

LOW DROP LINEAR VOLTAGE REGULATORS

FEATURES

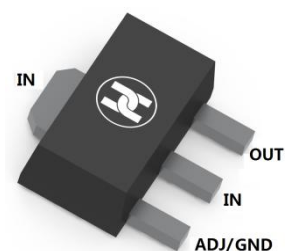
- Low Dropout Voltage
- Low power consumption
- Low temperature coefficient
- High input voltage (up to 24V)
- Power Dissipation : 200mW
- Surface Mount device

APPLICATIONS

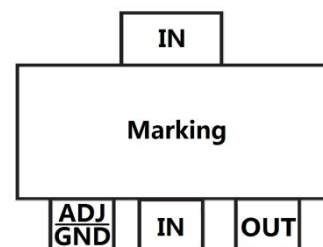
- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

MECHANICAL DATA

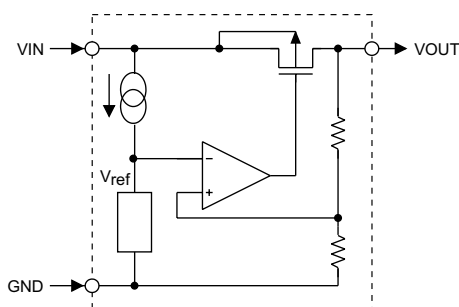
- Case: SOT-89
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.055 grams (approximate)



SOT-89



BLOCK DIAGRAM



SELECTION TABLE

Part No.	Output Voltage	Tolerance
HT7130	3.0V	5%
HT7133	3.3V	5%
HT7136	3.6V	5%
HT7144	4.4V	5%
HT7150	5.0V	5%

ABOSLUTE MAXIMUM RATINGS(Ta=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Input Voltage	V_i	-0.3V~28V	V
Power Dissipation	P_D	200	mW
Operating Temperature	T_{OPR}	0~70	℃
Storage Temperature Range	T_{STG}	-50 ~+125	℃

LOW DROP LINEAR VOLTAGE REGULATORS

ELECTRICAL CHARACTERISTICS OF HT7130($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Output voltage	V_{OUT}	2.85	3.0	3.15	V	$V_{\text{IN}}=5\text{V}, I_{\text{OUT}}=10\text{mA}$
Output Current	I_{OUT}	20	30		mA	$V_{\text{IN}}=5\text{V}$
Load Regulation	ΔV_{OUT}		60	100	mV	$V_{\text{IN}}=5\text{V}, 1\text{mA} \leq I_{\text{OUT}} \leq 20\text{mA}$
Voltage Drop	V_{DIF}		100		mV	$I_{\text{OUT}}=1\text{mA}$
Current Consumption	I_{SS}		4	6	μA	$V_{\text{IN}}=5\text{V}, \text{No Load}$
Line Regulation	$\Delta V_{\text{OUT}}/(\Delta V_{\text{IN}} \times V_{\text{OUT}})$		0.2		%/V	$4\text{V} \leq V_{\text{IN}} \leq 24\text{V}, I_{\text{OUT}}=1\text{mA}$
Input Voltage	V_{IN}			24	V	
Temperature Coefficient	$\Delta V_{\text{OUT}}/\Delta T_a$		± 0.45		mV/ $^{\circ}\text{C}$	$V_{\text{IN}}=5\text{V}, I_{\text{OUT}}=10\text{mA}, 0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS OF HT7133($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Output voltage	V_{OUT}	3.14	3.3	3.47	V	$V_{\text{IN}}=5.5\text{V}, I_{\text{OUT}}=10\text{mA}$
Output Current	I_{OUT}	20	30		mA	$V_{\text{IN}}=5.5\text{V}$
Load Regulation	ΔV_{OUT}		60	100	mV	$V_{\text{IN}}=5.5\text{V}, 1\text{mA} \leq I_{\text{OUT}} \leq 30\text{mA}$
Voltage Drop	V_{DIF}		100		mV	$I_{\text{OUT}}=1\text{mA}$
Current Consumption	I_{SS}		4	6	μA	$V_{\text{IN}}=5.5\text{V}, \text{No Load}$
Line Regulation	$\Delta V_{\text{OUT}}/(\Delta V_{\text{IN}} \times V_{\text{OUT}})$		0.2		%/V	$4.5\text{V} \leq V_{\text{IN}} \leq 24\text{V}, I_{\text{OUT}}=1\text{mA}$
Input Voltage	V_{IN}			24	V	
Temperature Coefficient	$\Delta V_{\text{OUT}}/\Delta T_a$		± 0.5		mV/ $^{\circ}\text{C}$	$V_{\text{IN}}=5.5\text{V}, I_{\text{OUT}}=10\text{mA}, 0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS OF HT7136($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Output voltage	V_{OUT}	3.42	3.6	3.78	V	$V_{\text{IN}}=5.6\text{V}, I_{\text{OUT}}=10\text{mA}$
Output Current	I_{OUT}	20	30		mA	$V_{\text{IN}}=5.6\text{V}$
Load Regulation	ΔV_{OUT}		60	100	mV	$V_{\text{IN}}=5.6\text{V}, 1\text{mA} \leq I_{\text{OUT}} \leq 30\text{mA}$
Voltage Drop	V_{DIF}		100		mV	$I_{\text{OUT}}=1\text{mA}$
Current Consumption	I_{SS}		3	7	μA	$V_{\text{IN}}=5.6\text{V}, \text{No Load}$
Line Regulation	$\Delta V_{\text{OUT}}/(\Delta V_{\text{IN}} \times V_{\text{OUT}})$		0.2		%/V	$4.6\text{V} \leq V_{\text{IN}} \leq 24\text{V}, I_{\text{OUT}}=1\text{mA}$
Input Voltage	V_{IN}			24	V	
Temperature Coefficient	$\Delta V_{\text{OUT}}/\Delta T_a$		± 0.6		mV/ $^{\circ}\text{C}$	$V_{\text{IN}}=5.6\text{V}, I_{\text{OUT}}=10\text{mA}, 0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$

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ELECTRICAL CHARACTERISTICS OF HT7144($T_a=25^{\circ}\text{C}$ unless otherwise specified)

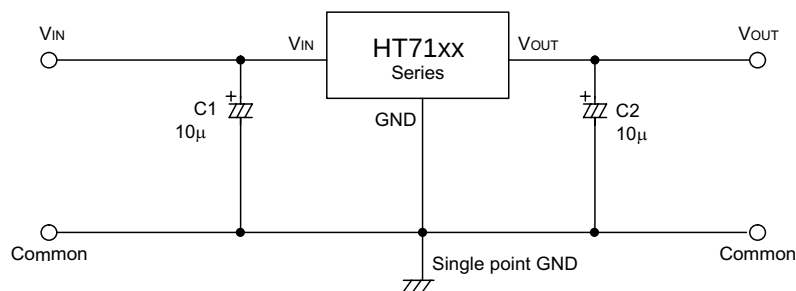
Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Output voltage	V_{OUT}	4.18	4.4	4.62	V	$V_{\text{IN}}=6.4\text{V}, I_{\text{OUT}}=10\text{mA}$
Output Current	I_{OUT}	20	30		mA	$V_{\text{IN}}=6.4\text{V}$
Load Regulation	ΔV_{OUT}		60	100	mV	$V_{\text{IN}}=6.4\text{V}, 1\text{mA} \leq I_{\text{OUT}} \leq 30\text{mA}$
Voltage Drop	V_{DIF}		100		mV	$I_{\text{OUT}}=1\text{mA}$
Current Consumption	I_{SS}		4	7.5	μA	$V_{\text{IN}}=6.4\text{V}$, No Load
Line Regulation	$\Delta V_{\text{OUT}}/(\Delta V_{\text{IN}} \times V_{\text{OUT}})$		0.2		%/V	$5.4\text{V} \leq V_{\text{IN}} \leq 24\text{V}, I_{\text{OUT}}=1\text{mA}$
Input Voltage	V_{IN}			24	V	
Temperature Coefficient	$\Delta V_{\text{OUT}}/\Delta T_a$		± 0.7		$\text{mV}/^{\circ}\text{C}$	$V_{\text{IN}}=6.4\text{V}, I_{\text{OUT}}=10\text{mA}$, $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS OF HT7150($T_a=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Output voltage	V_{OUT}	4.75	5.0	5.25	V	$V_{\text{IN}}=7\text{V}, I_{\text{OUT}}=10\text{mA}$
Output Current	I_{OUT}	20	30		mA	$V_{\text{IN}}=7\text{V}$
Load Regulation	ΔV_{OUT}		60	100	mV	$V_{\text{IN}}=7\text{V}, 1\text{mA} \leq I_{\text{OUT}} \leq 30\text{mA}$
Voltage Drop	V_{DIF}		100		mV	$I_{\text{OUT}}=1\text{mA}$
Current Consumption	I_{SS}		5	9	μA	$V_{\text{IN}}=7\text{V}$, No Load
Line Regulation	$\Delta V_{\text{OUT}}/(\Delta V_{\text{IN}} \times V_{\text{OUT}})$		0.2		%/V	$6\text{V} \leq V_{\text{IN}} \leq 24\text{V}, I_{\text{OUT}}=1\text{mA}$
Input Voltage	V_{IN}			24	V	
Temperature Coefficient	$\Delta V_{\text{OUT}}/\Delta T_a$		± 0.75		$\text{mV}/^{\circ}\text{C}$	$V_{\text{IN}}=7\text{V}, I_{\text{OUT}}=10\text{mA}$, $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$

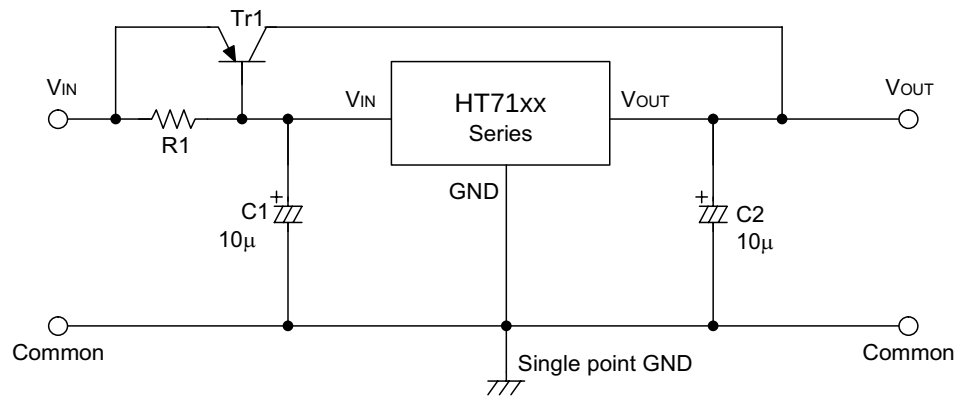
TYPICAL APPLICATION

Basic circuits

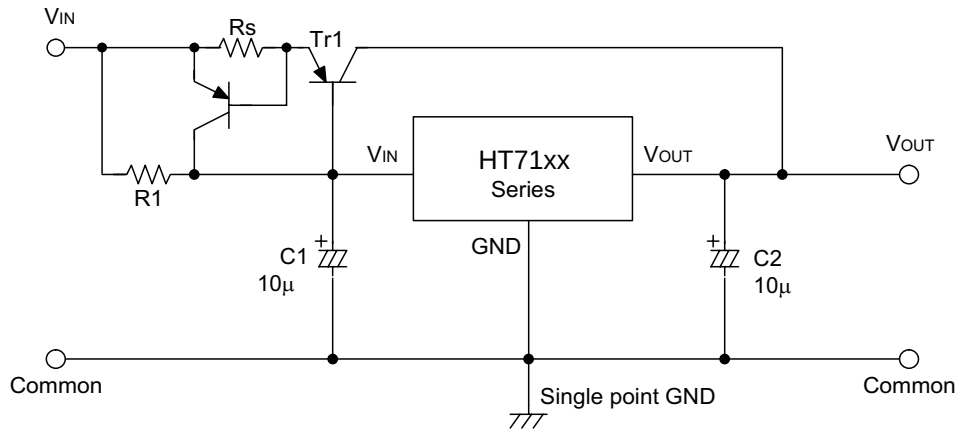


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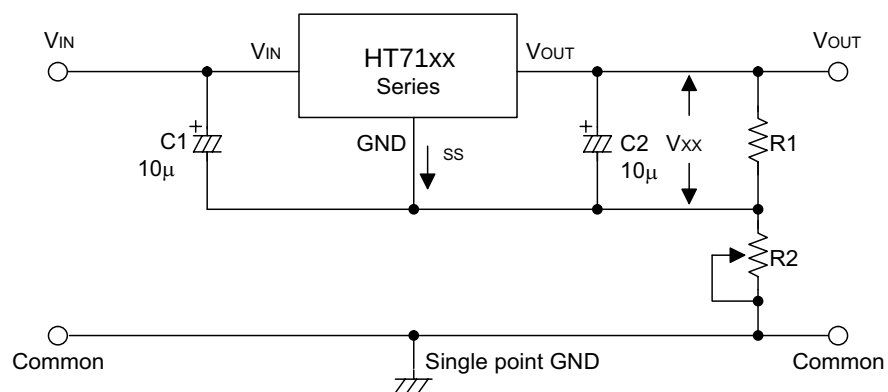
High output current positive voltage regulator



Short-Circuit protection by $Tr1$



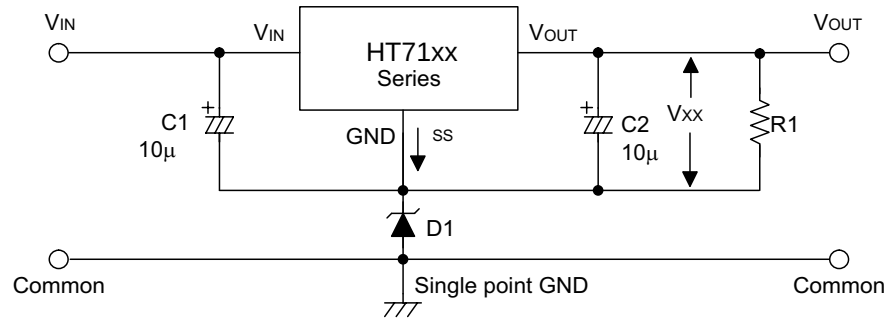
Circuit for increasing output voltage



$$V_{OUT} = V_{xx} \left(1 + \frac{R2}{R1}\right) + I_{ss} R2$$

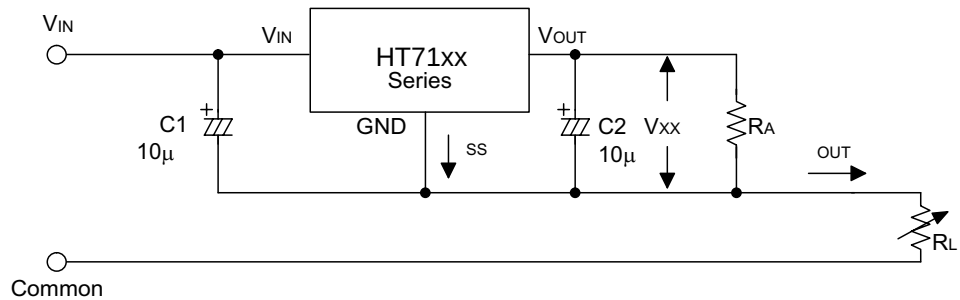
LOW DROP LINEAR VOLTAGE REGULATORS

Circuit for increasing output voltage



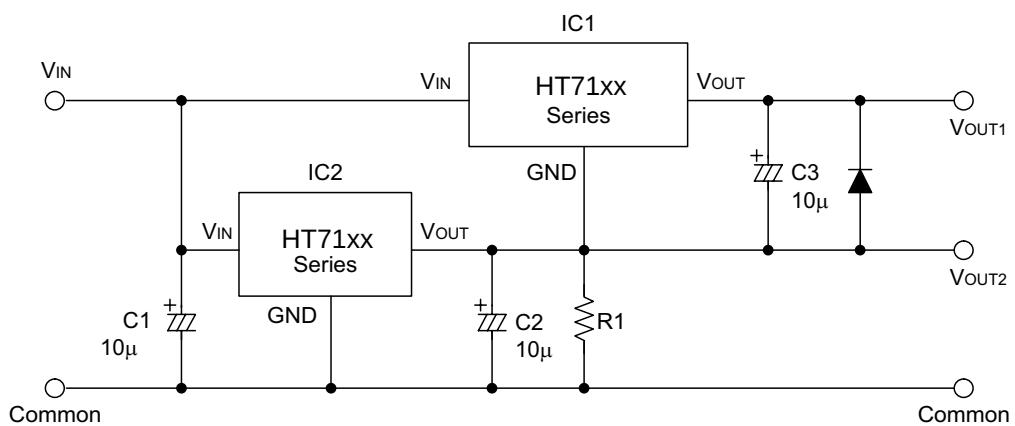
$$V_{OUT} = V_{XX} + V_{D1}$$

Constant current regulator



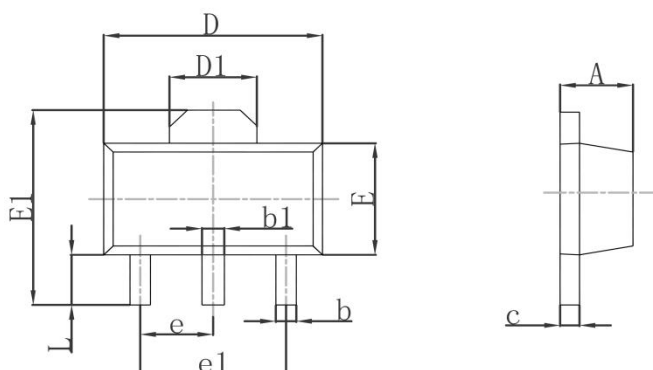
$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

Dual supply



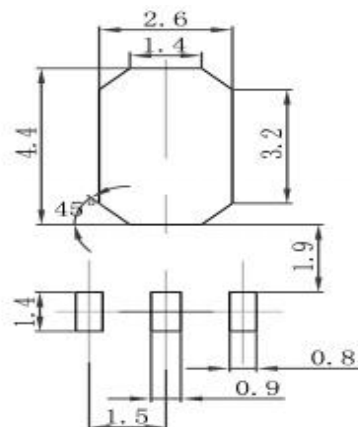
LOW DROP LINEAR VOLTAGE REGULATORS

SOT-89 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550REF		0.061REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

SOT-89 Suggested Pad Layout

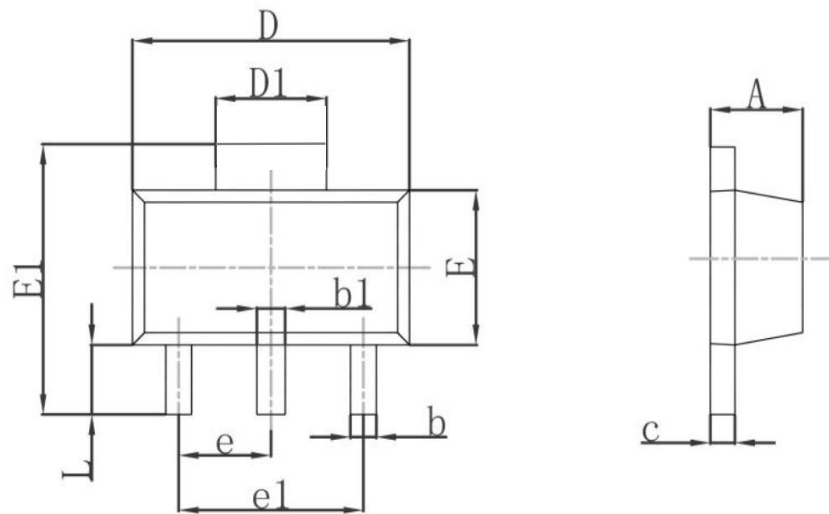


Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

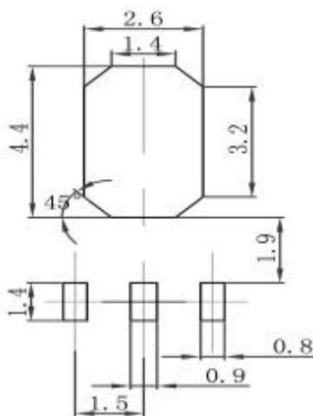
BIPOLAR TRANSISTOR (PNP)

SOT-89 Package Outline Dimensions



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	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550REF		0.0610REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500REF		0.0590REF	
L	0.900	1.200	0.035	0.047
e1	3.000REF		1.181REF	

SOT-89 Suggested Pad Layout



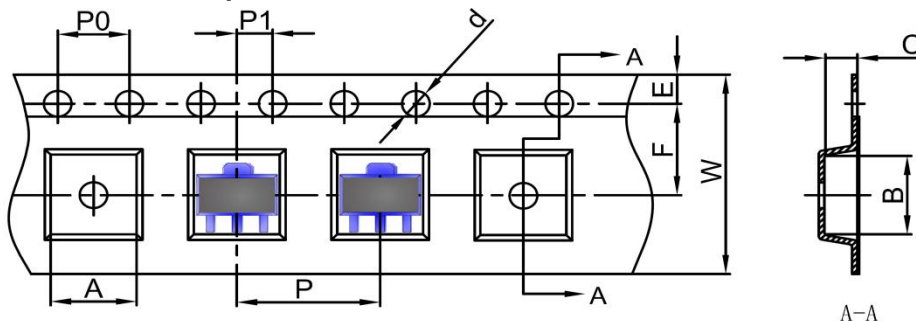
Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

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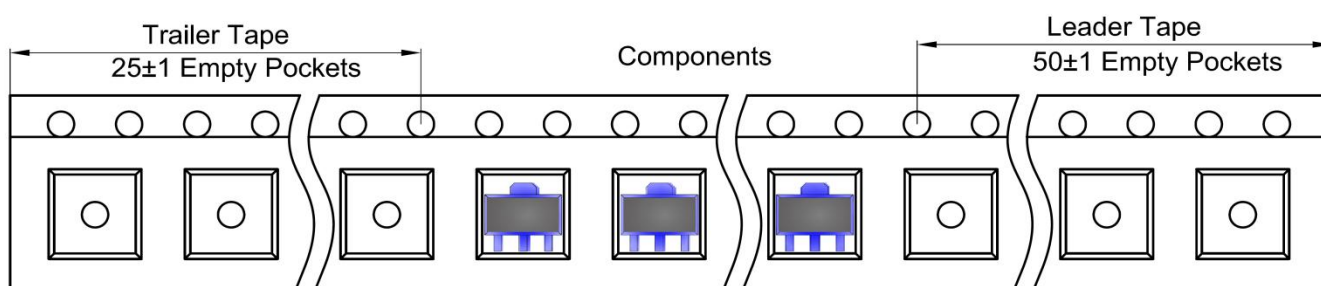
SOT-89 Tape and Reel

SOT-89 Embossed Carrier Tape

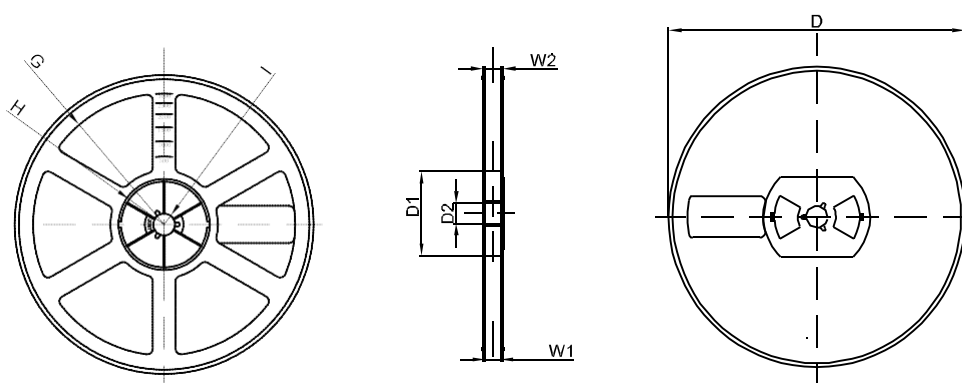


DIMENSIONS ARE IN MILLIMETER										
TYPE	A	B	C	d	E	F	P0	P	P1	W
SOT-89	4.85	4.45	1.85	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00
TOLERANCE	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

SOT-89 Tape Leader and Trailer



SOT-89 Reel



DIMENSIONS ARE IN MILLIMETER								
REEL OPTION	D	D1	D2	G	H	I	W1	W2
7" DIA	Ø178	54.40	13.00	R78	R25.60	R6.50	13.20	16.50
TOLERANCE	±2	±1	±1	±1	±1	±1	±1	±1