



**INTERNATIONAL  
SEMICONDUCTOR, INC.**

**EPITAXIAL PLANAR NPN TRANSISTOR**

**KTN2222S/AS**

**GENERAL PURPOSE APPLICATIONS  
SWITCHING APPLICATIONS**

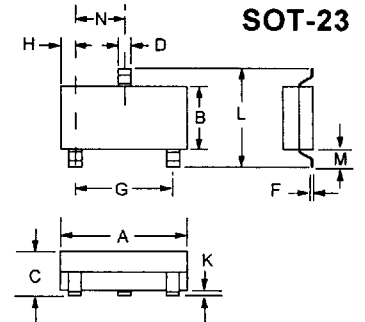
**FEATURES**

- Low Leakage Current:  
 $I_{CEX} = 10 \text{ mA Max}$ ,  $V_{CE} = 60 \text{ Volts}$ ,  $V_{EB(OFF)} = 3 \text{ Volts}$
- Low Saturation Voltage:  
 $V_{CE(Sat)} = 0.3 \text{ Volts}$ ,  $I_C = 150 \text{ mA}$ ,  $I_B = 15 \text{ mA}$

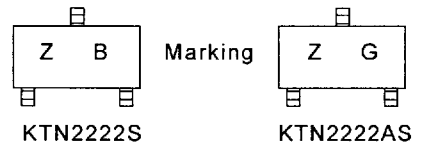
**MAXIMUM RATINGS at  $T_A = 25^\circ\text{C}$**

CHARACTERISTIC	SYMBOL	RATING		UNIT
		KTN2222S	KTN2222AS	
Collector-Base Voltage	$V_{CBO}$	60	75	V
Collector-Emitter Voltage	$V_{CEO}$	30	40	V
Emitter-Base Voltage	$V_{EBO}$	5	6	V
Collector Current	$I_C$	600		mA
Collector Power Dissipation at $T_A = 25^\circ\text{C}$	$P_C^*$	350		mW
Junction Temperature	$T_J$	150		$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55 to +150		$^\circ\text{C}$

\*  $P_C$ : Package Mounted on 99.5% Alumina 10 x 8 x 0.6 mm



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.08	0.110	0.120
B	1.20	1.40	0.047	0.056
C	0.85	1.20	0.033	0.047
D	0.37	0.45	0.015	0.018
F	0.086	0.152	0.003	0.006
G	1.78	2.04	0.070	0.080
H	0.45	0.60	0.018	0.024
K	0.10	0.25	0.004	0.010
L	2.10	2.50	0.083	0.098
M	0.45	0.60	0.018	0.024
N	0.89	1.02	0.035	0.040



**ELECTRICAL CHARACTERISTICS at  $T_A = 25^\circ\text{C}$**

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT	
Collector Cut-off Current	KTN2222AS	$I_{CEX}$	$V_{CE} = 60V$ , $V_{EB(OFF)} = 3V$	-	-	10 nA	
Collector Cut-off Current	KTN2222S	$I_{CBO}$	$V_{CB} = 50V$ , $I_E = 0$	-	-	0.01 uA	
	KTN2222AS		$V_{CB} = 60V$ , $I_E = 0$	-	-	0.01 uA	
Emitter Cut-off Current	KTN2222AS	$I_{EBO}$	$V_{EB} = 3V$ , $I_C = 0$	-	-	10 nA	
Collector-Base Breakdown Voltage	KTN2222S	$V_{(BR)CBO}$	$I_C = 10\mu A$ , $I_E = 0$	60	-	-	V
	KTN2222AS			75	-	-	V
Collector-Emitter Breakdown Voltage *	KTN2222S	$V_{(BR)CEO}$	$I_C = 10mA$ , $I_B = 0$	30	-	-	V
	KTN2222AS			40	-	-	V
Emitter-Base Breakdown Voltage	KTN2222S	$V_{(BR)EBO}$	$I_C = 10\mu A$ , $I_C = 0$	5	-	-	V
	KTN2222AS			6	-	-	V

Pulse Test: Pulse Width 300 usec, Duty Cycle 2.0%

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# KTN222S/AS

ELECTRICAL CHARACTERISTICS at  $T_A = 25^\circ\text{C}$ , Continued

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
DC Current Gain *	KTN2222S KTN2222AS	$h_{re}(1)$	$I_C=0.1\text{mA}, V_{CE}=10\text{V}$	35	-	-	
		$h_{re}(2)$	$I_C=1.0\text{mA}, V_{CE}=10\text{V}$	50	-	-	
		$h_{re}(3)$	$I_C=10\text{mA}, V_{CE}=10\text{V}$	75	-	-	
		$h_{re}(4)$	$I_C=150\text{mA}, V_{CE}=10\text{V}$	100	-	300	
	KTN2222S KTN2222AS	$h_{re}(5)$	$I_C=500\text{mA}, V_{CE}=10\text{V}$	30 40	- -	- -	
Collector-Emitter Saturation Voltage *	KTN2222S KTN2222AS	$V_{CE(sat)1}$	$I_C=150\text{mA}, I_B=15\text{mA}$	-	-	0.4	V
				-	-	0.3	
	KTN2222S KTN2222AS	$V_{CE(sat)2}$	$I_C=500\text{mA}, I_B=50\text{mA}$	-	-	1.6	
				-	-	1.0	
Base - Emitter Saturation Voltage *	KTN2222S KTN2222AS	$V_{BE(sat)1}$	$I_C=150\text{mA}, I_B=15\text{mA}$	-	-	1.3	V
				0.6	-	1.2	
	KTN2222S KTN2222AS	$V_{BE(sat)2}$	$I_C=500\text{mA}, I_B=50\text{mA}$	-	-	2.6	
				-	-	2.0	
Transition Frequency	KTN2222S KTN2222AS	$f_T$	$I_C=20\text{mA}, V_{CE}=20\text{V}, f=100\text{MHz}$	250	-	-	MHz
				300	-	-	
Collector Output Capacitance		$C_{ob}$	$V_{CB}=10\text{V}, I_E=0, f=1.0\text{MHz}$	-	-	8	pF
Input Capacitance	KTN2222S KTN2222AS	$C_{ib}$	$V_{EB}=0.5\text{V}, I_C=0, f=1.0\text{MHz}$	-	-	30	
				-	-	25	
Input Impedance	KTN2222AS	$h_{ie}$	$I_C=1\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	2.0	-	8.0	kohm
			$I_C=10\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	0.25	-	1.25	
Voltage Feedback Ratio	KTN2222AS	$h_{re}$	$I_C=1\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	-	-	8	$\times 10^{-4}$
			$I_C=10\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	-	-	4	
Small-Signal Current Gain	KTN2222AS	$h_{re}$	$I_C=1\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	50	-	300	
			$I_C=10\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	75	-	375	
Collector Output Admittance	KTN2222AS	$h_{oe}$	$I_C=1\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	5	-	35	$\mu\Omega$
			$I_C=10\text{mA}, V_{CE}=10\text{V}, f=1\text{kHz}$	25	-	200	
Collector-Base Time Constant	KTN2222AS	$C_c'r_{bb}$	$I_C=20\text{mA}, V_{CB}=20\text{V}, f=31.8\text{MHz}$	-	-	150	pS
Noise Figure	KTN2222AS	NF	$I_C=100\mu\text{A}, V_{BE(off)}=0.5\text{V}, R_g=1\text{kohm}, f=1\text{kHz}$	-	-	4	dB
Switching Time	Delay Time	$t_d$	$V_{CC}=30\text{V}, V_{BE(off)}=0.5\text{V}, I_C=150\text{mA}, I_{B1}=15\text{mA}$	-	-	10	nS
	Rise Time	$t_r$		-	-	25	
	Storage Time	$t_{stg}$	$V_{CC}=30\text{V}, I_C=150\text{mA}, I_{B1}=I_{B2}=15\text{mA}$	-	-	225	
	Fall Time	$t_f$		-	-	60	

\* Pulse Test: Pulse Width 300 usec, Duty Cycle 2.0%

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