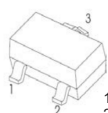
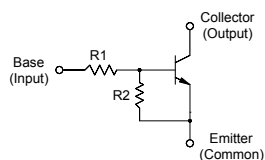


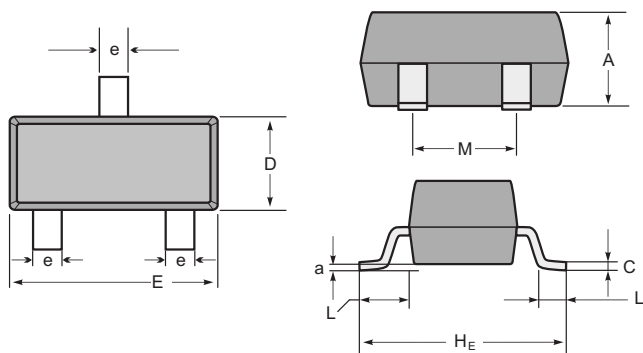
for switching and interface circuit and drive circuit applications



1.BASE
2.EMITTER
3.COLLECTOR



SOT-23



SOT-23 mechanical data

UNIT		A	C	D	E	H _E	e	M	L	L ₁	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Absolute Maximum Ratings (T_a = 25 °C)

Parameter	Symbol	Value	Unit
Collector Base Voltage	V _{CBO}	50	V
Collector Emitter Voltage	V _{CEO}	50	V
Collector Current	I _C	100	mA
Total Power Dissipation	P _{tot}	200	mW
Junction Temperature	T _j	150	°C
Storage Temperature Range	T _s	- 55 to + 150	°C

MMUN2211-MMUN2241

Characteristics at $T_a = 25\text{ }^{\circ}\text{C}$

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$				
MMUN2211	h_{FE}	35	-	-
MMUN2212		60	-	-
MMUN2213		80	-	-
MMUN2214		80	-	-
MMUN2215		160	-	-
MMUN2216		160	-	-
MMUN2230		3	-	-
MMUN2231		8	-	-
MMUN2232		15	-	-
MMUN2233		80	-	-
MMUN2234		80	-	-
MMUN2235		80	-	-
MMUN2238		160	-	-
MMUN2241		160	-	-
Collector Base Cutoff Current at $V_{CB} = 50\text{ V}$	I_{CBO}	-	100	nA
Collector Emitter Cutoff Current at $V_{CE} = 50\text{ V}$	I_{CEO}	-	500	nA
Emitter Base Cutoff Current at $V_{EB} = 6\text{ V}$				
MMUN2211	I_{EBO}	-	0.5	mA
MMUN2212		-	0.2	
MMUN2213		-	0.1	
MMUN2214		-	0.2	
MMUN2215		-	0.9	
MMUN2216		-	1.9	
MMUN2230		-	4.3	
MMUN2231		-	2.3	
MMUN2232		-	1.5	
MMUN2233		-	0.18	
MMUN2234		-	0.13	
MMUN2235		-	0.2	
MMUN2238		-	4	
MMUN2241		-	0.1	
Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	50	-	V
Collector Emitter Breakdown Voltage at $I_C = 2\text{ mA}$	$V_{(BR)CEO}$	50	-	V
Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$ at $I_C = 10\text{ mA}$, $I_B = 5\text{ mA}$ at $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$				
MMUN2230	V_{CEsat}	-	0.25	V
MMUN2231		-	0.25	
MMUN2215		-	0.25	
MMUN2216		-	0.25	
MMUN2232		-	0.25	
MMUN2233		-	0.25	
MMUN2234		-	0.25	
MMUN2235		-	0.25	
MMUN2238		-	0.25	

MMUN2211-MMUN2241

Characteristics at $T_a = 25^\circ\text{C}$

Parameter		Symbol	Min.	Max.	Unit
Output Voltage (on) at $V_{CC} = 5\text{ V}$, $V_B = 2.5\text{ V}$, $R_L = 1\text{ K}\Omega$	MMUN2211	V_{OL}	-	0.2	V
	MMUN2212		-	0.2	
	MMUN2214		-	0.2	
	MMUN2215		-	0.2	
	MMUN2216		-	0.2	
	MMUN2230		-	0.2	
	MMUN2231		-	0.2	
	MMUN2232		-	0.2	
	MMUN2233		-	0.2	
	MMUN2234		-	0.2	
	MMUN2235		-	0.2	
	MMUN2238		-	0.2	
	at $V_{CC} = 5\text{ V}$, $V_B = 3.5\text{ V}$, $R_L = 1\text{ K}\Omega$		-	0.2	
	MMUN2213		-	0.2	
	at $V_{CC} = 5\text{ V}$, $V_B = 5\text{ V}$, $R_L = 1\text{ K}\Omega$		-	0.2	
	MMUN2241		-	0.2	
Output Voltage (off) at $V_{CC} = 5\text{ V}$, $V_B = 0.5\text{ V}$, $R_L = 1\text{ K}\Omega$ at $V_{CC} = 5\text{ V}$, $V_B = 0.05\text{ V}$, $R_L = 1\text{ K}\Omega$ at $V_{CC} = 5\text{ V}$, $V_B = 0.25\text{ V}$, $R_L = 1\text{ K}\Omega$	MMUN2230	V_{OH}	4.9	-	V
	MMUN2215		4.9	-	
	MMUN2216		4.9	-	
	MMUN2233		4.9	-	
	MMUN2238		4.9	-	
Input Resistor	MMUN2211	R1	7	13	$\text{K}\Omega$
	MMUN2212		15.4	28.6	
	MMUN2213		32.9	61.1	
	MMUN2214		7	13	
	MMUN2215		7	13	
	MMUN2216		3.3	6.1	
	MMUN2230		0.7	1.3	
	MMUN2231		1.5	2.9	
	MMUN2232		3.3	6.1	
	MMUN2233		3.3	6.1	
	MMUN2234		15.4	28.6	
	MMUN2235		1.54	2.86	
	MMUN2238		1.54	2.88	
	MMUN2241		70	130	
Resistor Ratio	MMUN2211/MMUN2212/MMUN2213	R1/R2	0.8	1.2	-
	MMUN2214		0.17	0.25	-
	MMUN2215/MMUN2216/MMUN2238		-	-	-
	MMUN2241		-	-	-
	MMUN2230/MMUN2231/MMUN2232		0.8	1.2	-
	MMUN2233		0.055	0.185	-
	MMUN2234		0.38	0.56	-
	MMUN2235		0.038	0.056	-

RATING AND CHARACTERISTIC CURVES (MMUN2211-MMUN2241)

