

PNP SILICON LOW POWER TRANSISTOR

Qualified per MIL-PRF-19500/350

DEVICES

2N3867 **2N3867S**
2N3868 **2N3868S**

LEVELS
JAN
JANTX
JANTXV
JANS

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

Parameters / Test Conditions	Symbol	2N3867	2N3868	Unit
Collector-Base Voltage	V_{CBO}	40	60	Vdc
Collector-Emitter Voltage	V_{CEO}	40	60	Vdc
Emitter-Base Voltage	V_{EBO}	4.0		Vdc
Collector Current	I_C	3.0		mA
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ ⁽¹⁾	P_T	1.0		W/°C
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

THERMAL CHARACTERISTICS

Parameters / Test Conditions	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	175	°C/mW

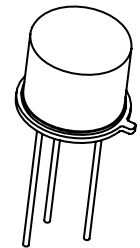
Note: * Electrical characteristics for “S” suffix devices are identical to the “non S” corresponding devices.

1/ Derate linearly 5.71mW/°C for $T_A > +25^\circ\text{C}$

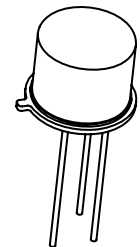
2/ Derate linearly 57.1mW/°C for $T_C > +25^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Current $I_C = 10\mu\text{A}$	$V_{(BR)CEO}$	40	60	Vdc
Collector-Base Cutoff Current $V_{CB} = 40\text{Vdc}$ $V_{CB} = 60\text{Vdc}$	I_{CBO}		100	μA
Emitter-Base Cutoff Current $V_{EB} = 4.0\text{Vdc}$	I_{EBO}		100	μA
Collector-Emitter Cutoff Current $V_{CE} = 40\text{Vdc}$ $V_{CE} = 60\text{Vdc}$ $V_{CE} = 40\text{Vdc}, T_A = +150^\circ\text{C}$ $V_{CE} = 60\text{Vdc}, T_A = +150^\circ\text{C}$	I_{CEX}		1.0 1.0 50 50	μA



TO-5 *
2N3867, 2N3868



TO-39 * (TP-205AD)
2N3867S, 2N3868S

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted) (CONT.)

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS ⁽²⁾				
Forward-Current Transfer Ratio $I_C = 500\text{mA}$, $V_{CE} = 1.0\text{Vdc}$ 2N3867, S 2N3868, S	h _{FE}	50		
$I_C = 1.5\text{A}$, $V_{CE} = 2.0\text{Vdc}$ 2N3867, S 2N3868, S		35	200	
$I_C = 2.5\text{A}$, $V_{CE} = 3.0\text{Vdc}$ 2N3867, S 2N3868, S		40	150	
$I_C = 3.0\text{A}$, $V_{CE} = 5.0\text{Vdc}$ 2N3867, S 2N3868, S		25		
$I_C = 500\text{mA}$, $V_{CE} = 1.0\text{Vdc}$, $T_A = -55^\circ\text{C}$ 2N3867, S 2N3868, S		20		
$I_C = 500\text{mA}$, $V_{CE} = 1.0\text{Vdc}$, $T_A = -55^\circ\text{C}$ 2N3867, S 2N3868, S		17		
Collector-Emitter Saturation Voltage $I_C = 500\text{mA}$, $I_B = 50\text{mA}$ $I_C = 1.5\text{A}$, $I_B = 150\text{mA}$ $I_C = 2.5\text{A}$, $I_B = 250\text{mA}$	V _{CE(sat)}		0.5 0.75 1.5	Vdc
Base-Emitter Saturation Voltage $I_C = 500\text{mA}$, $I_B = 50\text{mA}$ $I_C = 1.5\text{A}$, $I_B = 150\text{mA}$ $I_C = 2.5\text{A}$, $I_B = 250\text{mA}$ 2N3867, S 2N3868, S	V _{BE(sat)}	0.9 0.85	1.0 1.4 1.4 2.0	Vdc

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio $I_C = 100\text{mA}$, $V_{CE} = 5.0\text{Vdc}$, $f = 20\text{MHz}$	h _{fc}	3	12	kΩ
Output Capacitance $V_{CB} = 10\text{Vdc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C _{obo}		120	pF
Input Capacitance $V_{EB} = 3.0\text{Vdc}$, $I_C = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$	C _{ibo}		800	pF

(2) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%

SWITCHING CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Delay Time Rise Time $V_{CC} = -30\text{dc}, V_{EB} = 0$ $I_C = 1.5\text{Adc}, I_{B1} = 150\text{mAdc}$	t_d t_r		35 65	nS
Storage Time Fall Time $V_{CC} = -30\text{dc}, V_{EB} = 0$ $I_C = 1.5\text{Adc}, I_{B1} = I_{B2} = 150\text{mAdc}$	t_s t_f		500 100	nS
Turn-On Time $V_{CC} = 30, I_C = 1.5\text{Adc}, I_B = 150\text{mA}$	t_{on}		100	nS
Turn-Off Time $V_{CC} = 30, I_C = 1.5\text{Adc}, I_B = 150\text{mA}$	t_{off}		600	nS

SAFE OPERATING AREA

DC Test

$T_C = 25^\circ\text{C}, 1 \text{ cycle}, t = 1.0\text{s}$

Test 1

$V_{CE} = 3.33\text{Vdc}, I_C = 3.0\text{Adc}$

Test 2

$V_{CE} = 40\text{Vdc}, I_C = 160\text{mAdc}$ 2N3867,
 $V_{CE} = 60\text{Vdc}, I_C = 80\text{mAdc}$ 2N3868, S