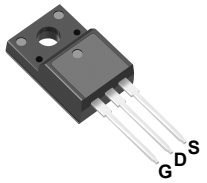
Description

WTM65R120AD/F is an N-channel power MOSFET designed according to super junction technology. This device has very low on-resistance and hard ruggedness for switching applications. It's very low conduction loss and fast switching can make applications more efficient and faster.

Features

- Low gate charge
- Low $R_{DS(on)}$ per chip area(Low FOM)
- Very low switching and conduction loss
- Extremely high commutation ruggedness
- 100% avalanche tested

Package & Internal circuit



TO-220F

WTM65R120AF

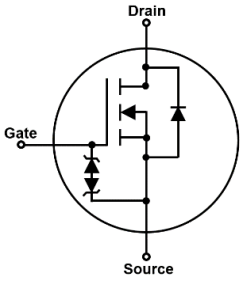


TO-252

WTM65R120AD

Applications

- TV and PC Power
- Adopter and Lighting
- Telecom and UPS(Uninterruptible Power Supply)



Key parameters

Parameter	Value	Unit
V_{DS} @ $T_{j,max}$	650	V
$Q_{g,typ}$	37.2	nC
I_D	26	A
$R_{DS(on),max}$	120	mΩ

Ordering Information

Ordering Code	Package	Marking	Packing type
WTM65R120AD	TO-252(A)	WPM 60R120AD XXX YYWW	Reel & Tape
WTM65R120AF	TO-220F	WPM 60R120AF XXX YYWW	Tube

WPMtek

Absolute maximum ratings at T_C=25ºC unless otherwise specified

Symbol	Parameter	Value	Unit	Test condition
V_{DS}	Drain-source voltage	650	V	-
V_{GS}	Gate-source voltage	±20	V	-
I_D(1)	Continuous drain current	26	A	T_C = 25˚C
	Continuous drain current	16.5	A	T_C = 100˚C
I_{DM}(2)	Pulsed drain current	78	A	T_C = 25˚C
E_{AS}	Single pulsed avalanche energy	85	mJ	Starting T_j = 25˚C, I_{AS} = 4.5A, V_{DD} = 50V, I_D = I_{AR}
P_{tot}	Total power dissipation	103	W	T_C = 25˚C
dv/dt	MOSFET dv/dt ruggedness	50	V/ns	V_{DS} = 0…400V
dv/dt	Reverse diode dv/dt	15	V/ns	V_{DS} = 0…400V, T_j = 25˚C, I_{SD}≤I_D
T_{stg}	Storage temperature	-55 to 150	˚C	-
T_j	Operating junction temperature	-55 to 150	˚C	-

1. limited by $T_{j,max}$, Maximum duty cycle D=0.75
2. Pulse width limited by $T_{j,max}$

Thermal characteristics

Symbol	Parameter	Value	Unit	Test condition
R_{thJC}	Thermal resistance, junction - case	1.21	˚C/W	-
R_{thJA}	Thermal resistance, junction - ambient	62.5	˚C/W	-

Static characteristics at T_C=25ºC unless otherwise specified

Symbol	Parameter	Maximum value			Unit	Test condition
		Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-source breakdown voltage	650	-	-	V	V_{GS} = 0V, I_D = 0.25mA
$V_{GS(th)}$	Gate threshold voltage	2.5	3.5	4.5	V	V_{GS} = V_{DS}, I_D = 0.25mA
I_{GSS}	Gate-body leakage current	-	-	1	uA	V_{GS} = ±20V, T_j = 25ºC
I_{DSS}	Zero gate voltage drain current	-	-	1	uA	V_{DS} = 650V, V_{GS} = 0V, T_j = 25˚C
$R_{DS(on)}$	Drain-source on-resistance	-	108	120	mΩ	V_{GS} = 10V, I_D = 13A

WPMtek

Dynamic characteristics

Symbol	Parameter	Values			Unit	Test condition
		Min.	Typ.	Max.		
C_{iss}	Input capacitance	-	1840	-	pF	V_{DS} = 400V, V_{GS} = 0V, f = 250kHz
C_{oss}	Output capacitance	-	29.8	-	pF	
C_{rss}	Reverse transfer capacitance	-	4.76	-	pF	
$C_{o(er)}$ (3)	Effective output capacitance, energy related	-	55.4	-	pF	V_{GS} =10V, V_{DS} = 0…400V
$C_{o(tr)}$ (4)	Effective output capacitance, time related	-	470	-	pF	V_{GS} =10V, V_{DS} = 0…400V
$t_{d(on)}$	Turn-on delay time	-	77	-	ns	V_{DD} = 400V, I_D = 13A, V_{GS} =10V, R_G =25Ω
t_r	Rise time	-	22	-	ns	
$t_{d(off)}$	Turn-off delay time	-	155	-	ns	
t_f	Fall time	-	13	-	ns	
R_G	Gate resistance	-	9	-	Ω	f = 1MHz, I_D = 0A
Q_g	Total gate charge	-	37.2	-	nC	V_{DD} = 400V, V_{GS} = 10V, I_D = 26A
Q_{gs}	Gate-source charge	-	10.7	-	nC	
Q_{gd}	Gate-drain charge	-	15.5	-	nC	

3. $C_{o(er)}$is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 400V
4. $C_{o(tr)}$is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 400V

Reverse diode characteristics

Symbol	Parameter	Values			Unit	Test condition
		Min.	Typ.	Max.		
V_{SD}	Diode forward voltage	-	-	1.4	V	V_{GS} = 0V, I_{SD} = 13A, T_j = 25˚C
I_{SD}	Continuous Diode forward current	-	-	26	A	-
t_{rr}	Reverse recovery time	-	291	-	ns	I_{SD} = 26A, V_{DS} = 400V, di/dt = 100A/us
I_{rr}	Reverse recovery current	-	23.7	-	A	
Q_{rr}	Reverse recovery charge	-	3.7	-	uC	

WPMtek

Characteristic Graph

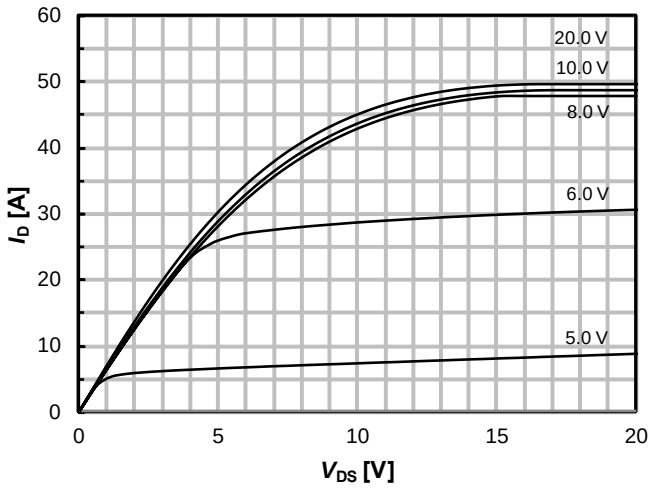


Fig. 1 Output Characteristics

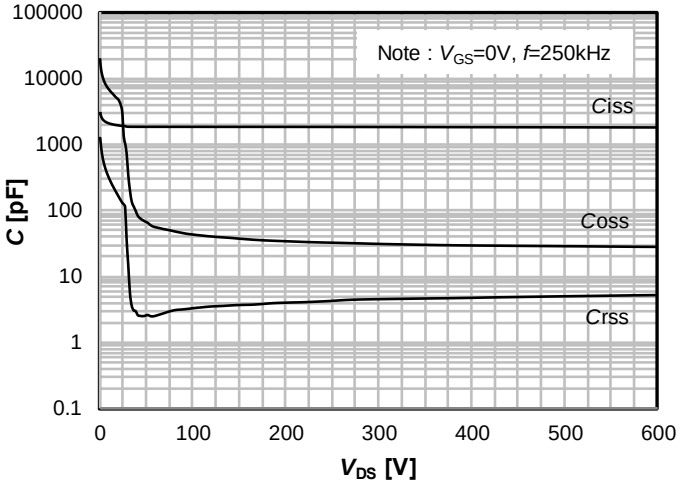


Fig. 2 Capacitances

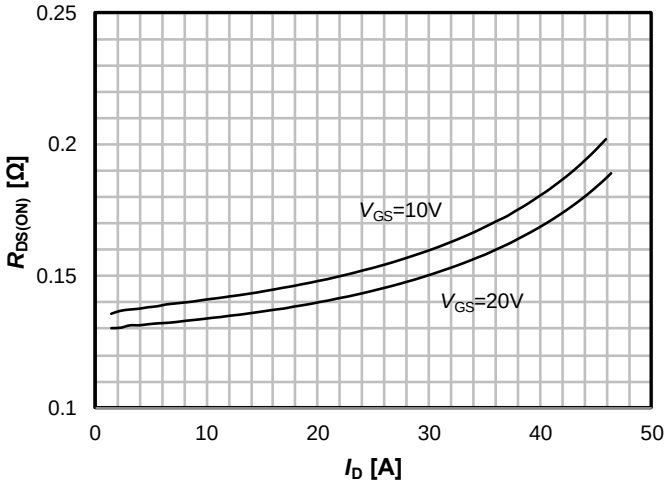


Fig. 3 On-state Resistance

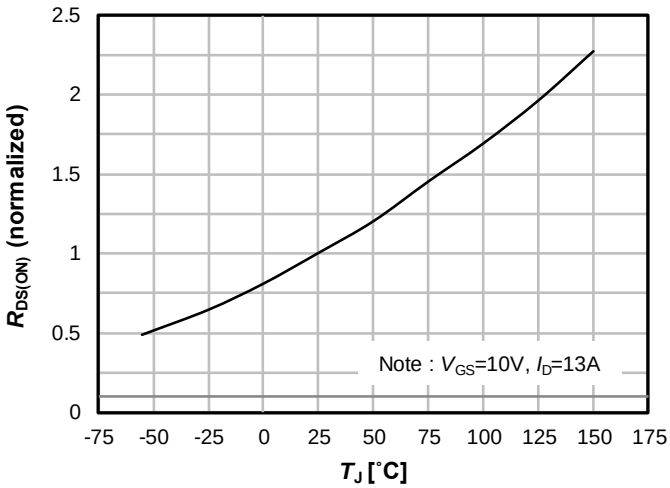


Fig. 4 On-state Resistance with Temperature

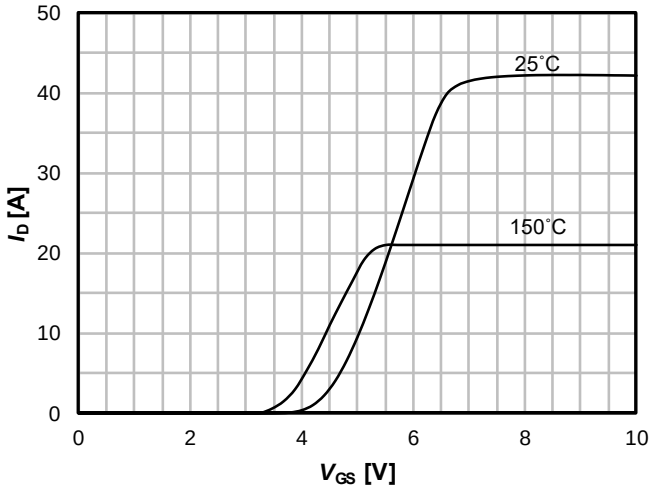


Fig. 5 Transfer Characteristics

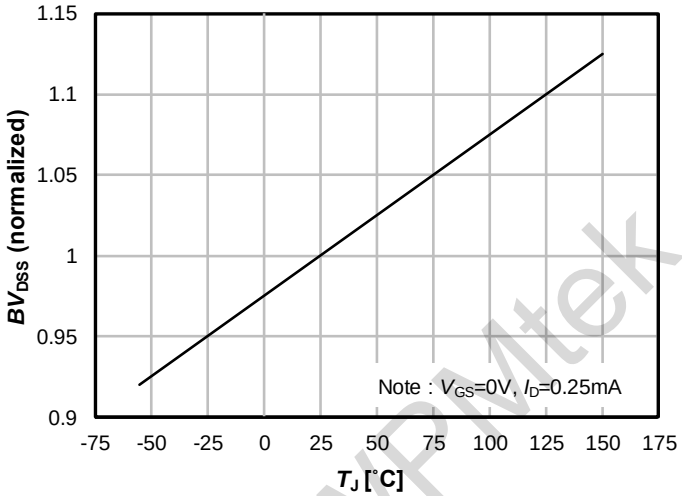


Fig. 6 Breakdown Voltage with Temperature

WPMtek

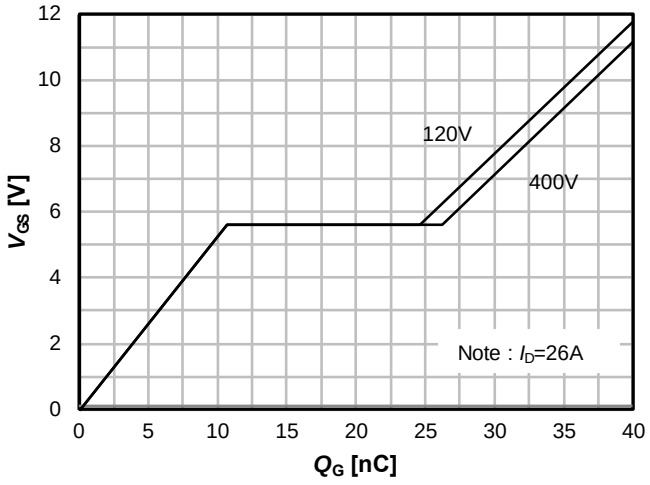


Fig. 7 Gate Charge

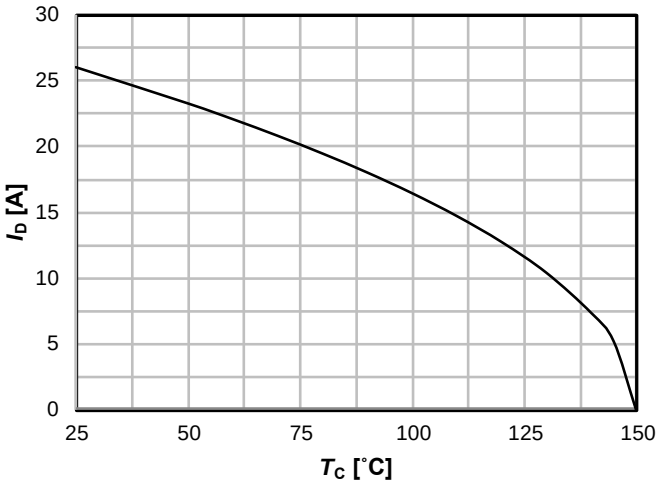


Fig. 8 Maximum Drain Current

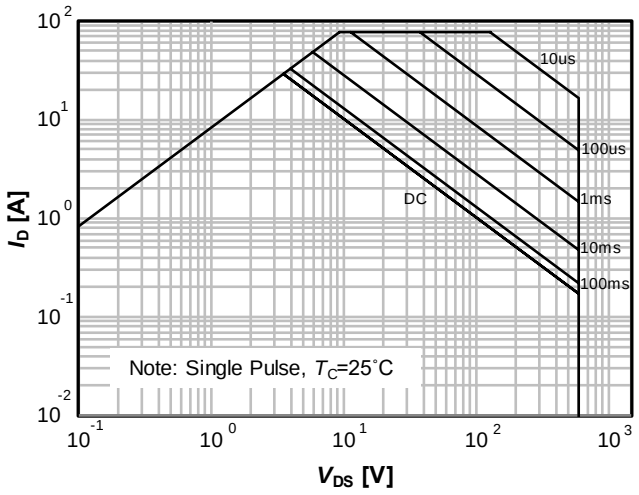


Fig. 9 Safe Operating Area

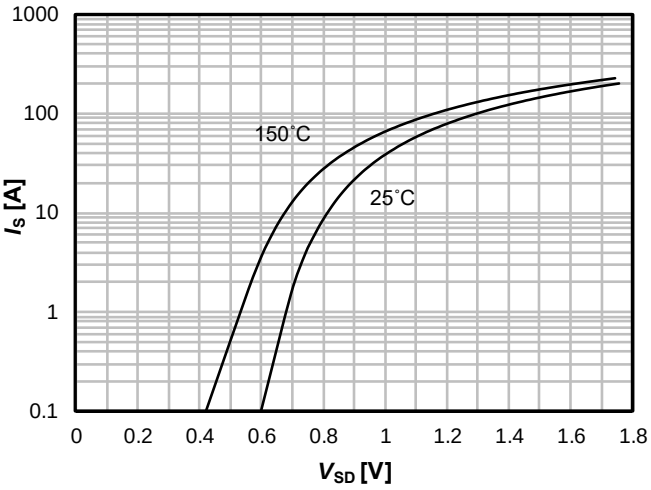


Fig. 10 Body Diode Characteristics

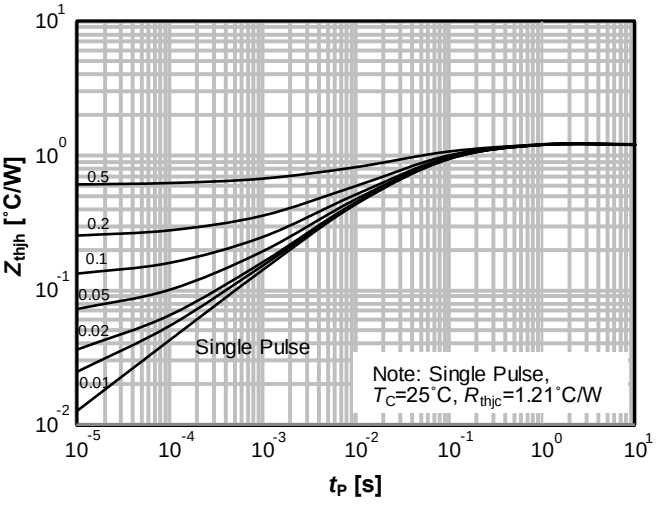


Fig. 11 Maximum Transient Thermal Characteristics

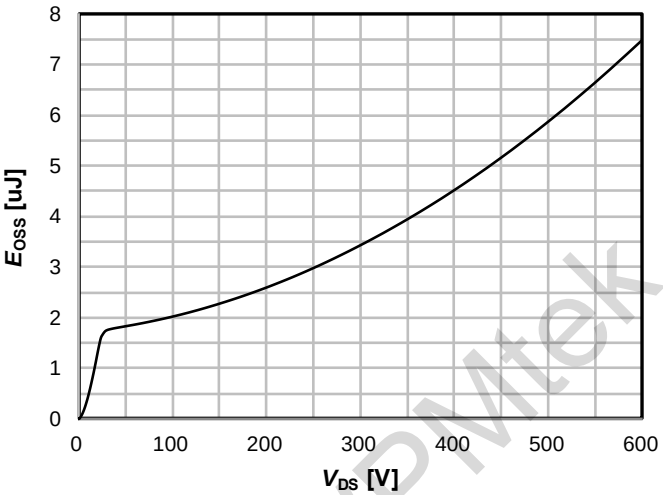


Fig. 12 C_{oss} Stored Energy

WPMtek

Test Circuits

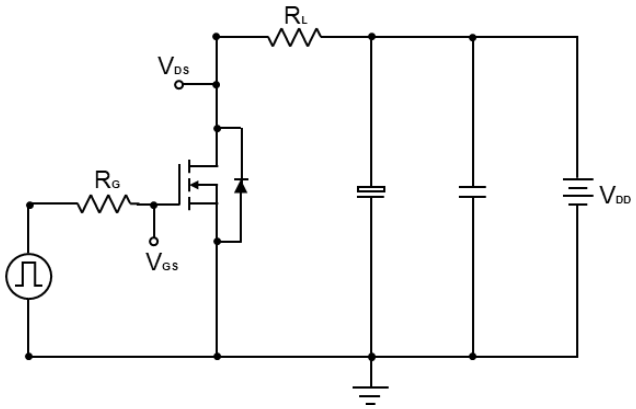


Fig. 13 Test circuit for resistive load switching times

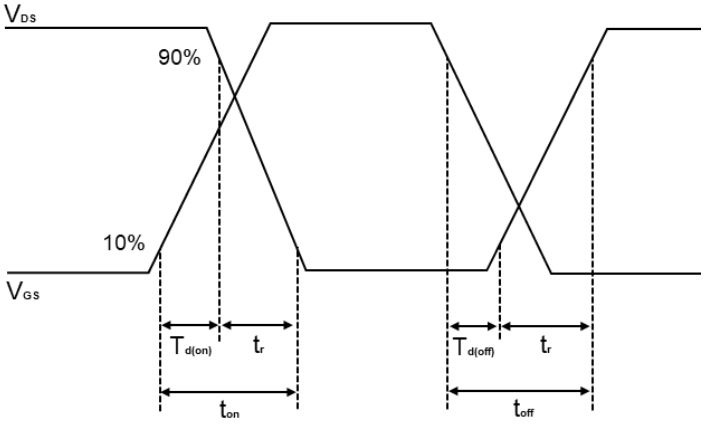


Fig. 14 Switching times waveform

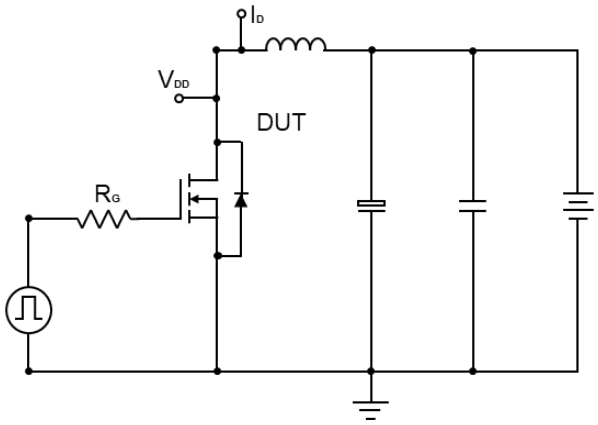


Fig. 15 Test circuit for unclamped inductive load

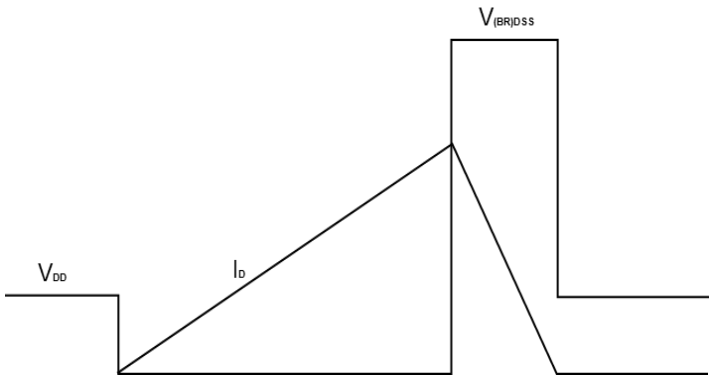


Fig. 16 Unclamped inductive waveform

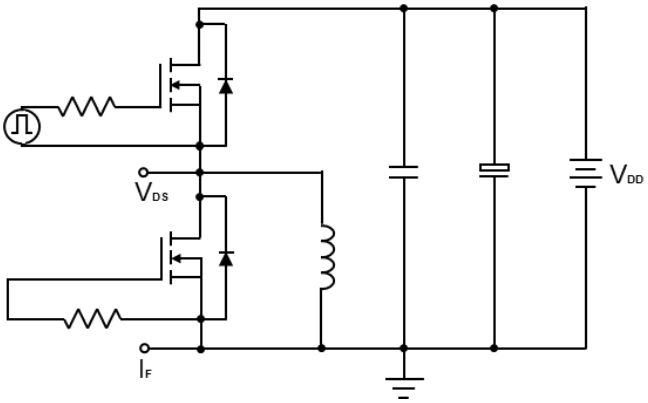


Fig. 17 Test circuit for diode characteristics

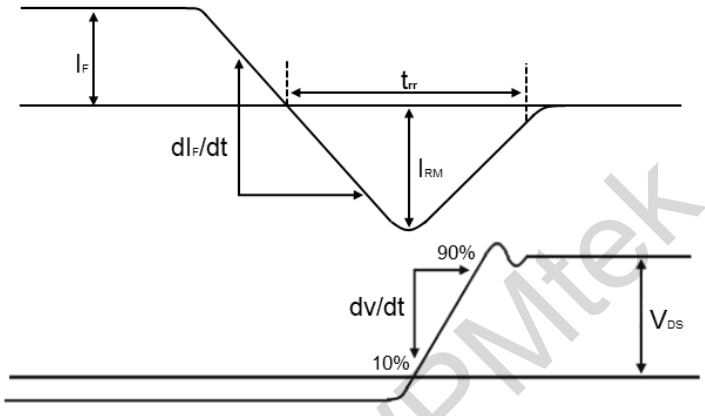
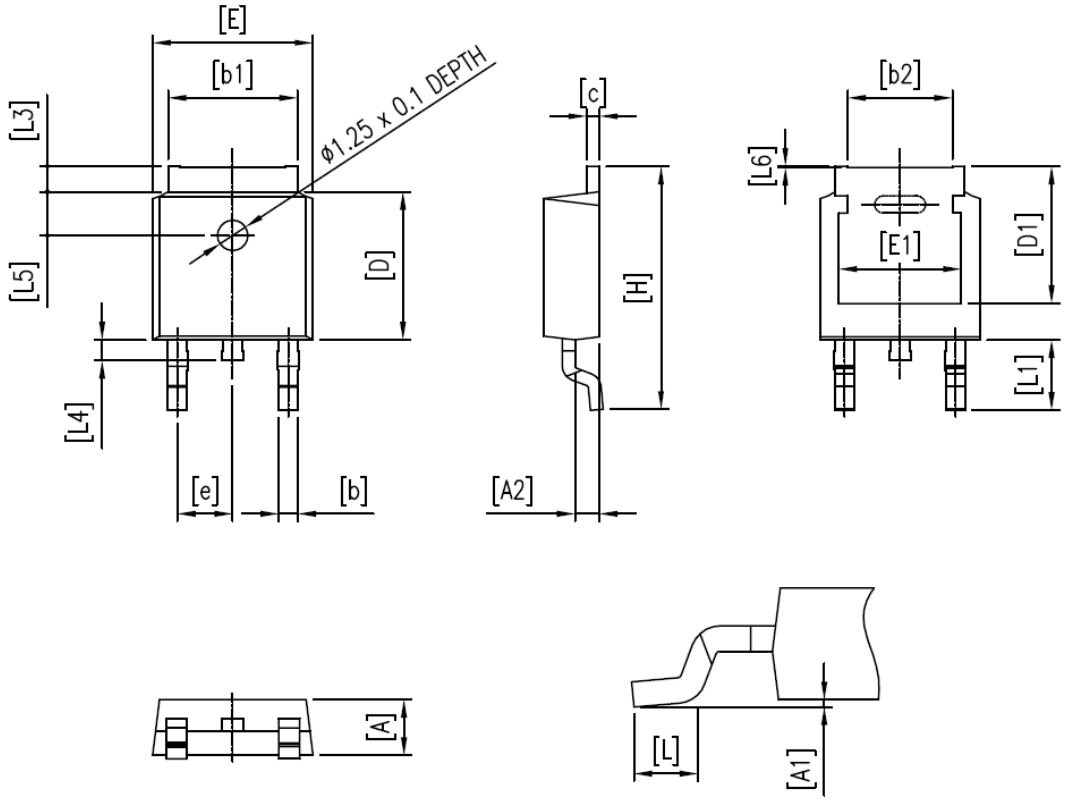


Fig. 18 Diode recovery waveform

WPMtek

Package Information

TO-252(A) Package Outline

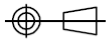


SCALE 2:1

* TO252 : DEFAULT
TO252A : LARGE FRAME

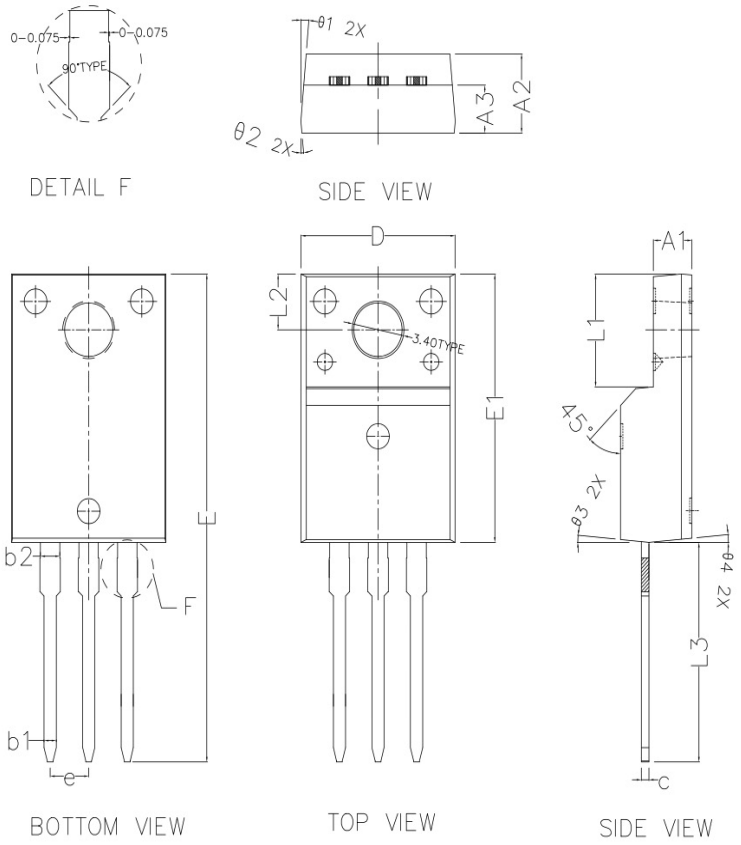
DIM.		MILIMETERS	
		MIN.	MAX.
A		2.20	2.38
A1		0.00	0.15
A2		0.90	1.10
b		0.72	0.85
b1		5.23	5.46
b2		4.27	4.37
b3		0.78	0.90
c		0.47	0.55
D		6.00	6.20
D1	TO252	5.40 REF	
	TO252A	5.65 REF	
E1	TO252	4.70	4.92
	TO252A	4.95	5.15
e		2.286 BSC	
H		9.90	10.20
L		1.40	1.70
L1		2.90 REF	
L3		0.90	1.20
L4		0.75	0.95
L5		1.70	1.90
L6		0.00	0.12

PROJECTION : 3rd



WPMtek

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		

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 particu lar 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 futher information.