ZHEJIANG UNIU-NE Technology CO.,LTD

浙 江 宇 力 微 新 能 源 科 技 有 限 公 司

AP1310(K) Data Sheet

V 3.0

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
100V	13mΩ@10V	55 A

Packages

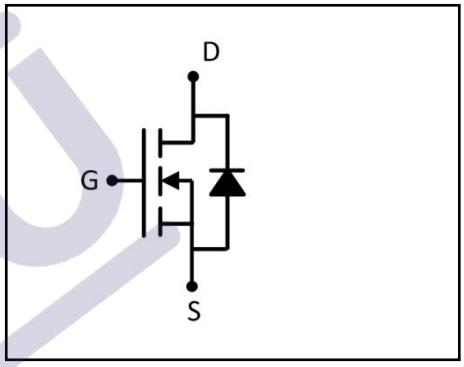
TO252

TO220

Key Feature

- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability

Schematic diagram



Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AP1310K	AP1310K	TO-252-3L	-	-	2500
AP1310	AP1310	TO-220-3L	-	-	1000

ABSOLUTE MAXIMUM RATINGS (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value		Unit
		TO-252	TO-220	
Drain-Source Voltage	V_{DC}	100		V
Gate-Source Voltage	V_{GS}	+20/-12		V
Continuous Drain Current	I_D	55		A
Pulsed Drain Current	I_{DM}	210		A
Single pulse avalanche energy	EAS	115		mJ
Power Dissipation	P_D	80	120	W
Thermal Resistance from Junction to Case	$R_{\Theta JC}$	1.8	0.92	°C/W
Thermal Resistance from Junction to Ambient	$R_{\Theta JA}$	75	62.5	°C/W
Junction Temperature	T_J	150		°C
Storage Temperature	T_{STG}	-55~+150		°C

MOSFET ELECTRICAL CHARACTERISTICS(Ta=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =—250μA	100	—	—	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=100V, V_{GS}= 0V	—	—	1	μA
Gate-body leakage current	IGSS	V_{GS} =+20V/-12V, V_{DS} = 0V	—	—	±100	nA
Gate threshold voltage(1)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1	1.5	2.5	V
Drain-source on-resistance(1)	$R_{DS(on)}$	V_{GS} =10V, I_D=25A	—	11	—	mΩ
		V_{GS} =4.5V, I_D =20A	—	15	—	
Forward tranconductance(1)	g_{FS}	V_{DS}=10V, I_D=10A	—	10	—	S
Dynamic characteristics(2)						
Input Capacitance	C_{iss}	V_{DS} =50V, V_{GS} =0V, f =1 MHz	—	1640	—	pF
Output Capacitance	C_{oss}		—	240	—	
Reverse Transfer Capacitance	C_{rss}		—	4	—	
Switching characteristics(2)						
Turn-on delay time	$t_{d(on)}$	V_{DD}=50V, I_D=1A, R_L=6Ω V_{GS}=10V, R_G=1Ω	—	14.2	—	ns
Turn-on rise time	t_r		—	20.8	—	
Turn-off delay time	$t_{d(off)}$		—	42	—	
Turn-off fall time	t_f		—	30	—	
Total Gate Charge	Q_g	V_{DS}=50V, I_D=10A, V_{GS}=10V	—	27.8	—	nC
Gate-Source Charge	Q_{gs}		—	3.5	—	
Gate-Drain Charge	Q_{gd}		—	8.8	—	
Source-Drain Diode characteristics						
Diode Forward voltage(1)	VDS	V_{GS} =0V, I_S=1A	—	—	1	V

NOTES:

1.Pulse test; pulse width≤300μs, duty cycle≤2%.

2.Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

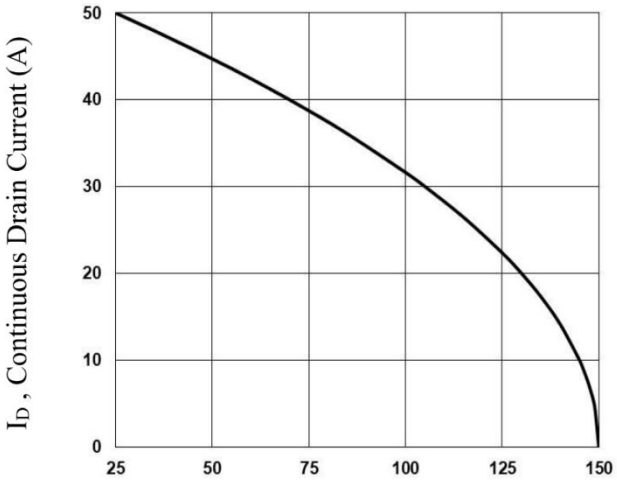


Fig.1 Continuous Drain Current vs. T_C

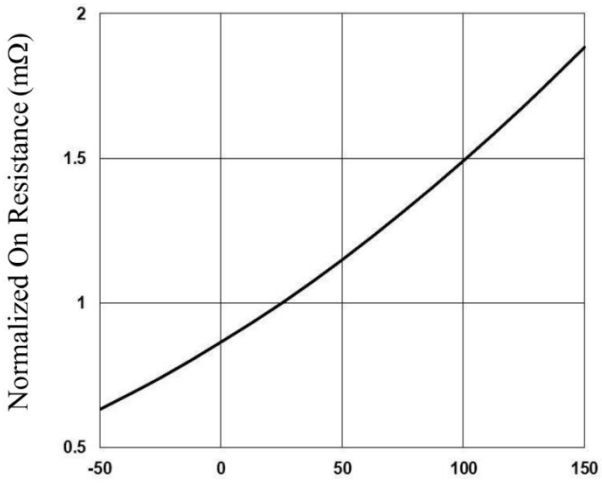


Fig.2 Normalized RDSON vs. T_J

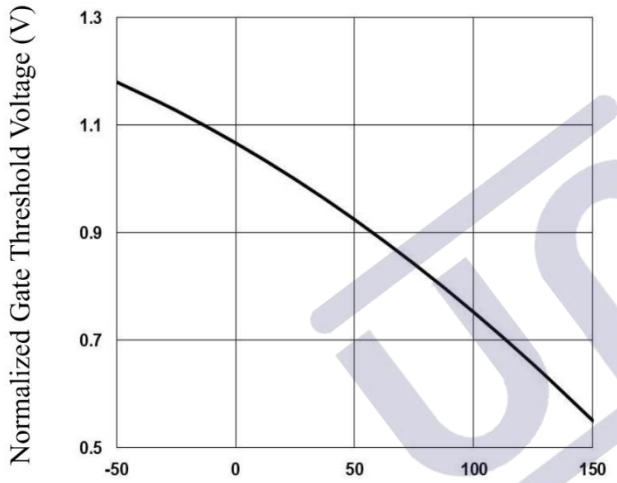


Fig.3 Normalized Vth vs. T_J

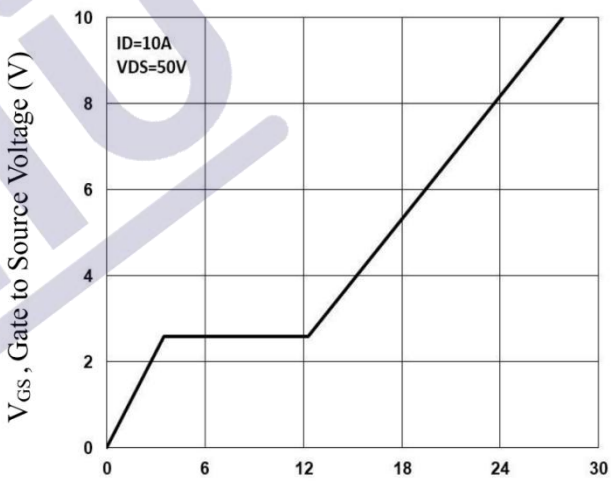


Fig.4 Gate Charg Characteristics

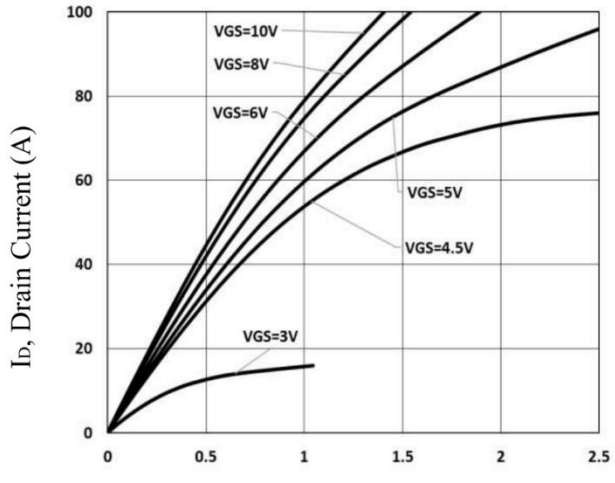


Fig.5 Typical Output Characteristics

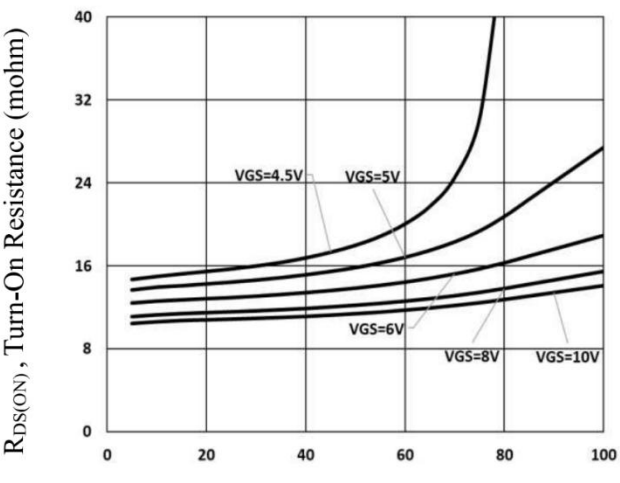


Fig.6 Turn-On Resistance vs.I_D

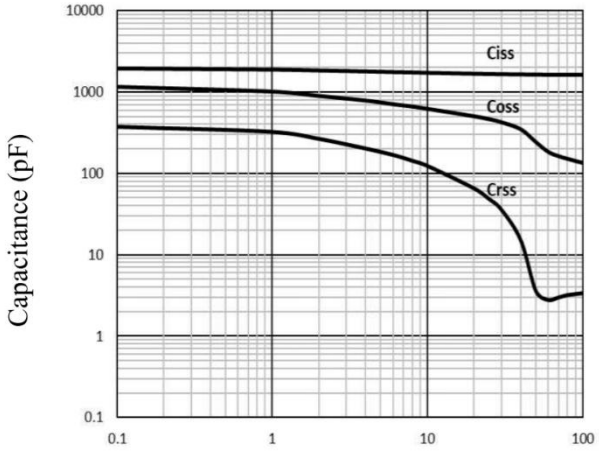


Fig.7 Capacitance Characteristics

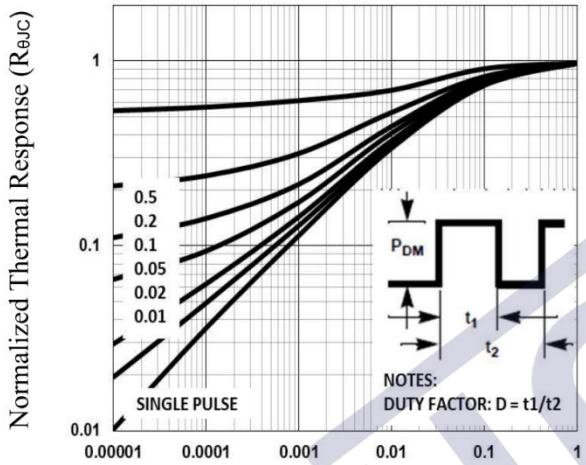


Fig.8 Normalized Transient Impedance

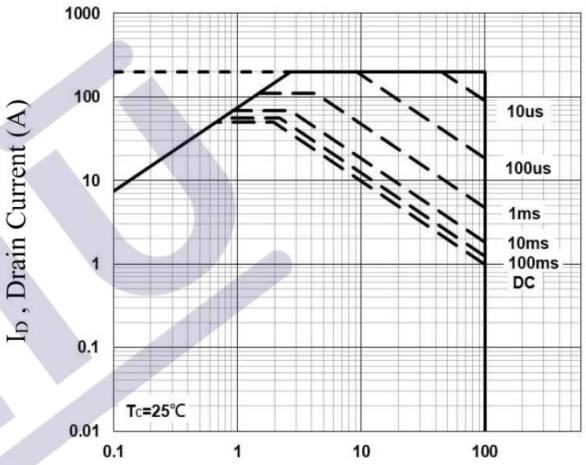


Fig.9 Maximum Safe Operation Area

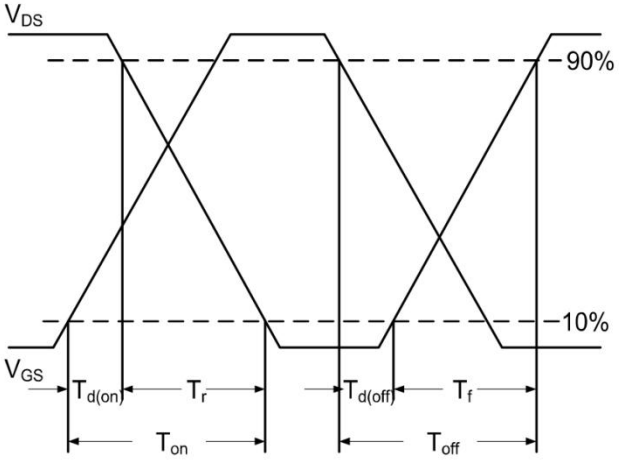


Fig.10 Switching Time Waveform

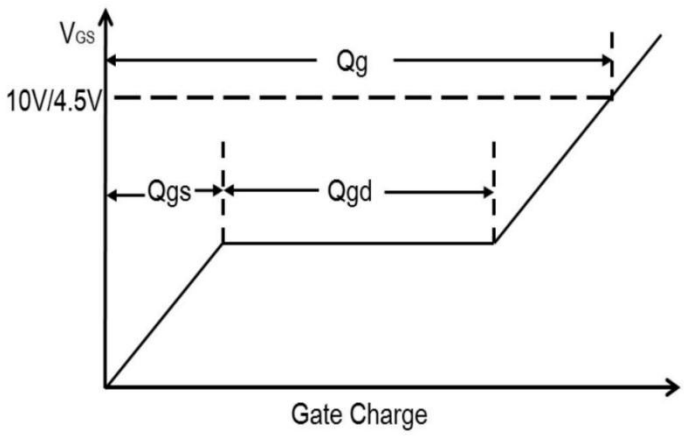
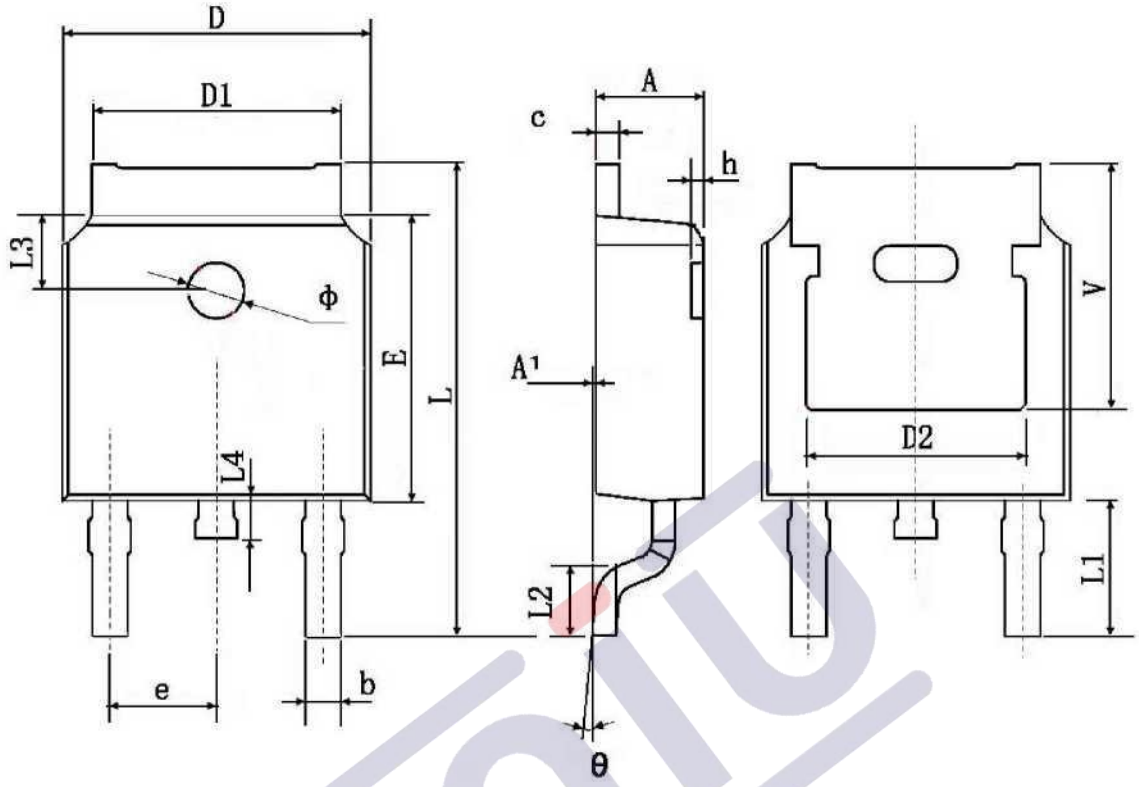


Fig.11 Gate Charge Waveform

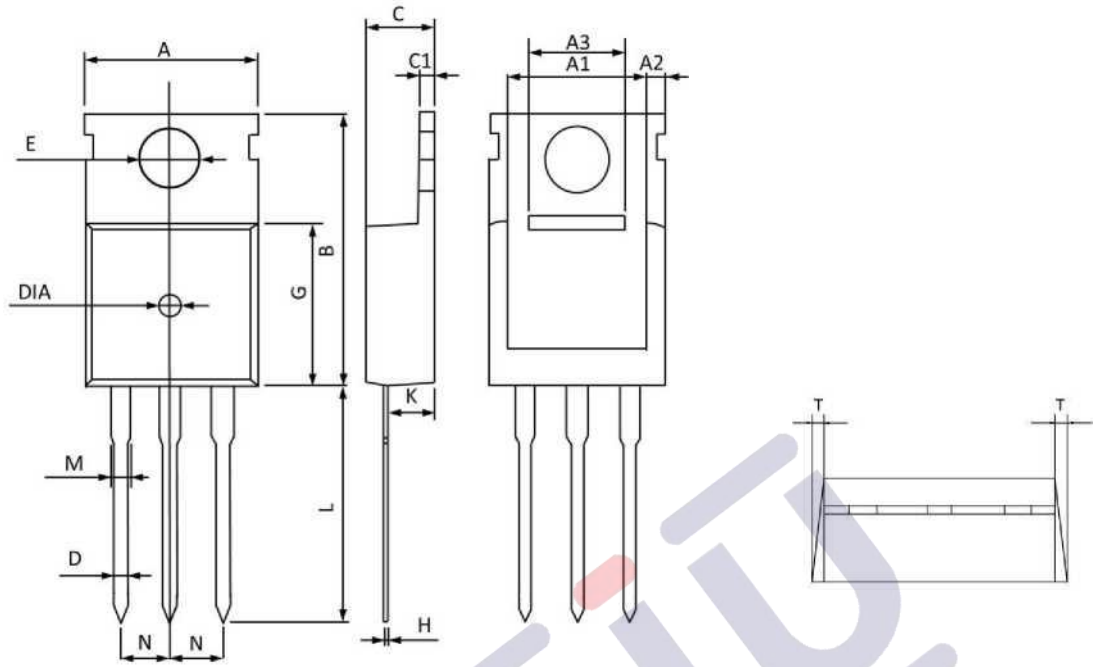
Package Information

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

TO-220



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.300	9.700	0.406	0.382
A1	8.840	8.440	0.348	0.332
A2	1.250	1.050	0.049	0.041
A3	5.300	5.100	0.209	0.201
B	16.200	15.400	0.638	0.606
C	4.680	4.280	0.184	0.169
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	3.800	3.400	0.150	0.134
G	9.300	8.700	0.366	0.343
H	0.600	0.400	0.024	0.016
K	2.700	2.100	0.106	0.083
L	13.600	12.800	0.535	0.504
M	1.500	1.100	0.059	0.043
N	2.590	2.490	0.102	0.098
T	W0.35		W0.014	
DIA	Φ1.5TYP.	deep0.2 TYP.	Φ0.059 TYP.	deep0.008 TYP.

1.版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2019/05/21	2.0	Change the package
2021/10/25	3.0	Add-on package

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