

FMUN5111DW Thru FMUN5135DW

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FMUN5111DW Thru FMUN5135DW

PNP Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

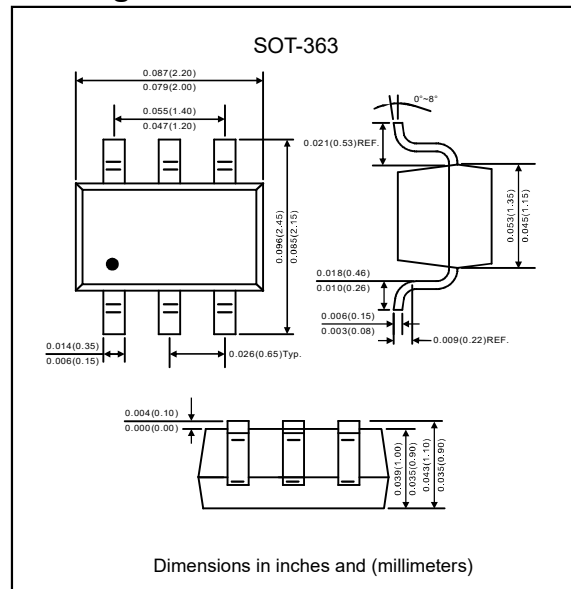
Features

- Simplifies circuit design.
- Reduces Board Space
- Reduces Component Count
- We declare that the material of product compliance with RoHs requirements.
- Suffix "-H" indicates Halogen free parts, ex. FMUN5211DW-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-363
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any

Package outline

Maximum ratings (At $T_A=25^\circ\text{C}$ unless otherwise noted, Common for Q_1 and Q_2)

Parameter	Symbol	Value	Unit
Collector base voltage	$-V_{CBO}$	50	V
Collector to emitter voltage	$-V_{CEO}$	50	V
Collector current	$-I_C$	100	mA
Power dissipation (Note1)	P_D	200	mW
Junction temperature	T_J	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to +150	$^\circ\text{C}$
Thermal resistance junction to ambient (Note 1)	$R_{\theta JA}$	493	$^\circ\text{C/W}$
Thermal resistance junction to lead (Note 1)	$R_{\theta JL}$	188	$^\circ\text{C/W}$

Note : 1. FR-4 @Minimum pad

Electrical characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted, common for Q_1 and Q_2)(Continued)

Parameter	Conditions	Symbol	Device	Min.	Typ.	Max.	Unit
DC Current gain	$-V_{CE} = 10\text{V}, -I_C = 5\text{mA}$	h_{FE}	FMUN5111DW	35	60	250	
			FMUN5112DW	60	100		
			FMUN5113DW	80	140		
			FMUN5114DW	80	140		
			FMUN5115DW	160	250		
			FMUN5116DW	160	250		
			FMUN5130DW	3	5		
			FMUN5131DW	8	15		
			FMUN5132DW	15	27		
			FMUN5133DW	80	140		
			FMUN5134DW	80	130		
			FMUN5135DW	80	140		

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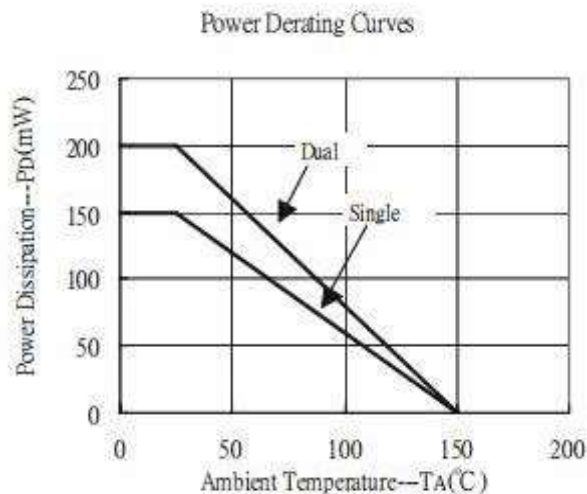
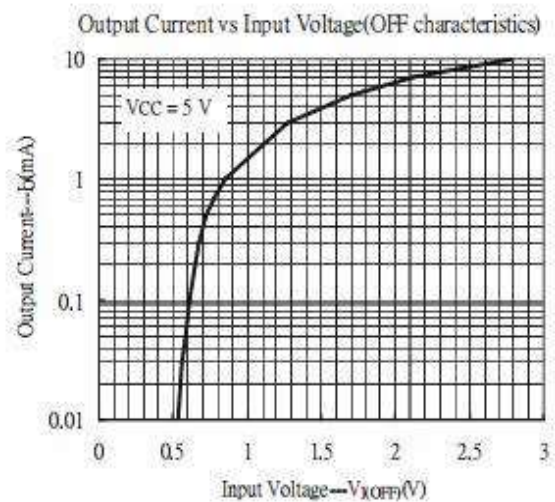
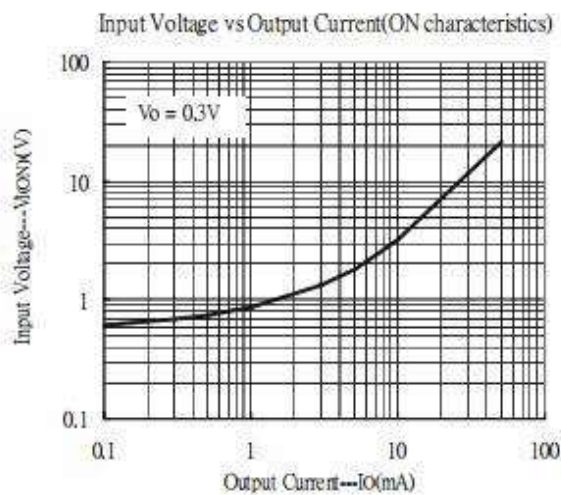
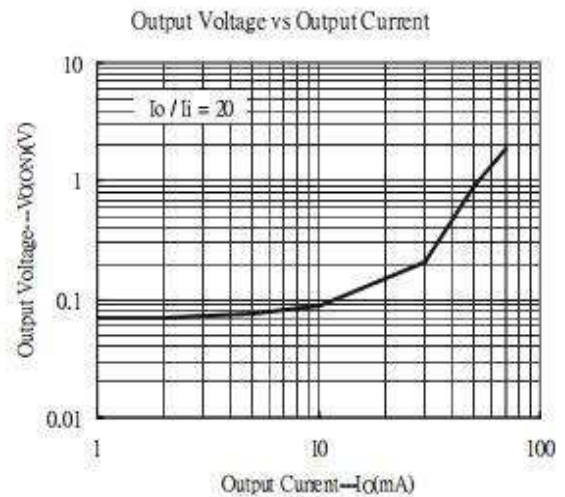
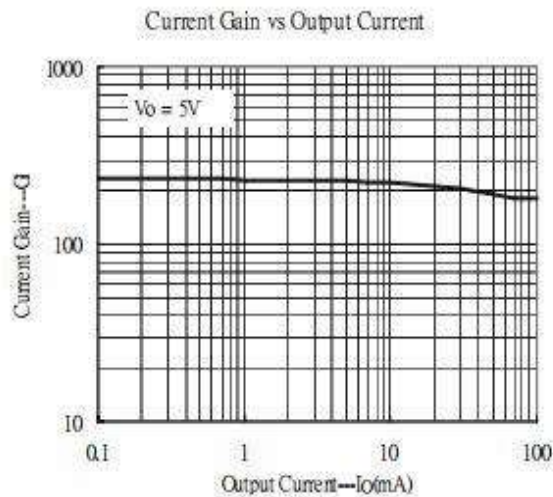
Electrical characteristics (At $T_A=25^\circ\text{C}$ unless otherwise noted, Common for Q₁ and Q₂) (Continued)

Parameter	Conditions	Device	Symbol	Min.	Typ.	Max.	Unit
Collector base breakdown voltage	$-I_C=10\mu\text{A}$, $I_E=0$		$-V_{(BR)CBO}$	50			V
Collector emitter breakdown voltage	$-I_C=2\text{mA}$, $I_B=0$		$-V_{(BR)CEO}$	50			V
Collector base cut off current	$-V_{CB}=50\text{V}$, $I_E=0$		$-I_{CBO}$			100	nA
Collector emitter cut off current	$-V_{CE}=50\text{V}$, $I_B=0$		$-I_{CEO}$			500	nA
Emitter base cut off current	$-V_{EB}=6\text{V}$	FMUN5111DW	$-I_{EBO}$			0.5	mA
		FMUN5112DW				0.2	
		FMUN5113DW				0.1	
		FMUN5114DW				0.2	
		FMUN5115DW				0.9	
		FMUN5116DW				1.9	
		FMUN5130DW				4.3	
		FMUN5131DW				2.3	
		FMUN5132DW				1.5	
		FMUN5133DW				0.18	
		FMUN5134DW				0.13	
		FMUN5135DW				0.2	
Collector emitter saturation voltage	$-I_C=10\text{mA}$, $-I_B=0.3\text{mA}$		$-V_{CE(sat)}$			0.25	V
	$-I_C=10\text{mA}$, $-I_B=5\text{mA}$	FMUN5130DW					
		FMUN5131DW					
	$-I_C=10\text{mA}$, $-I_B=1\text{mA}$	FMUN5132DW FMUN5134DW					
Output voltage (on)	$-V_{CC}=5\text{V}$, $-V_B=2.5\text{V}$, $R_L=1\text{K}\Omega$		$-V_{OL}$			0.2	V
	$-V_{CC}=5\text{V}$, $-V_B=3.5\text{V}$, $R_L=1\text{K}\Omega$	FMUN5213DW					
Output voltage (off)	$-V_{CC}=5\text{V}$, $-V_B=0.5\text{V}$, $R_L=1\text{K}\Omega$		$-V_{OH}$	4.9			V
	$-V_{CC}=5\text{V}$, $-V_B=0.05\text{V}$, $R_L=1\text{K}\Omega$	FMUN5230DW					
	$-V_{CC}=5\text{V}$, $-V_B=0.25\text{V}$, $R_L=1\text{K}\Omega$	FMUN5115DW					
		FMUN5116DW					
		FMUN5231DW					
		FMUN5232DW					

Note : Pulse Test : Pulse Width < 300 μs , Duty Cycle < 2.0%

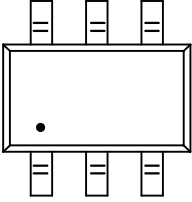
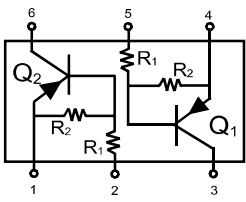
FMUN5111DW Thru FMUN5135DW

Rating and characteristic curves



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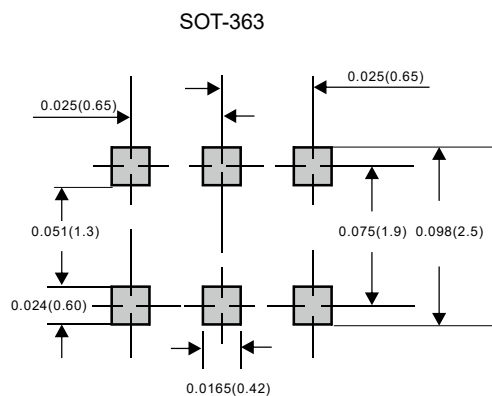
Pinning information

Pin	Simplified outline	Symbol
Pin2, 5 Base Pin1, 4 Emitter Pin3, 6 Collector		

Device marking, Resistor values and ordering information

Device	Marking	Input resistor R ₁ (K Ω)			R ₂ (K Ω)	Resistor ratio R ₁ / R ₂		
		Min	Normal	Max		Min	Normal	Max
FMUN5111DW	0A	7	10	13	10	0.8	1.0	1.2
FMUN5112DW	0B	15.4	22	28.6	22	0.8	1.0	1.2
FMUN5113DW	0C	32.9	47	61.1	47	0.8	1.0	1.2
FMUN5114DW	0D	7	10	13	47	0.17	0.21	0.25
FMUN5115DW	0E	7	10	13	—	—	—	—
FMUN5116DW	0F	3.3	4.7	6.1	—	—	—	—
FMUN5130DW	0G	0.7	1	1.3	1	0.8	1.0	1.2
FMUN5131DW	0H	1.5	2.2	2.9	2.2	0.8	1.0	1.2
FMUN5132DW	0J	3.3	4.7	6.1	4.7	0.8	1.0	1.2
FMUN5133DW	0K	3.3	4.7	6.1	47	0.055	0.1	0.185
FMUN5134DW	0L	15.4	22	28.6	47	0.38	0.47	0.56
FMUN5135DW	0M	1.54	2.2	2.86	47	0.038	0.047	0.056

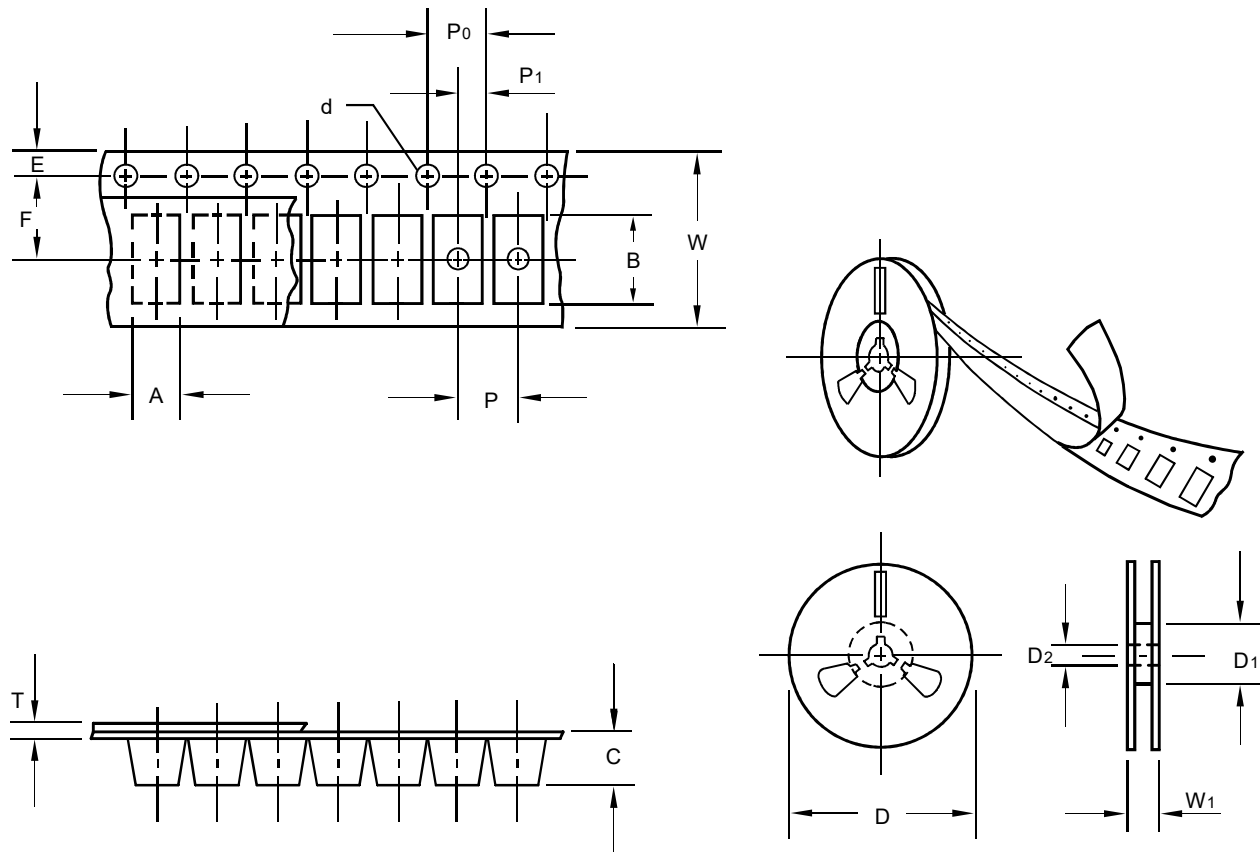
Suggested solder pad layout



Dimensions in inches and (millimeters)

FMUN5111DW Thru FMUN5135DW

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D ₁	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D ₁	min	62.00
Feed hole diameter	D ₂	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P ₀	0.1	4.00
Embossment center	P ₁	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W ₁	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

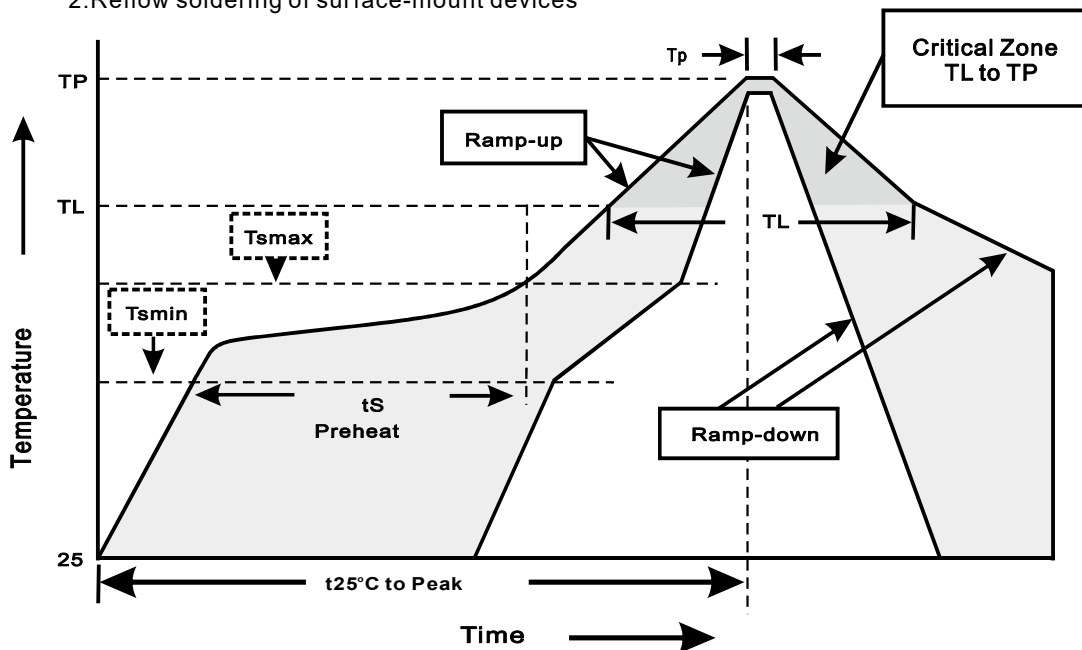
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-363	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000	9.50

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes