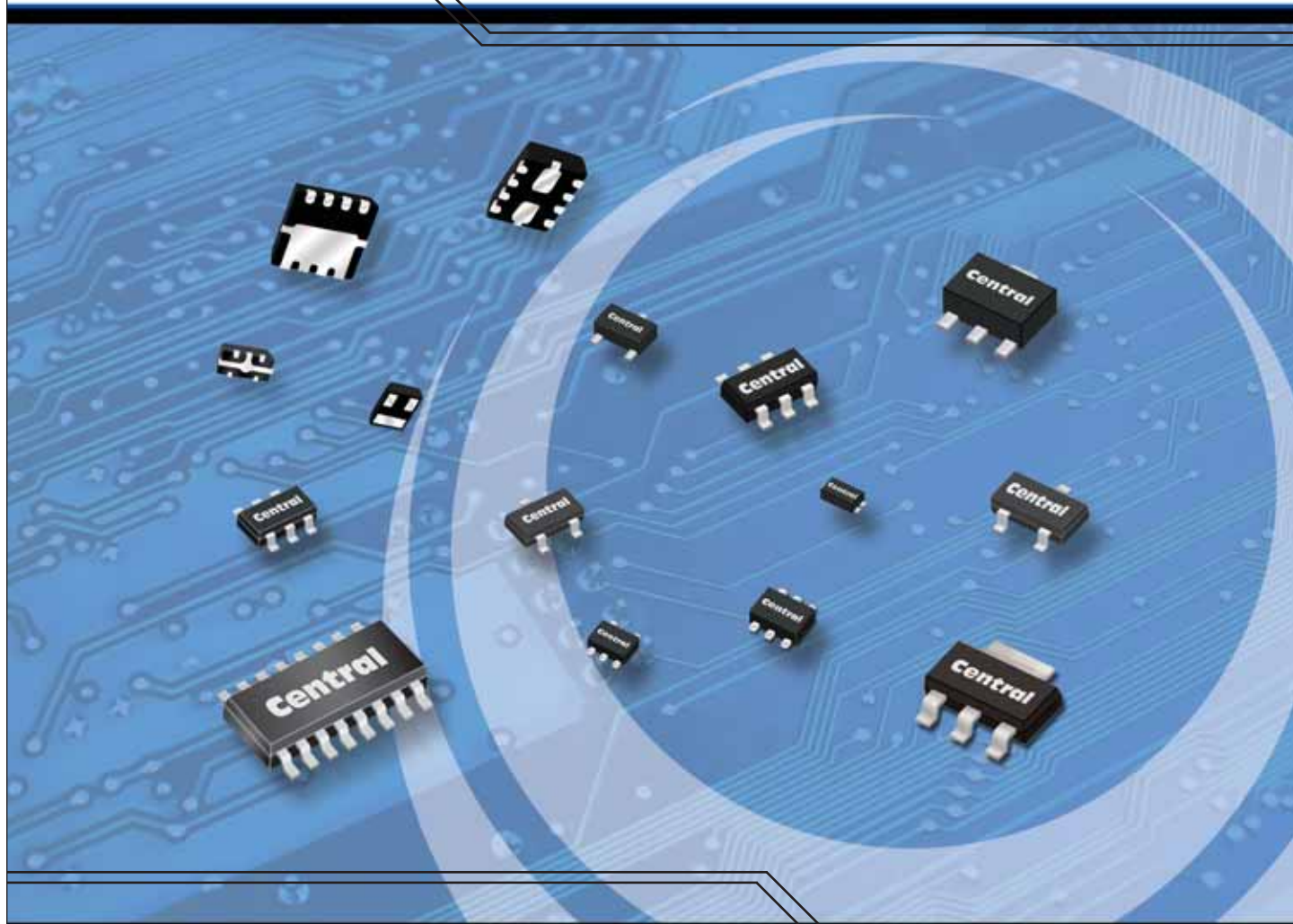


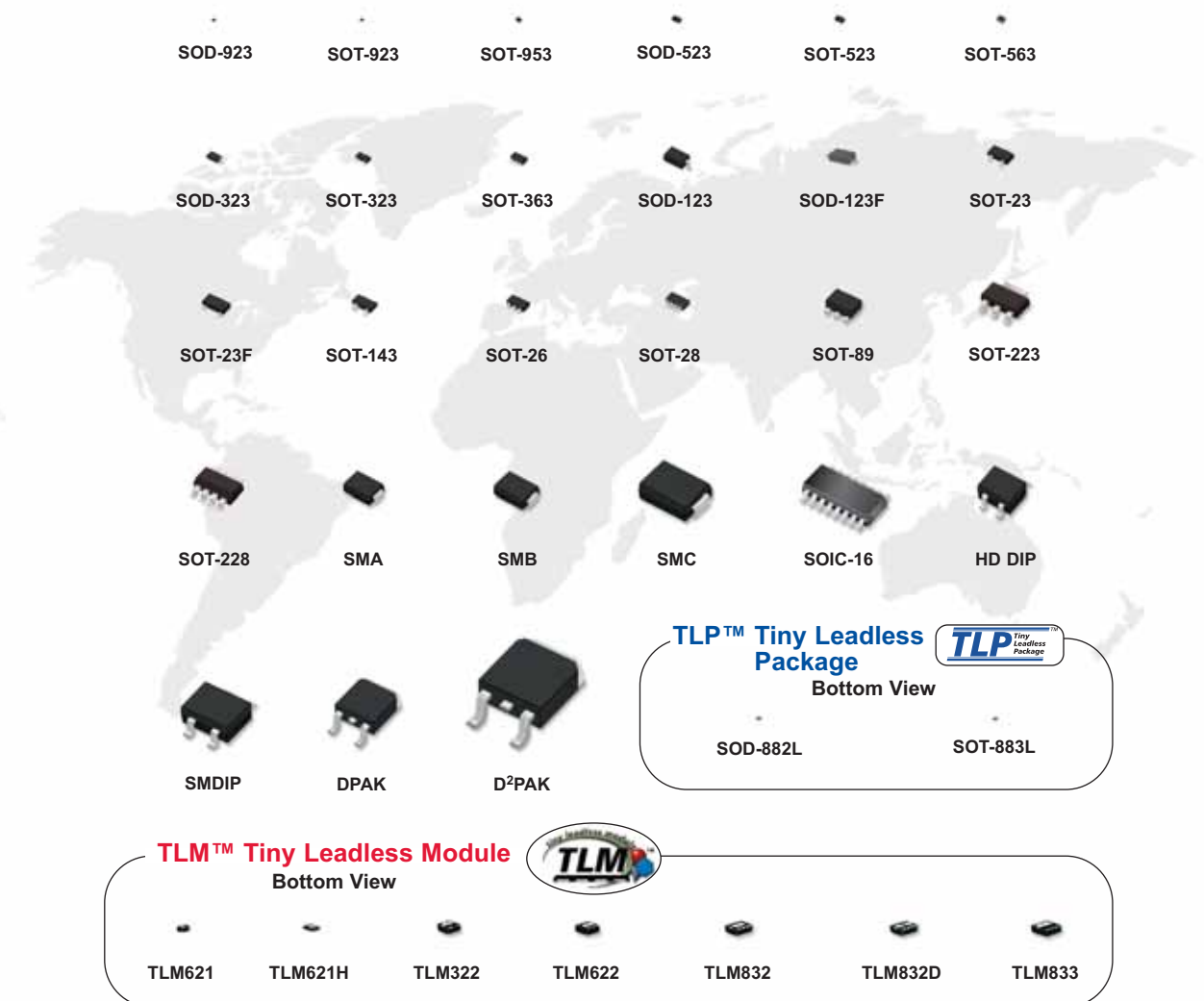
# Small Signal Transistors



- General Purpose Amplifiers/Switches
- Saturated Switches
- Low Noise Amplifiers
- High Current
- High Voltage
- RF Oscillator
- Darlington
- Low  $V_{CE(SAT)}$
- Chopper



## Surface Mount Packages (Actual Size)



**TLP™ Tiny Leadless Package**  
Bottom View  
SOD-882L SOT-883L

**TLM™ Tiny Leadless Module**  
Bottom View  
TLM621 TLM621H TLM322 TLM622 TLM832 TLM832D TLM833



145 Adams Avenue, Hauppauge, NY 11788 USA  
Tel: (631) 435-1110 • Fax: (631) 435-1824  
[www.centalsemi.com](http://www.centalsemi.com)

General Purpose Amplifiers/Switches

	FAMILY	BV <sub>CBO</sub>	BV <sub>CEO</sub>	BV <sub>EBO</sub>	I <sub>CBO</sub> @ V <sub>CE</sub>	V <sub>CB</sub> @ V <sub>CE</sub>	h <sub>FE</sub>		@ V <sub>CE</sub>	@ I <sub>C</sub>	V <sub>CE(SAT)</sub> @ I <sub>C</sub>	C <sub>ob</sub>	f <sub>T</sub>	NF	t <sub>off</sub>	FAMILY	SOT-923	SOT-953	SOT-883L	SOT-523	SOT-563	SOT-323	SOT-363	SOT-23	SOT-26	SOT-89	SOT-223	SOIC-16		
		(V) MIN	(V) MIN	(V) MIN	(nA) MAX	(V)	MIN	MAX	(V)	(mA)	(V) MAX	(pF) MAX	(MHz) MIN	(dB) MAX	(ns) MAX															
<p><b>S</b> Devices are listed in order of descending breakdown voltage.</p>																														
E	NPN	2222AE	<b>100</b>	<b>45</b>	6.0	10	60	100	300	10	150	<b>0.5</b>	500	8.0	300	4.0	285	2222AE											CMPT2222AE	
		8099	80	80	6.0	100	80	100	300	5.0	1.0	0.4	100	6.0	150	-	-	8099											CMPT8099	
		2222A	75	40	6.0	10	60	100	300	10	150	1.0	500	8.0	300	4.0	285	2222A				CMUT2222A	CMLT2222A (2x)	CMST2222A	CMKT2222A (2x)	CMPT2222A	CMXT2222A (2x)	CXT2222A	CZT2222A	MMPQ2222A (4x)
		3904E	60	40	6.0	50*	30	100	300	1.0	10	<b>0.2</b>	50	4.0	300	<b>4.0</b>	250	3904E	CMBT3904E	CMNT3904E	CET3904E		CMLT3904E (2x)			CMPT3904E				
		3904	60	40	6.0	50*	30	100	300	1.0	10	0.3	50	4.0	300	5.0	250	3904				CMUT3904		CMST3904	CMKT3904 (2x)	CMPT3904	CMXT3904 (2x)	CXT3904	CZT3904	MMPQ3904 (4x)
4401	60	40	6.0	100*	35	100	300	1.0	150	0.75	500	6.5	250	-	255	4401												CMPT4401		
E	PNP	2907AE	<b>90</b>	60	5.0	10	50	100	300	10	150	<b>0.7</b>	500	8.0	200	-	100	2907AE											CMPT2907AE	
		8599	80	80	5.0	100	80	100	300	5.0	1.0	0.4	100	4.5	150	-	-	8599											CMPT8599	
		2907A	60	60	5.0	10	50	100	300	10	150	1.6	500	8.0	200	-	100	2907A				CMUT2907A	CMLT2907A (2x)	CMST2907A	CMKT2907A (2x)	CMPT2907A	CMXT2907A (2x)	CXT2907A	CZT2907A	MMPQ2907A (4x)
		3906E	<b>60</b>	40	<b>6.0</b>	50*	30	100	300	1.0	10	<b>0.2</b>	50	4.0	300	4.0	250	3906E	CMBT3906E	CMNT3906E	CET3906E		CMLT3906E (2x)			CMPT3906E				
		3906	40	40	5.0	50*	30	100	300	1.0	10	0.4	50	4.5	250	4.0	300	3906				CMUT3906		CMST3906	CMKT3906 (2x)	CMPT3906	CMXT3906 (2x)	CXT3906	CZT3906	MMPQ3906 (4x)
4403	40	40	5.0	100*	35	100	300	2.0	150	0.75	500	8.5	200	-	255	4403												CMPT4403		
E	NPN & PNP	2222A (NPN) +	75	40	6.0	10	60	100	300	10	150	1.0	500	8.0	300	4.0	285	2222A (NPN) +												
		2907A (PNP) +	60	60	5.0	10	50	100	300	10	150	1.6	500	8.0	200	-	100	2907A (PNP) +					CMLT2207 (2x)		CMKT2207 (2x)		CMXT2207 (2x)			MMPQ6502 (4x)
		3904E (NPN) +	60	40	6.0	50*	30	100	300	1.0	10	<b>0.2</b>	50	4.0	300	<b>4.0</b>	250	3904E (NPN) +					CMLT3946E (2x)							
		3906E (PNP) +	<b>60</b>	40	<b>6.0</b>	50*	30	100	300	1.0	10	<b>0.2</b>	50	4.0	300	4.0	250	3906E (PNP) +												
		3904 (NPN) +	60	40	6.0	50*	30	100	300	1.0	10	0.3	50	4.0	300	5.0	250	3904 (NPN) +								CMKT3946 (2x)		CMXT3946 (2x)		
3906 (PNP) +	40	40	5.0	50*	30	100	300	1.0	10	0.4	50	4.5	250	4.0	300	3906 (PNP) +														

Saturated Switches

<p><b>S</b> Devices are listed in order of descending f<sub>T</sub>.</p>																														
E	NPN	2369	40	15	4.5	400	20	40	120	1.0	10	0.25	10	4.0	500	-	18	2369											CMPT2369	
		3646	40	15	5.0	500*	20	15	-	1.0	300	0.5	300	5.0	350	-	28	3646											CMPT3646	
E	PNP	3640	12	12	4.0	10*	6.0	30	120	0.3	10	0.6	50	3.5	500	-	35	3640											CMPT3640	

Low Noise Amplifiers

<p><b>S</b> Devices are listed in order of ascending NF.</p>																														
E	NPN	5089	30	25	4.5	50	15	400	1,200	5.0	0.1	0.5	10	4.0	50	2.0	-	5089										CMKT5089M10 (2x Matched)	CMPT5089	
		930	45	45	5.0	10	45	100	300	5.0	0.01	1.0	10	8.0	30	3.0	-	930											CMPT930	
		2484	60	60	6.0	10	45	250	-	5.0	1.0	0.35	1.0	6.0	-	3.0	-	2484											CMPT2484	
		5088	35	30	4.5	50	20	300	900	5.0	0.1	0.5	10	4.0	50	3.0	-	5088										CMKT5088 (2x)	CMPT5088	
		5088E	<b>50</b>	<b>50</b>	<b>5.0</b>	50	20	300	900	5.0	0.1	0.1	10	4.0	<b>100</b>	3.0	-	5088E				CMUT5088E	CMLT5088E (2x)						CMPT5088E	
		6428	60	50	6.0	10	30	250	650	5.0	0.1	0.6	100	3.0	100	3.0	-	6428											CMPT6428	
6429	55	45	6.0	10	30	500	1,250	5.0	0.1	0.6	100	3.0	100	3.0	-	6429												CMPT6429		
E	PNP	5087	50	50	3.0	50	35	250	800	5.0	0.1	0.3	10	4.0	40	2.0	-	5087										CMKT5087 (2x)	CMPT5087	
		5087E	<b>50</b>	<b>50</b>	<b>5.0</b>	50	20	300	900	5.0	0.1	0.1	10	4.0	<b>100</b>	3.0	-	5087E				CMUT5087E						CMKT5087E (2x)	CMPT5087E	
		5086	50	50	3.0	50	35	150	500	5.0	0.1	0.3	10	4.0	40	3.0	-	5086										CMPT5086		
		992	110	110	5.0	-	-	200	800	6.0	1.0	0.3	10	3.0	50	3.0	-	992											CMPT992	
E	NPN & PNP	5088E (NPN) +	<b>50</b>	<b>50</b>	<b>5.0</b>	50	20	300	900	5.0	0.1	0.1	10	4.0	<b>100</b>	3.0	-	5088E (NPN) +					CMLT5078E (2x)							
		5087E (PNP) +	<b>50</b>	<b>50</b>	<b>5.0</b>	50	20	300	900	5.0	0.1	0.1	10	4.0	<b>100</b>	3.0	-	5087E (PNP) +												
		5088 (NPN) +	35	30	4.5	50	20	300	900	5.0	0.1	0.5	10	4.0	50	3.0	-	5088 (NPN) +										CMKT5078 (2x)		
5087 (PNP) +	50	50	3.0	50	35	250	800	5.0	0.1	0.3	10	4.0	40	2.0	-	5087 (PNP) +														

E Indicates Enhanced Specification Device. Enhanced Spec in Red and Bold S Indicates Sorted Columns.

(2x) under part number indicates two devices in one package. (4x) under part number indicates four devices in one package.

High Current



Tiny Leadless Module™

FAMILY	BV <sub>CB0</sub>	BV <sub>CEO</sub>	BV <sub>EBO</sub>	I <sub>CB0</sub>	@ V <sub>CB</sub>	h <sub>FE</sub>		@ V <sub>CE</sub>	@ I <sub>C</sub>	V <sub>CE(SAT)</sub>	@ I <sub>C</sub>	C <sub>ob</sub>	f <sub>T</sub>	NF	t <sub>off</sub>	FAMILY	TLM621	TLM832D	TLM833	SOT-523	SOT-563	SOT-323	SOT-23	SOT-89	SOT-223	
	(V) MIN	(V) MIN	(V) MIN	(nA) MAX	(V)	MIN	MAX	(V)	(mA)	(V) MAX	(mA)	(pF) MAX	(MHz) MIN	(dB) MAX	(ns) MAX											
E NPN	853	200	100	6.0	10	150	100	300	2.0	2,000	0.05	100	38†	190†	-	-	853			CTLT853-M833					CXT853	CZT853
	3019	120	80	7.0	10	90	100	300	10	150	0.5	500	12	100	-	4.0	3019						CMPT3019	CXT3019	CZT3019	
	A06	80	80	4.0	100	80	100	-	1.0	100	0.25	100	-	100	-	-	A06						CMPTA06			
	491E	80	60	5.0	100	60	<b>200</b>	<b>600</b>	5.0	500	<b>0.2</b>	500	10	150	-	-	491E						CMPT491E			
	651	80	60	5.0	100	80	75	-	2.0	500	0.5	2,000	-	75	-	-	651								CZT651	
	3410	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	10	100	-	-	3410	CTLT3410-M621	CTLM3410-M832D (2x)		CMUT3410	CMLT3410 (2x)	CMST3410	CMPT3410	CXT3410	
	68	25	20	5.0	100	25	85	375	1.0	500	0.5	1,000	-	65	-	-	68								CBCX68	CBCP68
E PNP	953	140	100	6.0	50	100	100	300	1.0	1,000	0.05	100	45†	150†	-	-	953			CTLT953-M833					CXT953	CZT953
	4033	80	80	5.0	50	60	100	300	5.0	100	0.5	500	20	100	-	-	4033						CMPT4033	CXT4033	CZT4033	
	A56	80	80	4.0	100	80	100	-	1.0	100	0.25	100	-	50	-	-	A56						CMPTA56			
	591E	80	60	5.0	100	60	<b>200</b>	<b>600</b>	5.0	500	<b>0.2</b>	500	10	150	-	-	591E						CMPT591E			
	751	80	60	5.0	100	80	75	-	2.0	500	0.5	2,000	-	75	-	-	751								CZT751	
	7410	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	15	100	-	-	7410	CTLT7410-M621	CTLM7410-M832D (2x)		CMUT7410	CMLT7410 (2x)	CMST7410	CMPT7410	CXT7410	
	69	25	20	5.0	100	25	85	375	1.0	500	0.5	1,000	-	65	-	-	69								CBCX69	CBCP69
NPN & PNP	3410 (NPN) +	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	10	100	-	-	3410 (NPN) +		CTLM3474-M832D (2x)							
	7410 (PNP)	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	15	100	-	-	7410 (PNP)					CMLT3474 (2x)				

High Voltage

Devices are listed in order of descending breakdown voltage.

E NPN	A46	450	450	6.0	100	400	50	200	10	10	0.5	50	7.0	20	-	-	A46						CMPTA46		CZTA46	
	A44	450	400	6.0	100	400	50	200	10	10	0.75	50	7.0	20	-	-	A44				CMLTA44		CMPTA44	CXTA44	CZTA44	
	6517	350	350	5.0	50	250	30	200	10	30	1.0	50	-	40	-	-	6517						CMPT6517			
	A42E	<b>350</b>	<b>350</b>	6.0	250	200	<b>50</b>	-	10	30	<b>0.35</b>	50	6.0	<b>50</b>	-	-	A42E						CMPTA42E			
	A42	300	300	6.0	100	200	40	-	10	30	0.5	20	3.0	50	-	-	A42						CMPTA42	CXTA42	CZTA42	
	5551E	<b>250</b>	<b>220</b>	6.0	50	120	<b>120</b>	<b>300</b>	5.0	10	<b>0.1</b>	50	6.0	100	8.0	-	-	5551E				CMUT5551E		CMPT5551E	CXT5551E	CZT5551E
	5551	180	160	6.0	50	120	80	250	5.0	10	0.2	50	6.0	100	8.0	-	-	5551				CMUT5551	CMLT5551 (2x)	CMPT5551	CXT5551	CZT5551
5551HC	180	160	6.0	50	120	80	250	5.0	10	0.2	50	15	100	-	-	5551HC					CMLT5551HC	CMPT5551HC	CXT5551HC	CZT5551HC		
E PNP	A96	450	450	6.0	100	400	50	200	10	10	0.5	50	7.0	20	-	-	A96						CMPTA96		CZTA96	
	A94	400	400	6.0	100	350	50	200	10	10	0.75	50	7.0	20	-	-	A94				CMLTA94		CMPTA94		CZTA94	
	6520	350	350	5.0	50	250	30	200	10	30	1.0	50	-	40	-	-	6520						CMPT6520			
	A92E	<b>350</b>	<b>350</b>	6.0	250	200	<b>50</b>	-	10	30	<b>0.35</b>	50	6.0	50	-	-	A92E						CMPTA92E			
	A92	300	300	5.0	250	200	25	-	10	30	0.5	20	6.0	50	-	-	A92						CMPTA92	CXTA92	CZTA92	
	5401E	<b>250</b>	<b>220</b>	<b>7.0</b>	50	120	<b>100</b>	<b>300</b>	5.0	10	<b>0.15</b>	50	6.0	100	8.0	-	-	5401E				CMUT5401E		CMPT5401E	CXT5401E	CZT5401E
5401	160	150	5.0	50	120	60	240	5.0	10	0.5	50	6.0	100	8.0	-	-	5401				CMUT5401		CMPT5401	CXT5401	CZT5401	
NPN & PNP	5551 (NPN) +	180	160	6.0	50	120	80	250	5.0	10	0.2	50	6.0	100	8.0	-	-	5551 (NPN) +					CMLT5554 (2x)			
	5401 (PNP)	160	150	5.0	50	120	60	240	5.0	10	0.5	50	6.0	100	8.0	-	-	5401 (PNP)								

E Indicates Enhanced Specification Device. Enhanced Spec in Red and Bold. S Indicates Sorted Columns.

(2x) under part number indicates two devices in one package.



Tiny Leadless Module™

**RF Oscillator**

FAMILY	BV <sub>CB0</sub> (V) MIN	BV <sub>CEO</sub> *BV <sub>CES</sub> (V) MIN	BV <sub>EBO</sub> (V) MIN	I <sub>CBO</sub> I <sub>CEV</sub> (nA) MAX	@ V <sub>CE</sub> (V)	h <sub>FE</sub>		@ V <sub>CE</sub> (V)	@ I <sub>C</sub> (mA)	V <sub>CE(SAT)</sub> (V) MAX	@ I <sub>C</sub> (mA)	C <sub>ob</sub> (pF) MAX	f <sub>T</sub> (MHz) MIN	NF (dB) MAX	t <sub>off</sub> (ns) MAX	FAMILY	TLM621	TLM832D	SOT-523	SOT-563	SOT-323	SOT-23	SOT-89	SOT-223
						MIN	MAX																	

Devices are listed in order of descending f<sub>T</sub>.

NPN	5179	20	12	2.5	20	15	25	-	1.0	3.0	0.4	10	1.0	900	4.5	-	5179			CMUT5179			CMPT5179		
	H10	30	25	3.0	100	25	60	-	10	4.0	0.5	4.0	0.7	650	-	-	H10						CMPTH10		
	918	30	15	3.0	10	15	20	-	1.0	3.0	0.4	10	1.7	600	6.0	-	918						CMPT918		
PNP	H81	20	20	3.0	100	10	60	-	10	5.0	0.5	5.0	0.85	600	-	-	H81						CMPTH81		

**Darlington**

Devices are listed in order of descending h<sub>FE</sub>.

NPN	900K	50	25	10	100	30	900,000	-	5.0	100	1.5	100	-	125	-	-	900K								CZT900K
	250K	50	25	10	100	30	250,000	-	5.0	100	1.5	100	-	125	-	-	250K								CZT250K
	A14E	<b>40</b>	<b>40*</b>	10	<b>100</b>	40	<b>40,000</b>	-	5.0	100	<b>1.0</b>	100	-	125	-	-	A14E						CMPTA14E		
	6427E	<b>60</b>	<b>60*</b>	<b>14</b>	100	30	<b>25,000</b>	200,000	5.0	100	1.0	500	7.0	200†	10	-	6427E				CMLT6427E	CMST6427E			
	A14	30	30*	10	100	30	20,000	-	5.0	100	1.5	100	-	125	-	-	A14						CMPTA14	CXTA14	CZTA14
	6427	40	40	12	50	30	20,000	200,000	5.0	100	1.5	500	7.0		10	-	6427						CMPT6427		
	A13	30	30*	10	100	30	10,000	-	5.0	100	1.5	100	-	125	-	-	A13						CMPTA13		
	A27	60	60*	10	100	50	10,000	-	5.0	100	1.5	100	-	125	-	-	A27						CMPTA27	CXTA27	CZTA27
	A28	80	80*	12	100	60	10,000	-	5.0	100	1.5	100	8.0	125	-	-	A28								CZTA28
	A29	100	100*	12	100	80	10,000	-	5.0	100	1.5	100	8.0	125	-	-	A29						CMPTA29		
PNP	2000	200	200*	10	500	180	3,000	-	5.0	160	1.1	80	-	-	-	-	2000								CZT2000
PNP	A64	30	30*	10	100	30	20,000	-	5.0	100	1.5	100	-	125	-	-	A64						CMPTA64	CXTA64	CZTA64
	A63	30	30*	10	100	30	10,000	-	5.0	100	1.5	100	-	125	-	-	A63						CMPTA63		
	A77	60	60*	10	100	50	10,000	-	5.0	100	1.5	100	-	125	-	-	A77						CMPTA77		CZTA77

**Low V<sub>CE(SAT)</sub>**

NPN	3410	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	10	100	-	-	3410	CTLT3410-M621		CMUT3410	CMLT3410 (2x)	CMST3410	CMPT3410	CXT3410	
PNP	7410	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	15	100	-	-	7410	CTLT7410-M621		CMUT7410	CMLT7410 (2x)	CMST7410	CMPT7410	CXT7410	
NPN & PNP	3410 (NPN) +	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	10	100	-	-	3410 (NPN) + 7410 (PNP)		CTLM3474-M832D (2x)		CMLT3474 (2x)				
	7410 (PNP)	40	25	6.0	100	40	100	300	1.0	100	0.45	1,000	15	100	-	-									

**Chopper**

PNP	404A	40	35	25	100	10	100	400	0.15	12	0.20	24	40	-	-	-	404A						CMPT404A		
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E Indicates Enhanced Specification Device. Enhanced Spec in Red and Bold. S Indicates Sorted Columns.

(2x) under part number indicates two devices in one package.