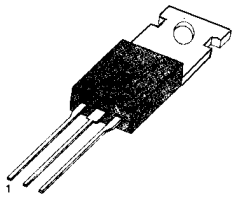
KA340TXX FIXED VOLTAGE REGULATOR (POSITIVE)

3-TERMINAL 1A POSITIVE VOLTAGE REGULATORS

The KA340TXX series ot three.terminai positive voltage regulators are available in TO-220 package and with several fixed output voltages, providing better performance than 78XX series regulators



1: Input 2: GND 3: Output

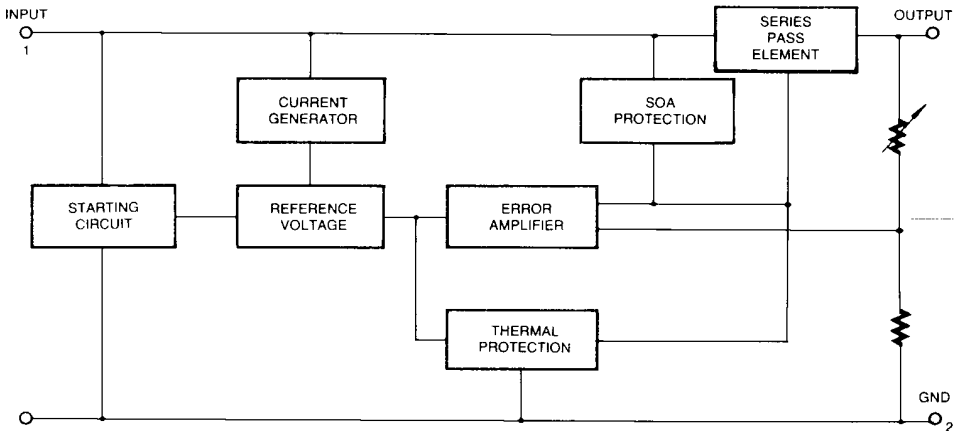
FEATURES

- Maximum output current: 1.5A
- Output voltage of 5, 6, 8, 9, 10,11, 12,15, 18, 24V
- Superior line and load regulation than 78XX series
- Output transistor SOA protection
- Internal short-circuit current limit
- Thermal overload protection

ORDERING INFORMATION

Device	Package	Operating Temperature
KA340TXX	TO-220	0 ~ + 125°C

BLOCK DIAGRAM



FAIRCHILD SEMICONDUCTOR™

KA340TXX FIXED VOLTAGE REGULATOR (POSITIVE)

ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise specified)

Characteristic	Symbol	Value	Unit
Input Voltage (for V_O = 5V)	V_I	35	V
Thermal Resisstance Junction-Cases	R_{EJC}	5	°C/ W
Thermal Resistance Junction-Air	R_{EJA}	65	°C/ W
Operating Temperature Range	T_{OPR}	0 ~ +125	°C
Storage Temperature	T_{STG}	-65 ~ + 150	°C

KA340T05 ELECTRICAL CHARACTERISTICS

(Refer to test circuit, 0°C ≤ T_j ≤ 125°C, V_I = 10V, I_O=0.5A, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5Ma ≤ I_O ≤1.0A		4.80	5.00	5.20	V
		5mA ≤ I_O ≤ 1.0A, PD ≤15W V_I = 7.5V to 20V		4.75		5.25	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 7V to 25V			3	50	mV
		V_I = 8V to 20V				50	
		I_O ≤ 1A	V_I = 8V to 12V			25	
			V_I = 7.5V to 20V T_J = 25°C			50	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		10	50	mV
			0.25A ≤ I_O ≤ 0.75A			25	
		5mA ≤ I_O ≤1A				50	
			T_J = 25°C			8	
			0°C ≤ T_J ≤ 125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA ≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 7.5V to 20V				1.0	
		V_I = 7V to 25V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			40		μV
		f = 120Hz, V_I = 8V to 18V T_J = 25°C		62	80		
		f = 120Hz, V_I = 8V to 18V 0°C ≤ T_J ≤ 125°C		62			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average T_C of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±0.6		mV/ °C
Output Resistance	R_O	f = 1KHz			17		mΩ

* Load and line regulation are specified at a constant junction temperature. Changes in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

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KA340T06 ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5Ma ≤ I_O ≤1.0A		5.75	6.00	6.26	V
		5mA ≤ I_O ≤1.0A, PD≤15W V_I = 8.5V to 21V		5.70		6.30	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 7V to 25V			3	60	mV
		V_I = 9V to 21V				60	
		I_O ≤1A	V_I = 9V to 13V			30	
			V_I = 8.5V to 21V T_J = 25°C			60	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		10	60	mV
			0.25A ≤ I_O ≤ 0.75A			30	
		5mA ≤ I_O ≤1A				60	
			T_J = 25°C			8	
			0°C ≤ T_J ≤ 125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA ≤ I_O ≤ 1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 8.5V to 22V				1.0	
		V_I = 8V to 25V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			45		μV
		f = 120Hz, V_I = 9V to 19V T_J = 25°C		59	75		
		f = 120Hz, V_I = 9V to 19V 0°C ≤ T_J ≤ 125°C		59			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average TC of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±0.7		mV/ °C
Output Resistance	R_O	f = 1KHz			18		mΩ

(Refer to test circuit, 0°C ≤ T_j ≤125°C, V_I = 11V, I_O=0.5A, unless otherwise specified)

KA340T08 ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $0°C \le T_j \le 125°C$, $V_I = 14V$, $I_O = 0.5A$, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = 25°C$, $5mA \le I_O \le 1.0A$		7.70	8.00	8.30	V
		$5mA \le I_O \le 1.0A$, $P_D \le 15W$ $V_I = 10.5V$ to $23V$		7.60		8.40	
Line Regulation	ΔV_O	$T_J = 25°C$, $V_I = 7V$ to $25V$			3	80	mV
		$V_I = 11V$ to $23V$				80	
		$I_O \le 1A$	$V_I = 11.5V$ to $17V$			40	
			$V_I = 10.5V$ to $23V$ $T_J = 25°C$			80	
Load Regulation	ΔV_O		$5mA \le I_O \le 1.5A$		10	80	mV
			$0.25A \le I_O \le 0.75A$			40	
		$5mA \le I_O \le 1A$				80	
			$T_J = 25°C$			8	mA
			$0°C \le T_J \le 125°C$			8.5	
Quiescent Currnet Change	ΔI_Q	$5mA \le I_O \le 1A$				0.5	mA
		$T_J = 25°C$ $I_O \le 1A$, $V_I = 10.5V$ to $23V$				1.0	
		$V_I = 10.5V$ to $25V$				1.0	
Output Noise Voltage	V_N	$T_A = 25°C$, f = 10Hz to 100KHz			52		μV
		f = 120Hz, $V_I = 11.5V$ to $21.5V$ $T_J = 25°C$		56	72		
		f = 120Hz, $V_I = 11V$ to $21.5V$ $0°C \le T_J \le 125°C$		56			
Dropout Voltage	V_D	$I_O = 1A$, $T_J = 25°C$			2.0		V
Peak Output Current	I_{PK}	$T_J = 25°C$			2.2		A
Short-Circuit Currnet	I_{SC}	$V_I = 35V$, $T_A = 25°C$			250		mA
Average TC of V_O	$\Delta V_O/\Delta T$	$I_O = 5mA$			±0.9		mV/ °C
Output Resistance	R_O	f = 1KHz			20		mΩ

*Load and line regulation are specified at a constant jundtion temperature. Changes in V_O due to heating effects must be taken into account spearately. Pulse testing with low duty cycle is used.

KA340T09 ELECTRICAL CHARACTERISTICS

(Refer to test circuit, 0°C ≤ T_j ≤125°C, V_I = 15V, I_O=0.5A, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O ≤1.0A		8.65	9.00	9.35	V
		5mA ≤ I_O ≤1.0A, PD ≤15W V_I = 11.5V to 24V		8.60		9.40	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 11.5V to 25V			3	90	mV
		V_I =12V to 24V				90	
		I_O ≤1A	V_I = 12V to 19V			45	
			V_I = 11.5V to 24V T_J = 25°C			90	
Load Regulation	ΔV_O		5mA ≤ I_O≤1.5A		10	90	mV
			0.25A ≤ I_O≤0.75A			45	
		5mA ≤ I_O ≤1A				90	
			T_J = 25°C			8	
			0°C ≤T_J≤ 125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA ≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 11.5V to 24V				1.0	
		V_I = 11.5V to 25V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			58		μV
		f = 120Hz, V_I = 12.5V to 22.5V T_J = 25°C		56	72		
		f = 120Hz, V_I = 12.5V to 22.5V 0°C ≤T_J ≤ 125°C		56			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average TC of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±1.0		mV/ °C
Output Resistance	R_O	f = 1KHz			22		mΩ

* Load and line regulation are specified at a constant junction temperature. Changes in V_O due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

KA340T10 ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $0°C \le T_j \le 125°C$, V_I = 16V, I_O=0.5A, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O ≤1.0A		9.60	10.00	10.40	V
		5mA ≤I_O ≤1.0A, PD ≤15W V_I = 12.5V to 25V		9.50		10.50	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 11.5V to 25V			3	100	mV
		V_I =13V to 25V				100	
		I_O ≤1A	V_I = 13V to 20V			50	
			V_I = 12.5V to 25V T_J = 25°C			100	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		10	100	mV
			0.25A ≤ I_O ≤ 0.75A			50	
		5mA ≤I_O ≤1A				100	
			T_J = 25°C			8	
			0°C ≤ T_J ≤125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA ≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 12.6V to 25V				1.0	
		V_I = 12.6V to 25V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			58		μV
		f = 120Hz, V_I = 13V to 23V T_J = 25°C		56	72		
		f = 120Hz, V_I = 13V to 23V 0°C ≤ T_J ≤125°C		56			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average TC of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±1.1		mV/ °C
Output Resistance	R_O	f = 1KHz			24		mΩ

*Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA340T11 ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O≤1.0A		11.60	11.00	11.40	V
		5mA ≤ I_O ≤1.0A, PD ≤15W V_I = 13.5V to 26V		10.50		11.50	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 13.5V to 25V			3	110	mV
		V_I =14V to 26V				110	
		I_O ≤1A	V_I = 14V to 21V			55	
			V_I = 13.5V to 26V T_J = 25°C			110	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		10	110	mV
			0.25A ≤ I_O ≤0.75A			55	
		5mA ≤ I_O ≤1A				110	
			T_J = 25°C			8	
			0°C ≤ T_J ≤125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA ≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 13.7V to 26V				1.0	
		V_I = 13.5V to 25V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			70		µA
		f = 120Hz, V_I = 14V to 24V T_J = 25°C		55	72		
		f = 120Hz, V_I = 14V to 24V 0°C ≤ T_J ≤125°C		55			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average T_C of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±1.3		mV/ °C
Output Resistance	R_O	f = 1KHz			26		mΩ

(Refer to test circuit, 0°C ≤ T_j ≤125°C, V_I = 18V, I_O=0.5A, unless otherwise specified)
*Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA340T12 ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O ≤1.0A		11.50	12.00	12.50	V
		5mA ≤ I_O ≤1.0A, P_D ≤15W V_I = 14.5V to 27V		11.40		12.60	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 14.5V to 30V			4	120	mV
		V_I =15V to 27V				120	
		I_O ≤1A	V_I = 16V to 22V			55	
			V_I = 14.6V to 27V T_J = 25°C			120	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		12	120	mV
			0.25A ≤ I_O ≤0.75A			60	
		5mA≤ I_O ≤1A				120	
			T_J = 25°C			8	
			0°C ≤T_J ≤125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 14.8V to 27V				1.0	
		V_I = 14.5V to 30V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			75		µA
		f = 120Hz, V_I = 15V to 25V T_J = 25°C		55	72		
		f = 120Hz, V_I = 15V to 25V 0°C ≤ T_J ≤125°C		55			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average T_C of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±1.5		mV/ °C
Output Resistance	R_O	f = 1KHz			28		mΩ

(Refer to test circuit, 0°C ≤ T_j ≤125°C, V_I = 189V, I_O=0.5A, unless otherwise specified)
*Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA340T15 ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O ≤1.0A		14.40	15.00	15.60	V
		5mA ≤ I_O ≤1.0A, PD ≤15W V_I = 17.5V to 30V		14.25		15.75	
Line Regulation	ΔV_O	T_J = 25°C, V_I = 17.5V to 30V			4	150	mV
		V_I =18.5V to 30V				150	
		I_O ≤1A	V_I = 20V to 26V			60	
			V_I = 17.7V to 30V T_J = 25°C			120	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		12	150	mV
			0.25A ≤ I_O ≤ 0.75A			75	
		5mA ≤ I_O ≤1A				150	
			T_J = 25°C			8	
			0°C ≤ T_J ≤125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 17.5V to 30V				1.0	
		V_I = 11.5V to 25V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			90		µA
		f = 120Hz, V_I = 18.5V to 28.5V T_J = 25°C		54	70		
		f = 120Hz, V_I = 15V to 25V 0°C ≤ T_J ≤125°C		54			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average T_C of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±1.8		mV/ °C
Output Resistance	R_O	f = 1KHz			29		mΩ

(Refer to test circuit, 0°C ≤ T_j ≤125°C, V_I = 23V, I_O=0.5A, unless otherwise specified)
*Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA340T18 ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O ≤1.0A		17.30	18.00	18.70	V
		5mA ≤ I_O ≤1.0A, PD ≤15W V_I = 21V to 33V		17.10		18.90	
Line Regulation	ΔV_O	T_J = 25°C, V_I =21V to 33V			5	180	mV
		V_I =22V to 33V				180	
		I_O ≤1A	V_I = 24V to 30V			90	
			V_I = 21V to 33V T_J = 25°C			180	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		12	180	mV
			0.25A ≤ I_O ≤ 0.75A			90	
		5mA ≤ I_O ≤1A				180	
			T_J = 25°C			8	
			0°C ≤ T_J ≤125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 21.5V to 33V				1.0	
		V_I = 21V to 33V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			110		μA
		f = 120Hz, V_I = 22V to 32V T_J = 25°C		53	69		
		f = 120Hz, V_I = 22V to 32V 0°C ≤ T_J ≤125°C		53			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average T_C of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±2.2		mV/ °C
Output Resistance	R_O	f = 1KHz			32		mΩ

(Refer to test circuit, 0°C ≤ T_j ≤ 125°C, V_I = 27V, I_O=0.5A, unless otherwise specified)
*Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA340T24 ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25°C, 5mA ≤ I_O ≤1.0A		23.00	24.00	25.00	V
		5mA ≤ I_O ≤1.0A, P_D ≤15W V_I = 27V to 38V		22.80		25.20	
Line Regulation	ΔV_O	T_J = 25°C, V_I =27V to 38V			5	240	mV
		V_I =28V to 38V				240	
		I_O ≤1A	V_I = 30V to 36V			120	
			V_I = 27V to 38V T_J = 25°C			240	
Load Regulation	ΔV_O		5mA ≤ I_O ≤1.5A		12	240	mV
			0.25A ≤ I_O ≤0.75A			120	
		5mA ≤ I_O ≤1A				240	
			T_J = 25°C			8	
			0°C ≤ T_J ≤125°C			8.5	
Quiescent Currnet Change	ΔI_Q	5mA ≤ I_O ≤1A				0.5	mA
		T_J = 25°C I_O ≤1A, V_I = 28 V to 38V				1.0	
		V_I =27 V to 38V				1.0	
Output Noise Voltage	V_N	T_A = 25°C, f = 10Hz to 100KHz			170		µA
		f = 120Hz, V_I = 28V to 38V T_J = 25°C		50	66		
		f = 120Hz, V_I = 28V to 38V 0°C ≤ T_J ≤125°C		50			
Dropout Voltage	V_D	I_O = 1A, T_J = 25°C			2.0		V
Peak Output Current	I_{PK}	T_J = 25°C			2.2		A
Short-Circuit Currnet	I_{SC}	V_I = 35V, T_A = 25°C			250		mA
Average T_C of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			±2.8		mV/ °C
Output Resistance	R_O	f = 1KHz			37		mΩ

(Refer to test circuit, 0°C ≤ T_J ≤125°C, V_I = 33V, I_O=0.5A, unless otherwise specified)
*Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

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Definition of Terms

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