N-CHANNEL POWER MOSFET MEM4N65

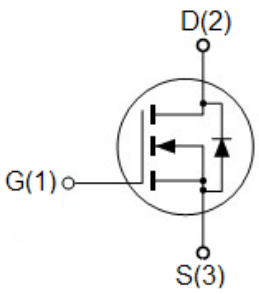
General Description

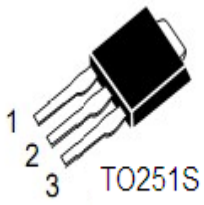
The MEM4N65 is a high voltage power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristic. This power MOSFET is usually used in high speed switching applications including power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

Features

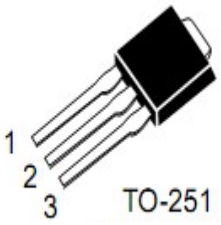
- 650V，4A
- RDS(ON)=2.1Ω@VGS=10V
- LOW CRSS
- FAST SWITCHING
- PACKAGE :TO251,TO251S,TO252,TO-220F

Pin Configuration

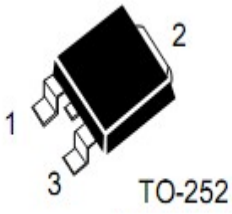




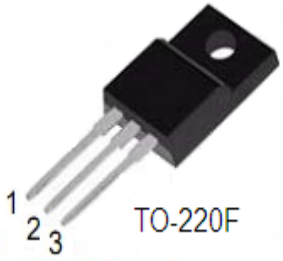
MEM4N65THDG



MEM4N65THG



MEM4N65K3G



MEM4N65A3G

Maximum Ratings(Ta=25℃)

Parameter		Symbol	Ratings		Unit
Drain-Source Voltage		V_{DSS}	650V		V
Gate-Source Voltage		V_{GSS}	±30		V
Drain Current	T_A=25℃	I_D	4		A
	T_A=100℃		2.5		
Pulsed Drain Current(Note1、2)		I_{DM}	16		A
Avalanche Energy	Single Pulsed(Note1)	E_{AS}	240		mJ
	Repetitive (Note2)	E_{AR}	10.6		
Total Power Dissipation	T_A=25℃	Pd	TO-251	50	W
			TO-220F	33	
			TO-252	57	
Operating Temperature Range		T_{Opr}	-55-150		℃
Storage Temperature Range		T_{stg}	-55-150		℃

Thermal Characteristics

Parameter	Symbol		TYP	Unit
Thermal Resistance,Junction-to-Case	RθJC	TO-220F	3.8	℃/W
		TO-252	2.2	
		TO-251	0.68	

Electrical Characteristics

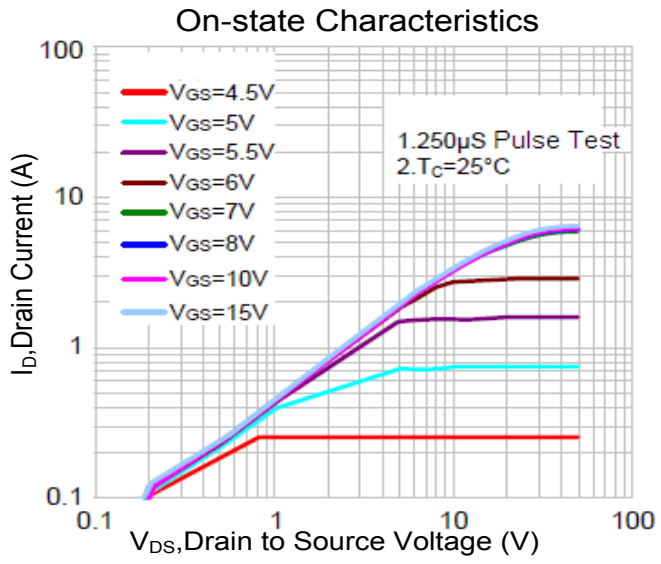
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	650	710	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250μA	2.0	3.05	4.0	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V，V_{GS}=30V	-	1.1	100	nA
		V_{DS}=0V，V_{GS}=-30V	-	0.1	-100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V V_{GS}=0V	-	0.1	1	μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1A	-	2.1	2.7	Ω
Forward Transconductance	g_{FS}	V_{DS} =15V, I_D= 2A	-	3.2	10	S
Drain-Source Diode Forward Continuous Current	Is	V_{GS}=0V	-	-	4	A
Source-drain (diode forward) voltage	V_{SD}	V_{GS}=0V,I_S=2A	-	0.85	1.4	V
Dynamic Characteristics						
Input Capacitance	Ciss	V_{DS} = 25 V,	-	556	710	pF
Output Capacitance	Coss	V_{GS} = 0 V,	-	50	80	
Reverse Transfer Capacitance	Crss	f = 1 MHz	-	3	12	
Switching Characteristics						
Turn-On Delay Time	td(on)	V_{DD} = 325 V,	-	20	-	ns
Rise Time	tr	R_G = 25Ω	-	19.2	-	
Turn-Off Delay Time	td(off)	V_{GS} = 10V	-	106	-	
Fall-Time	tf	I_D = 4A	-	20	-	
		(Note2、3)				
Total Gate Charge	Qg	V_{DS} = 520V,		15.6	-	nc
Gate-Source Charge	Qgs	V_{GS} = 10V,	-	3.5	-	
Gate-Drain Charge	Qgd	I_D = 4A	-	5.6	-	
		(Note2、3)				

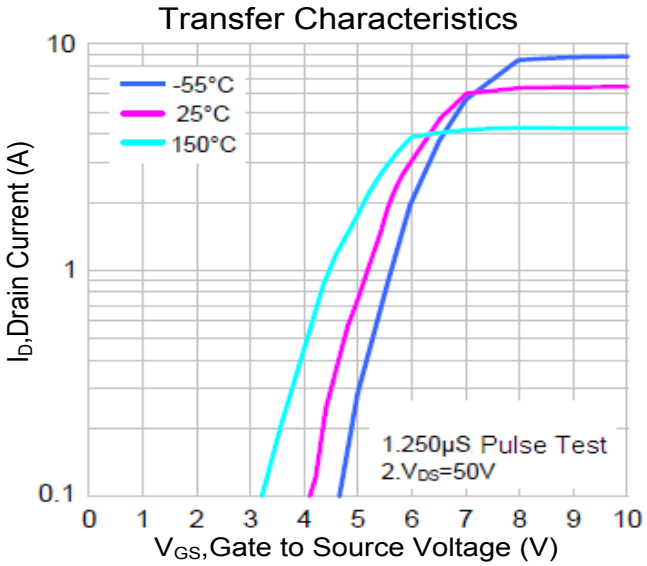
1、L=27.5mH,V_{DD}=50V,I_D=4.0A,R_G=25Ω,Starting T_J=25℃.

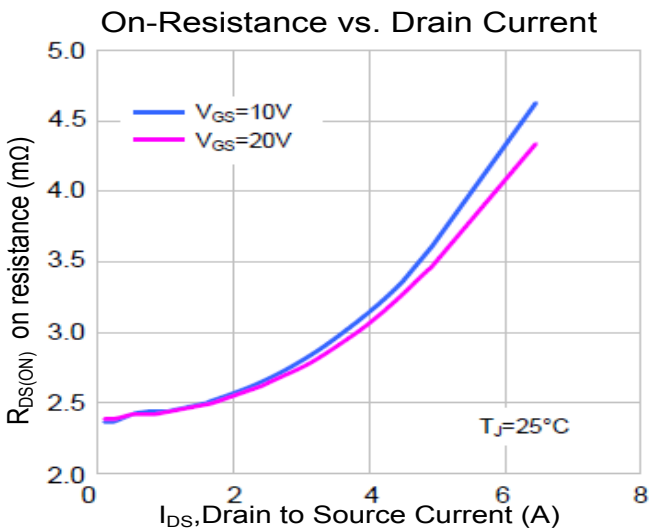
2、Pulse width <300μs , duty cycle <2%.

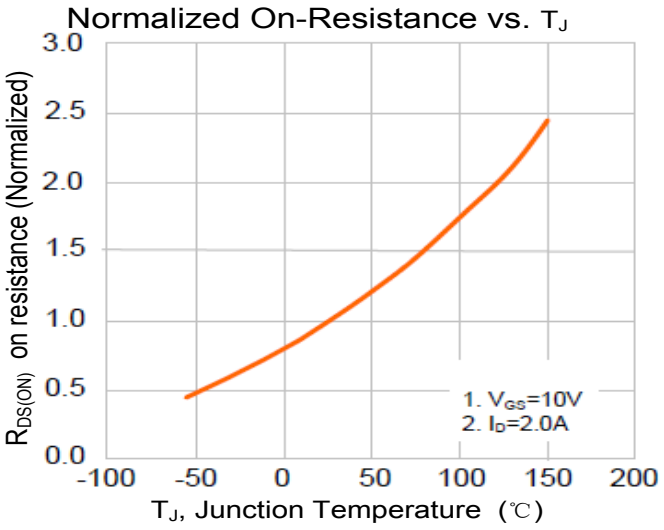
3、Not influenced by junction temperature.

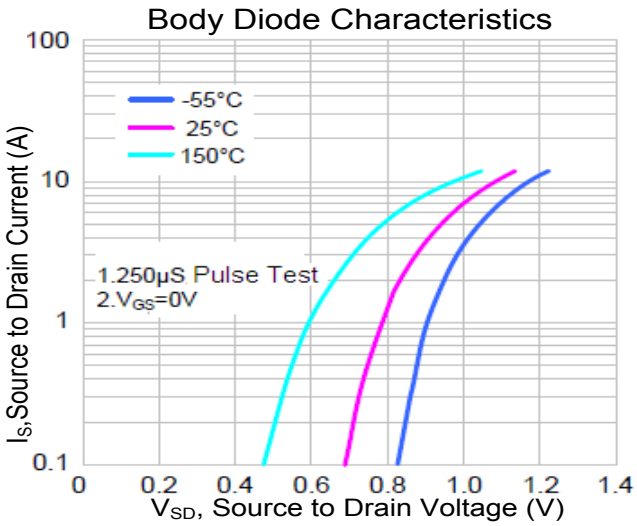
Typical performance characteristics

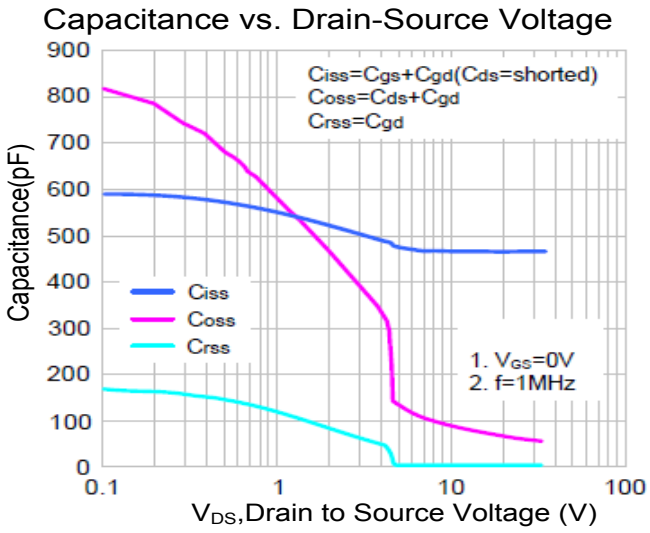




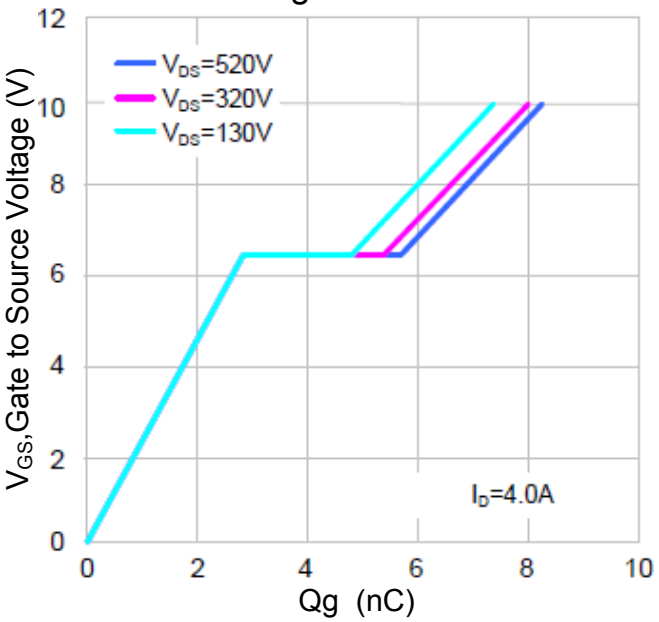




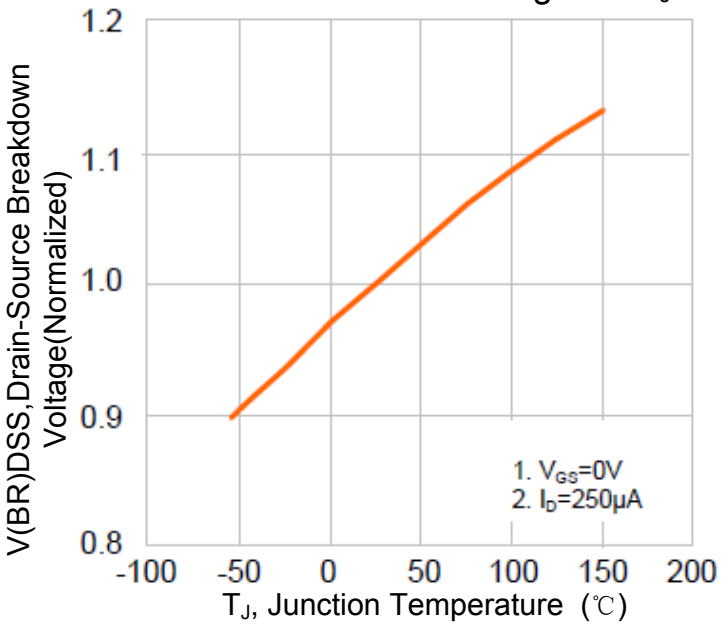




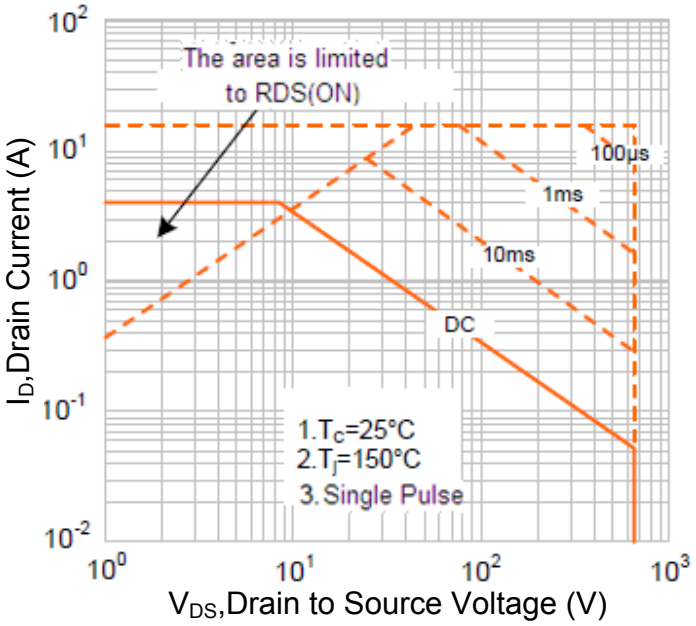
Gate Charge Characteristics



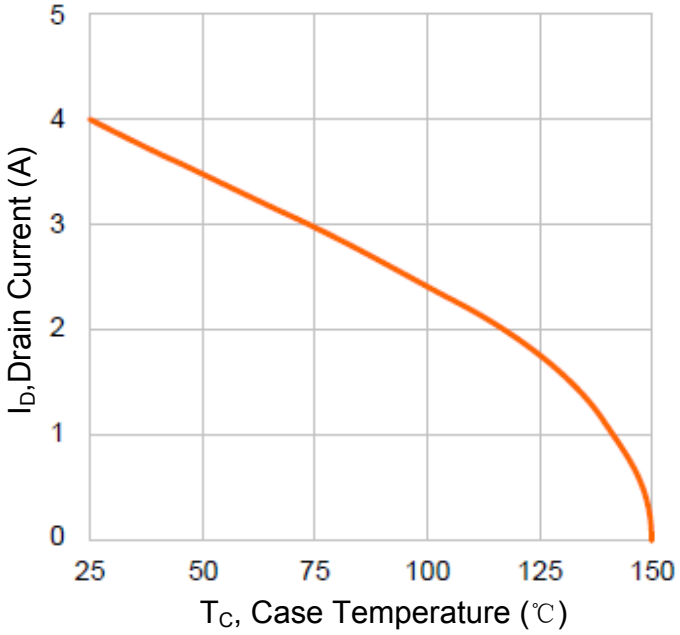
Drain-Source Breakdown Voltage vs. T_J



The maximum safe operating area

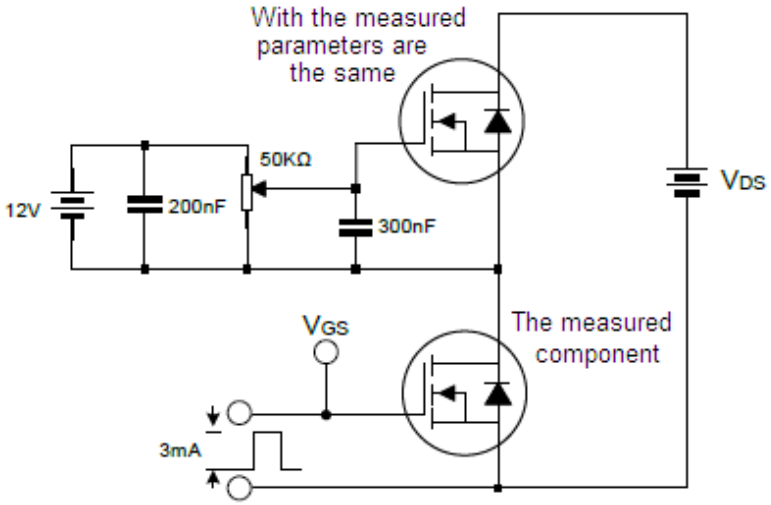


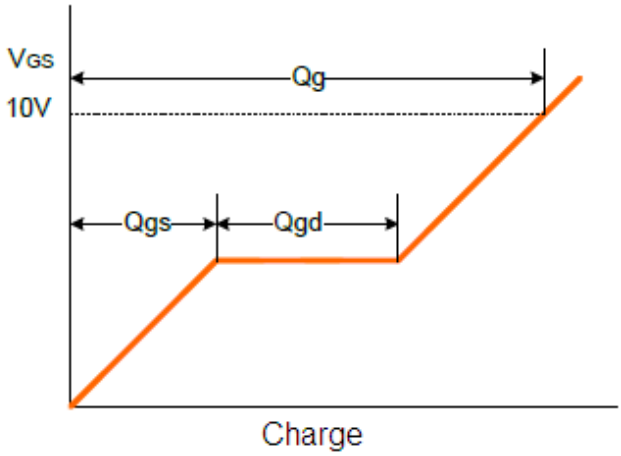
The maximum Drain Current vs. Tc



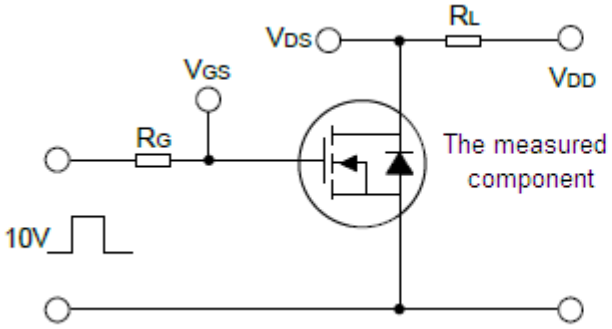
Typical Circuit

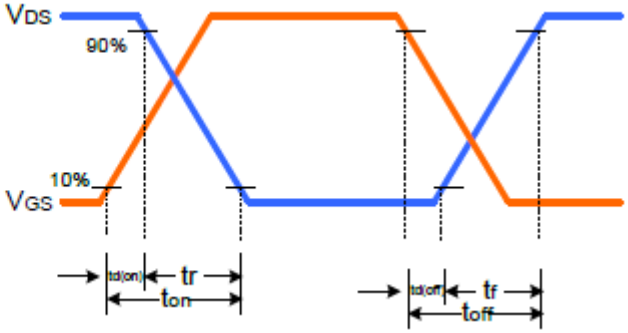
Gate Charge Testing circuit with Waveform



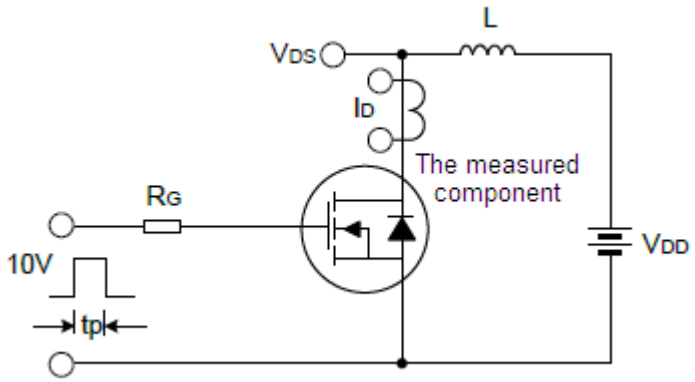


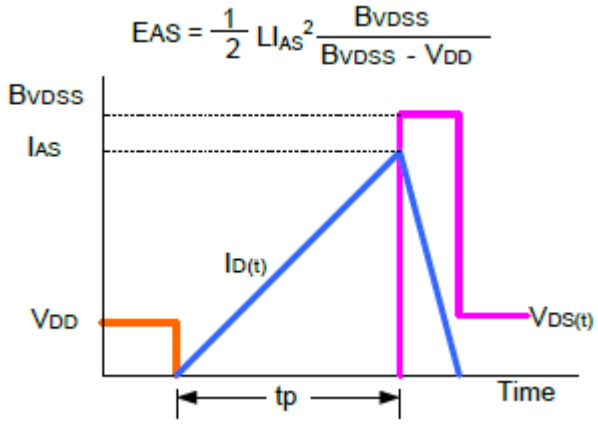
Switching test circuit with Waveform





Eas Test circuit and Waveform

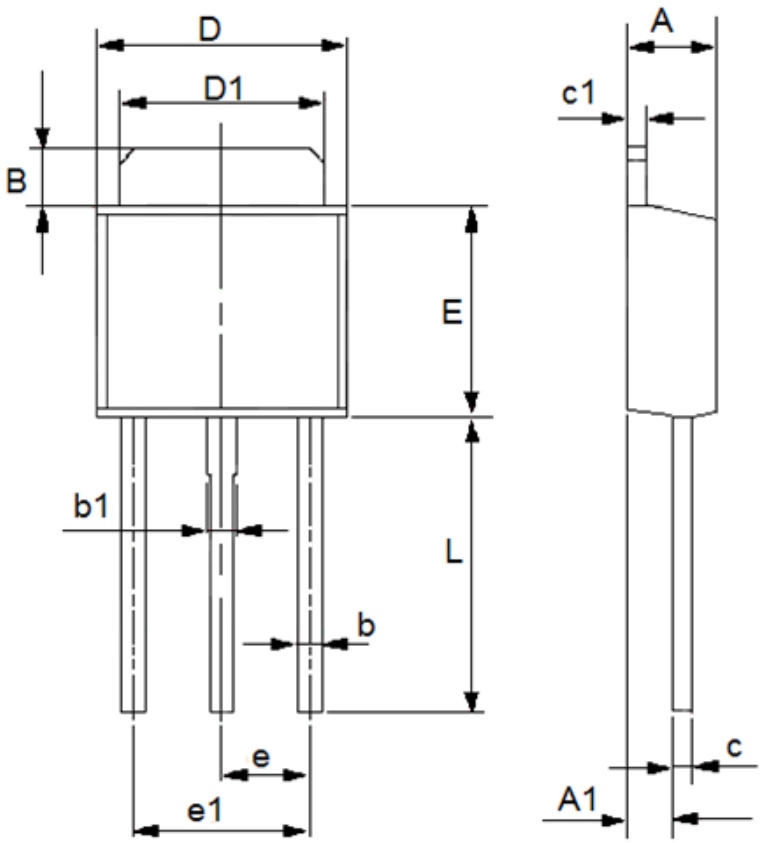




Package Information

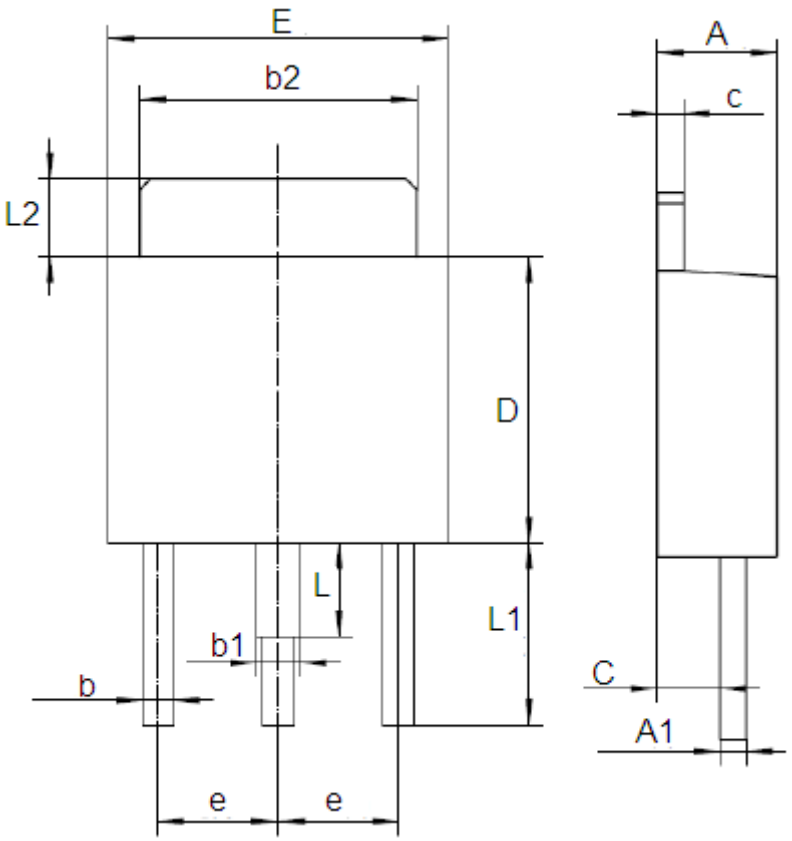
NOTE:（ A)、(B)、(C）…on behalf of the different shapes of the size, the difference is not large, the company random delivery. These sizes are in line with our product requirements, please rest assured that the use of.

- **Package Type:TO-251（A）**



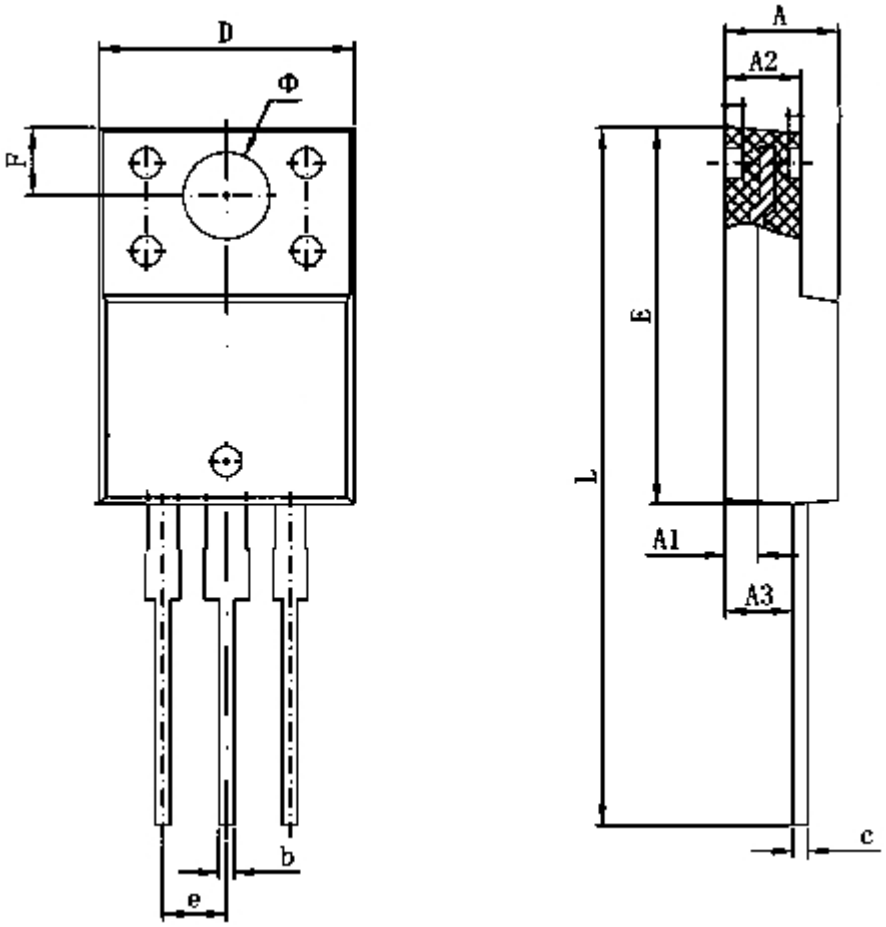
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.2	2.47	0.0866	0.0972
A1	1.05	1.35	0.0413	0.0531
B	1.35	1.65	0.0531	0.065
b	0.5	0.75	0.0197	0.0295
b1	0.7	0.95	0.0276	0.0374
D	6.35	6.68	0.25	0.263
D1	5.2	5.4	0.2047	0.2126
E	5.35	5.75	0.2106	0.2263
e	2.3(TYP)		0.0906(TYP)	
e1	4.6(TYP)		0.1811(TYP)	
L	7.5	8.25	0.2953	0.3248
c	0.5(TYP)		0.0197(TYP)	
c1	0.5(TYP)		0.0197(TYP)	

- **Package Type:TO-251（S）**



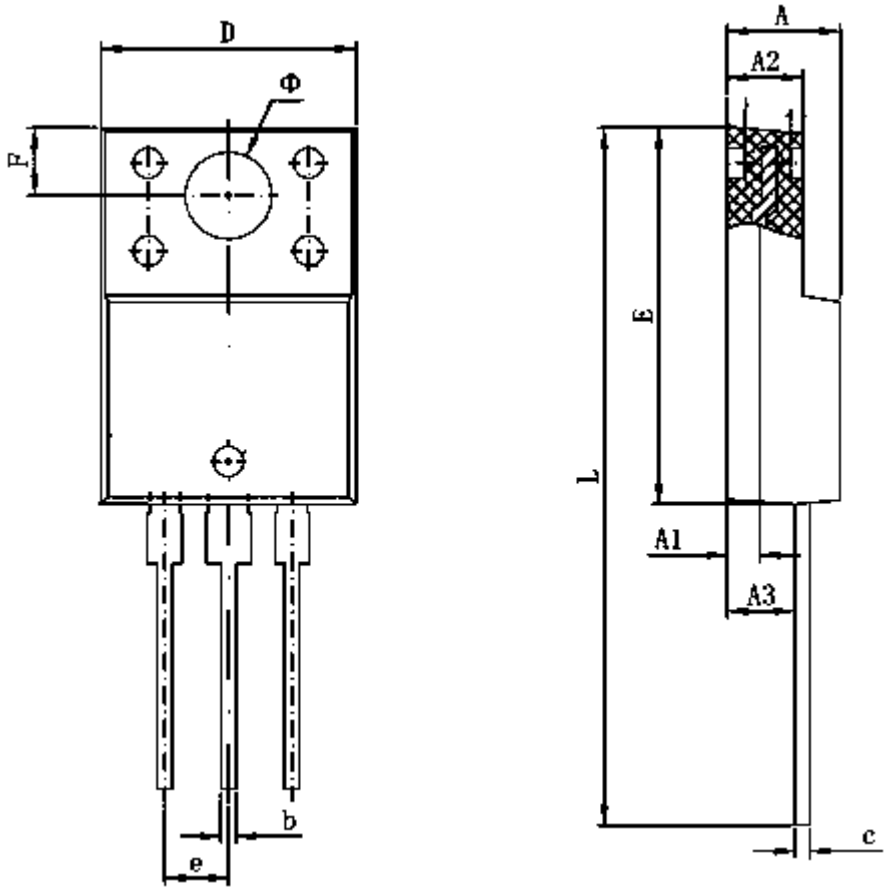
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.3 REF		0.0905 REF	
A1	1.2 REF		0.047 REF	
b	0.6 REF		0.0236 REF	
b1	0.65	0.95	0.0256	0.0374
b2	5.3 REF		0.2087 REF	
c	0.51 REF		0.0201 REF	
D	5.5 REF		0.2165 REF	
E	6.5 REF		0.2559 REF	
e	2.3 REF		0.0905 REF	
L	1.7 REF		0.0669 REF	
L1	3.2	3.7	0.126	0.1457
L2	1.35	1.65	0.053	0.65

- **Package Type:TO-220F（A）**



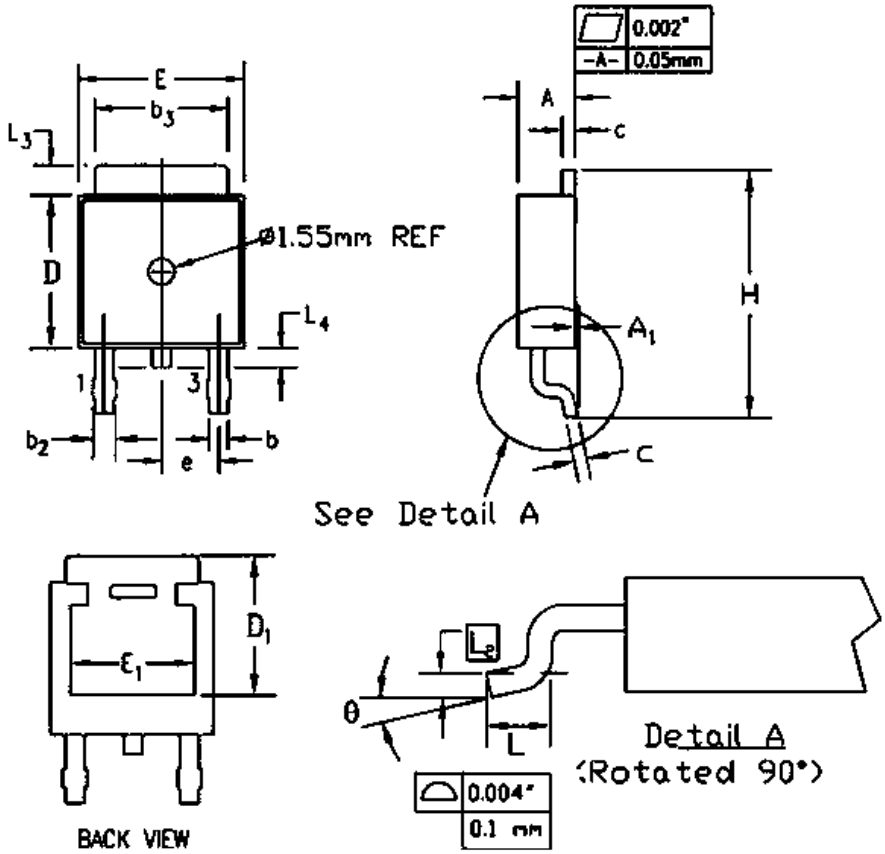
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	4.5	4.9	0.1771	0.1929
A1	0.75	1.05	0.0295	0.0413
A2	2.35	2.75	0.0925	0.1083
A3	2.65	2.85	0.1043	0.1122
b	0.75	0.85	0.0295	0.0334
c	0.45	0.6	0.0177	0.0236
D	10	10.32	0.3937	0.4063
E	15.65	16.05	0.6161	0.6319
e	2.54REF		0.100REF	
F	3.2	3.4	0.1260	0.1338
Φ	3.08	3.28	0.1212	0.1291
L	28.45	29.25	1.1201	1.1516

- **Package Type:TO-220F（B）**



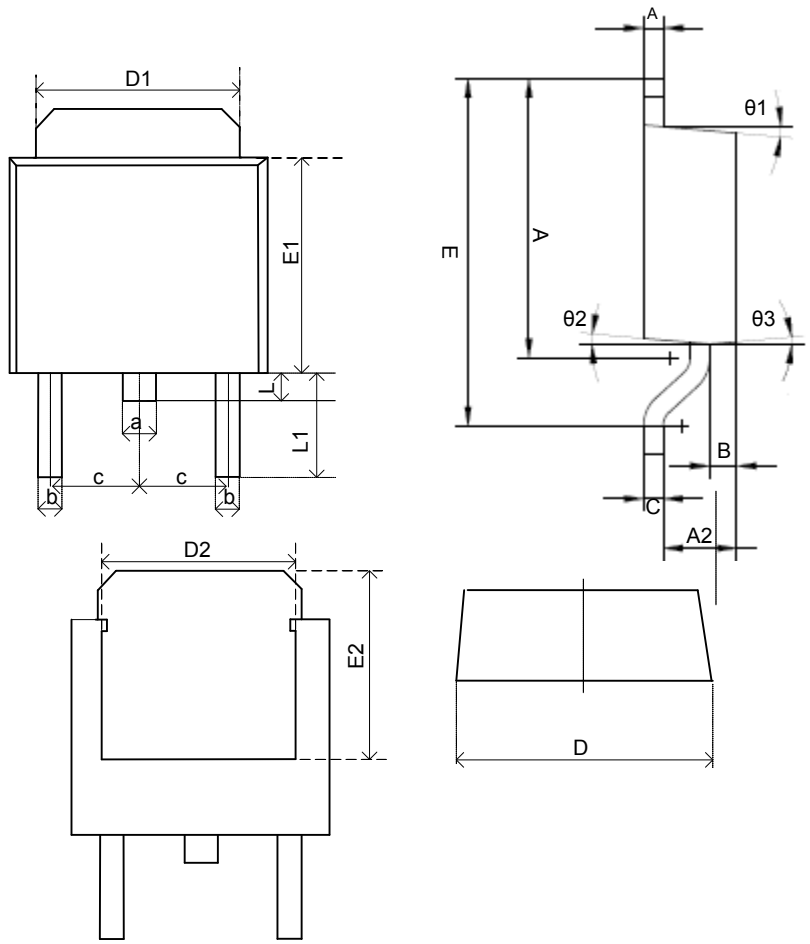
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	4.5	4.9	0.1771	0.1929
A1	0.75	1.05	0.0295	0.0413
A2	2.35	2.75	0.0925	0.1083
A3	2.65	2.9	0.1043	0.1142
b	0.75	0.85	0.0295	0.0334
c	0.45	0.6	0.0177	0.0236
D	10	10.32	0.3937	0.4063
E	15.65	16.15	0.6161	0.6358
e	2.54REF		0.100REF	
F	3.2	3.4	0.1260	0.1338
Φ	3.08	3.28	0.1212	0.1291
L	26.2	29.8	1.0315	1.1732

- **Package Type:TO-252(A)**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.19	2.38	0.086	0.094
A1	-	0.13	-	0.005
b	0.64	0.89	0.025	0.035
b2	0.84	1.14	0.033	0.045
b3	5.21	5.46	0.205	0.215
c	0.46	0.61	0.018	0.024
D	5.97	6.22	0.235	0.250
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.7	4.9	0.185	0.1929
e	2.2	2.4	0.0866	0.0945
H	9.65	10.41	0.380	0.410
L	1.40	1.78	0.055	0.070
L2	0.51REF		0.020REF	
L3	0.89	1.27	0.035	0.050
L4	0.6	1.01	0.0236	0.040
θ	0°	8°	0°	8°

● **Package Type:TO-252（B）**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	7.0	7.4	0.2756	0.2913
B	0.6	0.8	0.0236	0.0315
C	0.5REF		0.0197REF	
D	6.5	6.7	0.2559	0.2638
D1	5.3REF		0.2087REF	
D2	4.6	4.8	0.1811	0.189
E	8.8	9.2	0.3464	0.3622
E1	5.4	5.8	0.2126	0.2283
E2	4.78	4.98	0.1882	0.1961
L	0.35	0.95	0.0138	0.0374
L1	2.35	2.95	0.0925	0.1161
a	0.85REF		0.0335REF	
b	0.6	0.8	0.0236	0.0315
c	2.3REF		0.0905REF	
θ1 θ2	5°REF		0.1968°REF	
θ3	0.5° REF		0.0197° REF	

- The information described herein is subject to change without notice.
- Nanjing Micro One Electronics Inc is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and/or reproduction or copying without the express permission of Nanjing Micro One Electronics Inc is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of Nanjing Micro One Electronics Inc.
- Although Nanjing Micro One Electronics Inc exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.