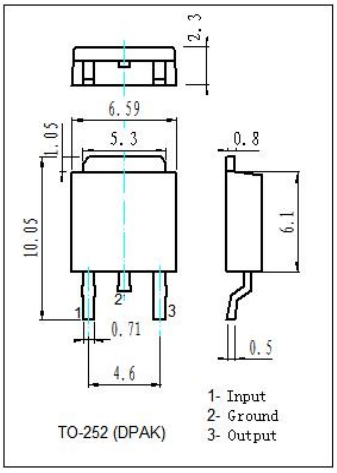
Three-Terminal 1.0A Positive Voltage Regulator

1 Description and Characteristics

The 78MXXA Of three-terminal Positive Regulator Is Available in TO-252 Package Making it Useful in a Wide Range of Applications.



2 Feature

- Output Current TO 1.0A
- Output Voltage of 5V, 6V, 8V, 9V, 10V, 12V, 15V
- Thermal Overload Protection
- Short Current Protection
- Output Transistor Safe Protection
- Package: TO-252(DPAK), Pin Configuration: I G O
- Compliant with the RoHS standard

3 Electric Characteristics

3.1 Absolute Maximum Ratings

Ta=25℃(unless otherwise specified)

Parameter	Symbol	Rating	Unit
DC Intput Voltage	V_I	35	V
Output Current	I_O	1.0	A
Thermal resistance junction-air	$R_{\theta JA}$	87	℃/W
Thermal resistance junction-cases	$R_{\theta JC}$	6.67	℃/W
Operating Junction Temperature Range	T_{opr}	0～125	℃
Storage Temperature Range	T_{stg}	-65～150	℃

3.2 Electric Parameters

78M05A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=10V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=10V,I_O=500mA		4.9	5.0	5.1	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=8V～20V		4.9	5.0	5.1	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=7.5V～20V			100	mV
			V_I=8V～12V			50	
Load Regulation	△V_O	T_j=25℃, V_I=10V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=10V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=8V～25V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			0.8		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=8V～18V, T_J=+25℃		62	73		dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			15		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			220		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.6		A

*V_O Grading: ±1%, ±2%

78M06A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=11V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=11V,I_O=500mA		5.88	6.0	6.12	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=9V～21V		5.88	6.0	6.12	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=8.5V～25V			120	mV
			V_I=9V～13V			60	
Load Regulation	△V_O	T_j=25℃, V_I=11V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=11V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=9V～25V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			0.8		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=9V～19V, T_J=+25℃		59	68		dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			17		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			200		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.6		A

*V_O Grading: ±1%, ±2%

78M08A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=14V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=14V,I_O=500mA		7.84	8.0	8.16	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=11.5V～23V		7.84	8.0	8.16	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=10.5V～25V			160	mV
			V_I=11V～17V			80	
Load Regulation	△V_O	T_j=25℃, V_I=14V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=14V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=11.5V～25V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			1.0		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=11.5V～21.5V, T_J=+25℃		56	62		dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			18		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			200		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.6		A

*V_O Grading: ±1%, ±2%

78M09A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=15V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=15V,I_O=500mA		8.82	9.0	9.18	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=12.5V～24V		8.82	9.0	9.18	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=11.5V～26V			180	mV
			V_I=12V～18V			90	
Load Regulation	△V_O	T_j=25℃, V_I=15V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=15V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=12.5V～25V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			1.2		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=12.5V～22.5V, T_J=+25℃		56	61		dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			18		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			200		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.5		A

*V_O Grading: ±1%, ±2%

78M10A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=16V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=16V,I_O=500mA		9.80	10	10.2	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=12.5V～25V		9.80	10	10.2	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=12.5V～30V			200	mV
			V_I=13V～19V			100	
Load Regulation	△V_O	T_j=25℃, V_I=16V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=16V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=12.5V～30V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			1.3		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=13.5V～24V, T_J=+25℃		56			dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			18		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			200		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.5		A

*V_O Grading: ±1%, ±2%

78M12A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=19V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=19V,I_O=500mA		11.76	12.0	12.24	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=15.5V～27V		11.76	12.0	12.24	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=14.5V～30V			240	mV
			V_I=16V～22V			120	
Load Regulation	△V_O	T_j=25℃, V_I=19V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=19V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=15V～30V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			1.5		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=15V～25V, T_J=+25℃		55	60		dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			18		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			200		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.6		A

*V_O Grading: ±1%, ±2%

78M15A Electrical Characteristics

(Refer to test circuits,0<Tj<125°C,Io=500mA,Vi=23V,Ci=0.33μF, Co=0.1μF, unless otherwise specified)

Parameter	Symbol	Testing Conditions		Min	Typ	Max	Units
Output Voltage	V_O*	T_j=25℃,V_I=23V,I_O=500mA		14.7	15.0	15.3	V
Output Voltage	V_O	5.0mA<I_O<1.0A,P_O<15W V_I=17.5V～30V		14.7	15.0	15.3	V
Line Regulation	△V_O	T_j=25℃, Io=500mA	V_I=17.5V～30V			300	mV
			V_I=20V～26V			150	
Load Regulation	△V_O	T_j=25℃, V_I=23V	I_O=5mA～1.0A			100	mV
			I_O=250mA～750mA			50	
Quiescent Current	I_Q	T_j=25℃				8	mA
Quiescent Current Change	△I_Q	T_j=25℃,V_I=23V,I_O=5mA～1.0A				0.5	mA
		T_j=25℃,I_O=0.5A,V_I=17.5V～30V				0.8	
Output Voltage Drift	△V_O/△T	I_O=5mA, T_J=0～125℃			1.8		mV/℃
Output Noise Voltage	V_N	f=10Hz～100KHz, T_a=25℃			42		μV
Supply Voltage Rejection	SVR	f=120Hz, I_O=500mA V_I=21V～33V, T_J=+25℃		53			dB
Dropout Voltage	V_D	I_O=1.0A, T_j=25℃			2		V
Output Resistance	R_O	f=1KHz			18		mΩ
Short Circuit Current	I_{SC}	V_I=35V, T_a=25℃			200		mA
Short Circuit Peak Current	I_{PK}	T_j=25℃			1.6		A

*V_O Grading: ±1%, ±2%

4 Test Circuits

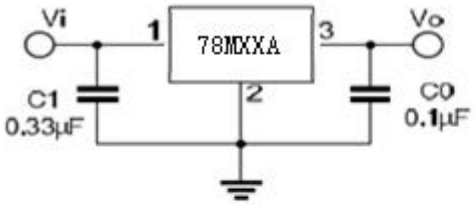


FIG.1 DC PARAMETERS

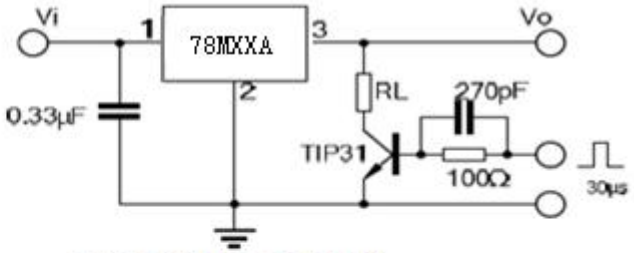


FIG.2 LOAD REGULATION

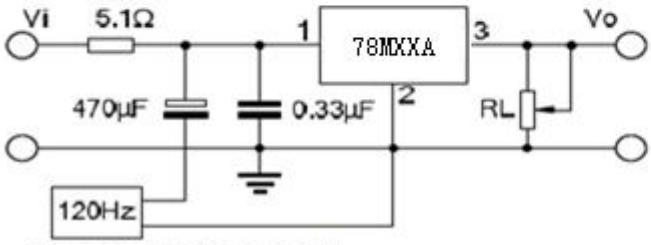


FIG.3 RIPPLE REJECTION

5 Application Circuits

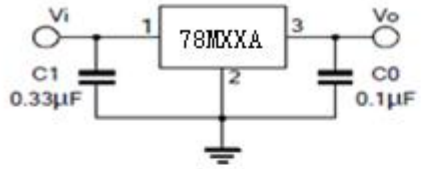


Fig.4 Fixed output regulator

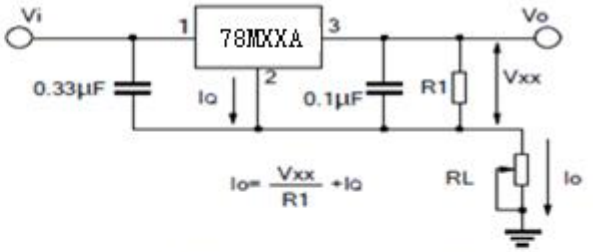


Fig.5 Constant current regulator

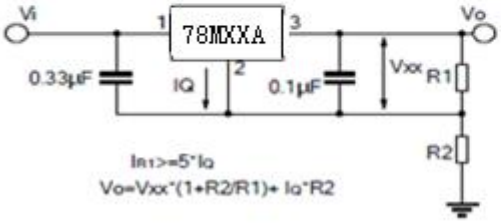


Fig.6 Circuit for increasing Regulator output voltage

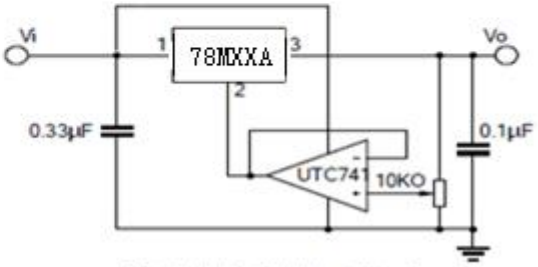


Fig.7 Adjustable output

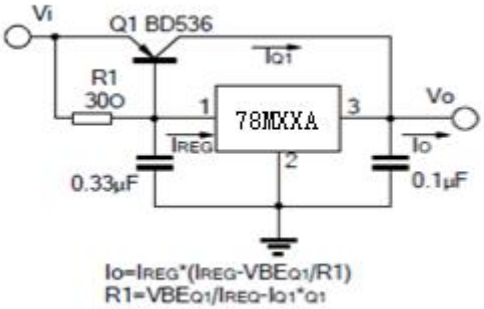


Fig.8 High current with voltage regulator

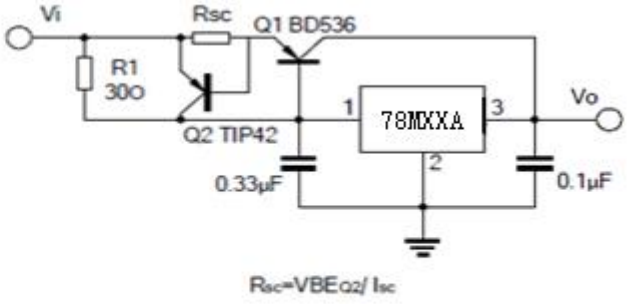


Fig.9 High output curent short circuit protection

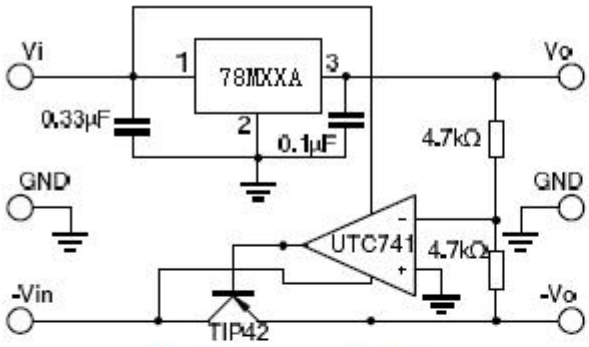


Fig.10 Tracking voltage regulator

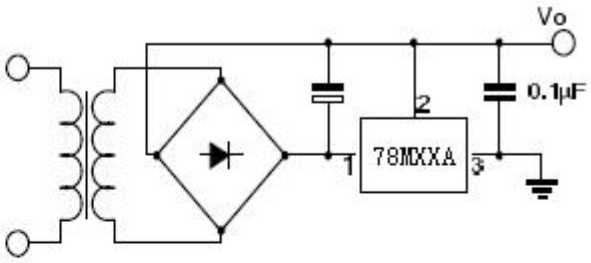


Fig.11 Negative output voltage ciruit

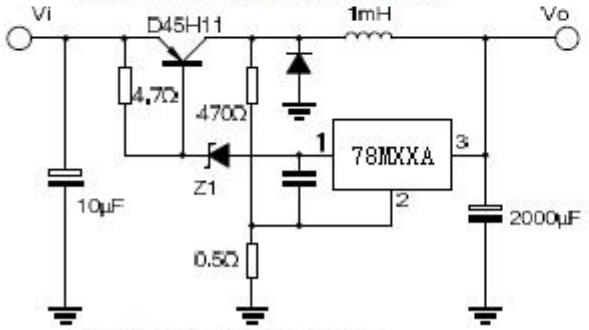


Fig.12 Switching regulator

6 Characteristic Cure

Fig. 1 Quiescent current

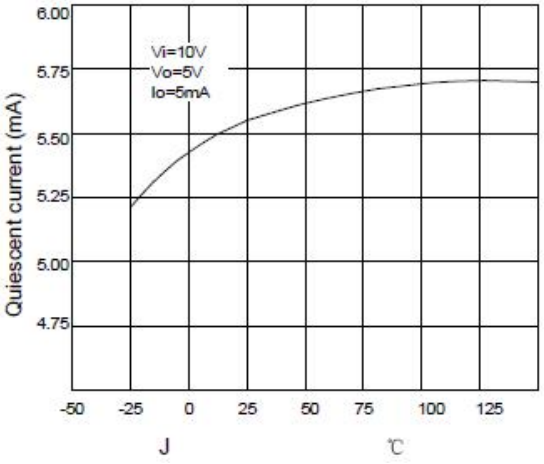


Fig. 2 Output voltage

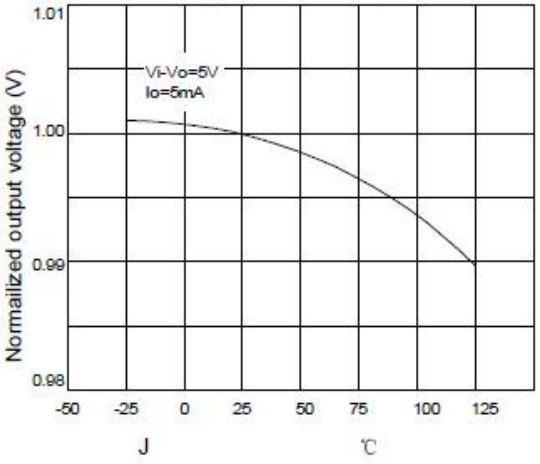


Fig. 3 Peak output current

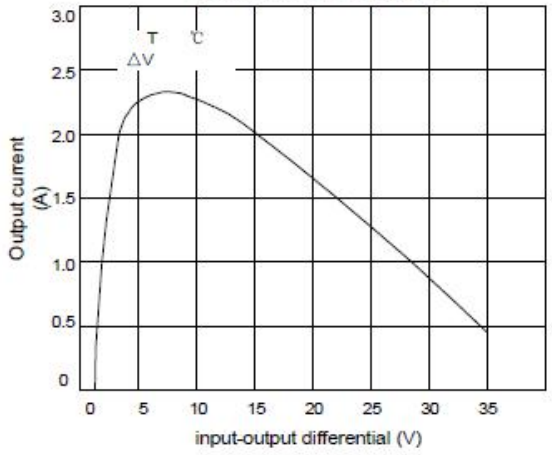
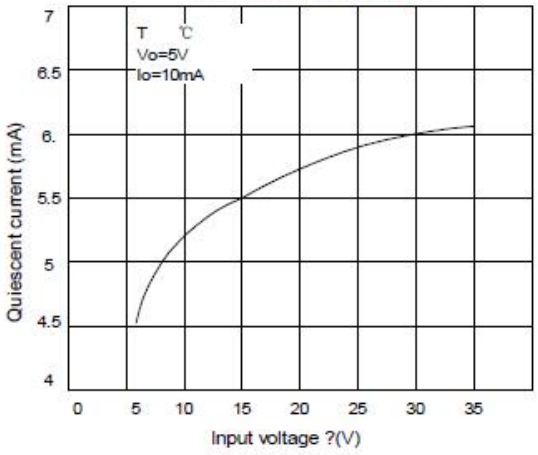
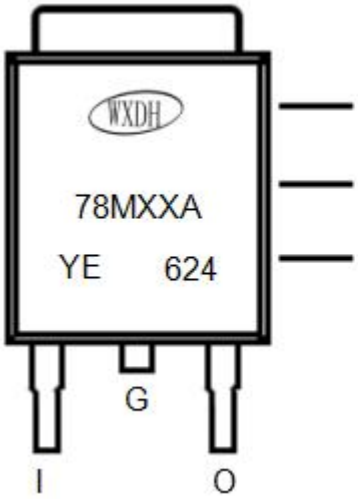


Fig. 4 Quiescent current



7 Marking



NO.1: LOGO WXDH

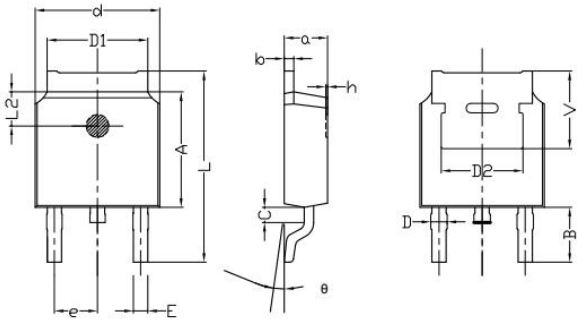
NO.2: Part Number 78MXXA

NO.3 Left: YE Production identification code

NO.3 Right: Assemblly Week Code, 624 On behalf of 24th natural week 2016 year

8 Dimension

TO-252B PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
a	2.20	2.40	0.087	0.095
b	0.46	0.58	0.018	0.023
c	0.70	0.90	0.028	0.035
D	0.80	1.00	0.032	0.039
d	6.30	6.70	0.248	0.264
D1	5.00	5.50	0.197	0.217
D2	TYP 4.83		TYP 0.190	
A	5.80	6.20	0.228	0.244
e	2.19	2.39	0.086	0.094
L	9.40	10.40	0.370	0.409
B	2.6	3.2	0.102	0.126
L2	1.5	1.8	0.059	0.071
θ	0	8	0	8
h	0	0.3	0	0.012
V	5.25	5.85	0.207	0.230

9 Attentions

- ROUM Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Roma products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

10 Appendix

Revision history:

Date	REV.	Description	Page
2017.05.15	1.0	Original	