



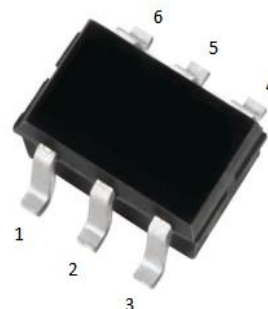
MMUN5211DW THRU MMUN5241DW

Dual Bias Resistor Transistors

1. Features

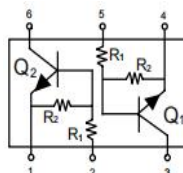
- NPN Silicon Surface Mount Transistors with Monolithic Bias Resistor Network
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Mounting cost and area can be cut in half

SOT-363



2. Mechanical Data

- Case: Molded Plastic, SOT-363 .
- Epoxy: UL 94V-0 rate flame retardant.
- Terminals: Plated Leads Solderable per MIL-STD-750, Method-2026.
- Mounting Position : Any.



3. Maximum Ratings

Electrical Characteristics Rating at 25°C ambient temperature unless otherwise specified.

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Collector Current	I_C	100	mA
Device Dissipation	P_D	250	mW
Junction Temperature	T_J	-55~+150	°C
Storage Temperature	T_{stg}	-55~+150	°C

Resistor Values

Type	Marking	R1 (K)	R2 (K)
MMUN5211DW	7A	10	10
MMUN5212DW	7B	22	22
MMUN5213DW	7C	47	47
MMUN5214DW	7D	10	47
MMUN5215DW	7E	10	∞
MMUN5216DW	7F	4.7	∞
MMUN5230DW	7G	1	1
MMUN5231DW	7H	2.2	2.2
MMUN5232DW	7J	4.7	4.7
MMUN5233DW	7K	4.7	47
MMUN5234DW	7L	22	47
MMUN5235DW	7M	2.2	47
MMUN5238DW	7Q	2.2	∞
MMUN5241DW	7T	100	∞



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4. Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Characteristics		Symbol	Condition	Min	TYP	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB}=50\text{V}$	-	-	100	nA
Collector Emitter Cutoff Current		I_{CEO}	$V_{CE}=50\text{V}$	-	-	500	nA
DC current gain	MMUN5211DW	h_{FE}	$V_{CE}=10\text{V}, I_C=5\text{mA}$	35	-	-	-
	MMUN5212DW			60	-	-	-
	MMUN5213DW			80	-	-	-
	MMUN5214DW			80	-	-	-
	MMUN5215DW			160	-	-	-
	MMUN5216DW			160	-	-	-
	MMUN5230DW			3	-	-	-
	MMUN5231DW			8	-	-	-
	MMUN5232DW			15	-	-	-
	MMUN5233DW			80	-	-	-
	MMUN5234DW			80	-	-	-
	MMUN5235DW			80	-	-	-
	MMUN5238DW			160	-	-	-
	MMUN5241DW			160	-	-	-
Emitter Base Cutoff Current	MMUN5211DW	I_{EBO}	$V_{EB} = 6\text{V}$	-	-	0.5	mA
	MMUN5212DW			-	-	0.2	mA
	MMUN5213DW			-	-	0.1	mA
	MMUN5214DW			-	-	0.2	mA
	MMUN5215DW			-	-	0.9	mA
	MMUN5216DW			-	-	1.9	mA
	MMUN5230DW			-	-	4.3	mA
	MMUN5231DW			-	-	2.3	mA
	MMUN5232DW			-	-	1.5	mA
	MMUN5233DW			-	-	0.18	mA
	MMUN5234DW			-	-	0.13	mA
	MMUN5235DW			-	-	0.2	mA
	MMUN5238DW			-	-	4	mA
	MMUN5241DW			-	-	0.1	mA
Collector Base Breakdown Voltage		$V_{(BR)CBO}$	$I_C=10\mu\text{A}$	50	-	-	V
Collector Emitter Breakdown Voltage		$V_{(BR)CEO}$	$I_C=2\text{mA}$	50	-	-	V
Collector Emitter Saturation Voltage	MMUN5230DW	$V_{CE(sat)}$	$I_C=10\text{mA}, I_B=0.3\text{mA}$	-	-	0.25	V
			$I_C=10\text{mA}, I_B=5\text{mA}$	-	-	0.25	V
	MMUN5231DW			-	-	0.25	V
	MMUN5215DW		$I_C=10\text{mA}, I_B=1\text{mA}$	-	-	0.25	V
	MMUN5216DW			-	-	0.25	V
	MMUN5232DW			-	-	0.25	V
	MMUN5233DW			-	-	0.25	V
	MMUN5234DW			-	-	0.25	V
	MMUN5235DW			-	-	0.25	V
	MMUN5238DW			-	-	0.25	V
	MMUN5241DW			-	-	0.25	V



MMUN5211DW THRU MMUN5241DW

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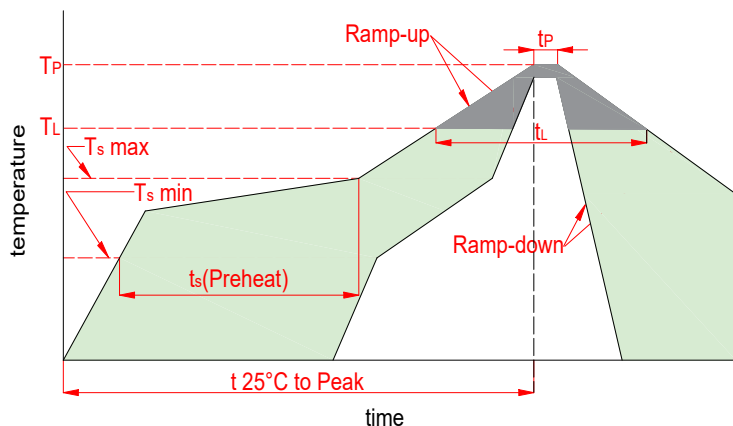
Characteristics		Symbol	Condition	Min	TYP	Max	Unit
Output Voltage (on)	MMUN5211DW	V_{OL}	$V_{CC}=5V, V_B=2.5V, R_L=1K\Omega$	-	-	0.2	V
	MMUN5212DW			-	-	0.2	V
	MMUN5214DW			-	-	0.2	V
	MMUN5215DW			-	-	0.2	V
	MMUN5216DW			-	-	0.2	V
	MMUN5230DW			-	-	0.2	V
	MMUN5231DW			-	-	0.2	V
	MMUN5232DW			-	-	0.2	V
	MMUN5233DW			-	-	0.2	V
	MMUN5234DW			-	-	0.2	V
	MMUN5235DW			-	-	0.2	V
	MMUN5238DW			-	-	0.2	V
	MMUN5213DW		$V_{CC}=5V, V_B=3.5V, R_L=1K\Omega$	-	-	0.2	V
	MMUN5241DW		$V_{CC}=5V, V_B=5V, R_L=1K\Omega$	-	-	0.2	V
Output Voltage (off)	MMUN5230DW	V_{OH}	$V_{CC}=5V, V_B=0.5V, R_L=1K\Omega$	4.9	-	-	V
			$V_{CC}=5V, V_B=0.05V, R_L=1K\Omega$	4.9	-	-	V
	MMUN5215DW		$V_{CC}=5V, V_B=0.25V, R_L=1K\Omega$	4.9	-	-	V
	MMUN5216DW			4.9	-	-	V
	MMUN5233DW			4.9	-	-	V
	MMUN5238DW			4.9	-	-	V
Input Resistor	MMUN5211DW	R_1	-	7	-	13	K Ω
	MMUN5212DW			15.4	-	28.6	K Ω
	MMUN5213DW			32.9	-	61.1	K Ω
	MMUN5214DW			7	-	13	K Ω
	MMUN5215DW			7	-	13	K Ω
	MMUN5216DW			3.3	-	6.1	K Ω
	MMUN5230DW			0.7	-	1.3	K Ω
	MMUN5231DW			1.5	-	2.9	K Ω
	MMUN5232DW			3.3	-	6.1	K Ω
	MMUN5233DW			3.3	-	6.1	K Ω
	MMUN5234DW			15.4	-	28.6	K Ω
	MMUN5235DW			1.54	-	2.86	K Ω
	MMUN5238DW			1.54	-	2.88	K Ω
	MMUN5241DW			70	-	130	K Ω
Resistor Ratio	MMUN5211DW/MMUN5212DW/MMUN5213DW	R1/R2	-	0.8	-	1.2	-
	MMUN5214DW			0.17	-	0.25	-
	MMUN5215DW/MMUN5216DW/MMUN5238DW			-	-	-	-
	MMUN5241DW			-	-	-	-
	MMUN5230DW/MMUN5231DW/MMUN5232DW			0.8	-	1.2	-
	MMUN5233DW			0.055	-	0.185	-
	MMUN5234DW			0.38	-	0.56	-
	MMUN5235DW			0.038	-	0.056	-



MMUN5211DW THRU MMUN5241DW

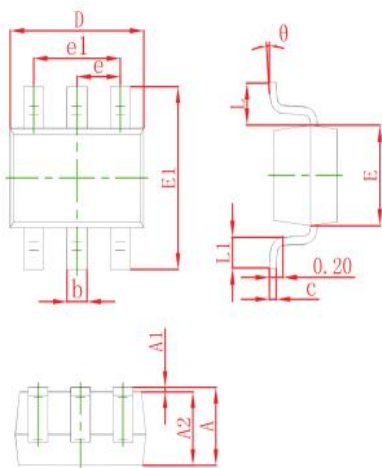
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5. Soldering Parameters



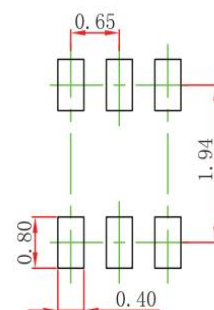
Reflow Condition		Lead-free
Pre Heat	Temp. min(T_s (min))	150℃
	Temp. max(T_s (min))	200℃
	Time(min to max)(t_s)	60~120s
Aver. ramp up rate(Liquidus Temp.)(T_L)to peak		3℃/s max
T_s (max) to T_L -Ramp-up Rate		3℃/s max
Reflow	Temp.(T_L)(Liquidus)	217℃
	Temp.(t_L)(Liquidus)	60~150s
Peak Temp.(T_P)		260 ^{+0/-5} ℃
Time within actual peak Temp.(t_p)		30s max
Ramp-down Rate		6℃/s max
Time 25℃ to peak Tempe.(T_P)		8 minutes max
Do not exceed		260℃

6. Dimensions

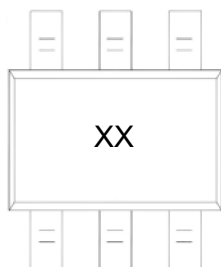


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.035	0.043	0.900	1.100
A1	0.000	0.004	0.000	0.100
A2	0.035	0.039	0.900	1.000
b	0.006	0.014	0.150	0.350
c	0.003	0.006	0.080	0.150
D	0.079	0.087	2.000	2.200
E	0.045	0.053	1.150	1.350
E1	0.085	0.096	2.150	2.450
e1	0.047	0.055	1.200	1.400
L1	0.010	0.018	0.260	0.460

Mounting PAD Layout



7. Part Marking System



8. Package Information

Package	Part Number	Tape Width(mm)	Quantity(pcs)
SOT-363	MMUN5211DW THRU MMUN5241DW	8	3000



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