manufacturer:*

Other Similar products are found below :

IRFD120 JANTX2N5237 BUK455-60A/B MIC4420CM-TR VN1206L NDP4060 SI4482DY IPS70R2K0CEAKMA1 SQD23N06-31L-GE3 TK16J60W,S1VQ(O 2SK2614(TE16L1,Q) DMN1017UCP3-7 DMN1053UCP4-7 SQJ469EP-T1-GE3 NTE2384 DMC2700UDMQ-7 DMN2080UCB4-7 DMN61D9UWQ-13 US6M2GTR DMN31D5UDJ-7 DMP22D4UFO-7B DMN1006UCA6-7 DMN16M9UCA6-7 STF5N65M6 IRF40H233XTMA1 STU5N65M6 DMN6022SSD-13 DMN13M9UCA6-7 DMTH10H4M6SPS-13 DMN2990UFB-7B IPB80P04P405ATMA2 2N7002W-G MCAC30N06Y-TP MCQ7328-TP NTMC083NP10M5L BXP7N65D BXP4N65F AOL1454G WMJ80N60C4 BXP2N20L BXP2N65D BXT1150N10J BXT1700P06M TSM60NB380CP ROG RQ7L055BGTCR DMNH15H110SK3-13 SLF10N65ABV2 BSO203SP BSO211P IPA60R230P6