

# Medium Power Transistor (32V, 0.8A)

## 2SD1781KQ/R

### ●Features

- 1) Very low  $V_{CE(sat)}$ .  
 $V_{CE(sat)} < 0.4\text{ V (Typ.)}$   
( $I_c / I_B = 500\text{mA} / 50\text{mA}$ )
- 2) High current capacity in compact package.
- 3) Complements the 2SB1197KX
- 4) We declare that the material of product compliance with RoHS requirements.
- 5) S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

### ●Structure

Epitaxial planar type  
NPN silicon transistor

### ●Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

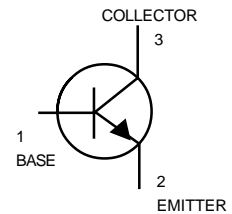
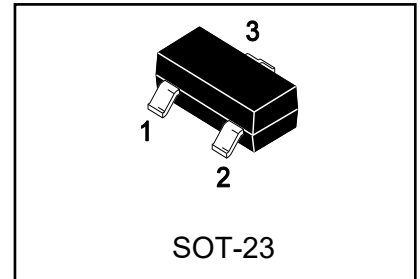
Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CB0}$	40	V
Collector-emitter voltage	$V_{CE0}$	32	V
Emitter-base voltage	$V_{EB0}$	5	V
Collector current	$I_c$	0.8	A (DC)
		1.5	A (Pulse) *
Collector power dissipation	$P_c$	200	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55~+150	$^\circ\text{C}$

\* Single pulse  $P_w=100\text{ms}$

### ORDERING INFORMATION

Device	Marking	Shipping
2SD1781KQ S-2SD1781KQ	AFQ	3000 Tape & Reel
2SD1781KR S-2SD1781KR	AFR	3000 Tape & Reel

2SD1781KQ  
2SD1781KR



●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CB0}$	40	—	—	V	$I_C=50\mu A$
Collector-emitter breakdown voltage	$BV_{CEO}$	32	—	—	V	$I_C=1mA$
Emitter-base breakdown voltage	$BV_{EBO}$	5	—	—	V	$I_E=50\mu A$
Collector cutoff current	$I_{CBO}$	—	—	0.5	$\mu A$	$V_{CB}=20V$
Emitter cutoff current	$I_{EBO}$	—	—	0.5	$\mu A$	$V_{EB}=4V$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	0.4	V	$I_C/I_B=500mA/50mA$
DC current transfer ratio	$h_{FE}$	120	—	390	—	$V_{CE}=3V, I_C=100mA$
Transition frequency	$f_T$	—	150	—	MHz	$V_{CE}=5V, I_E=-50mA, f=100MHz$
Output capacitance	$C_{ob}$	—	10	—	pF	$V_{CB}=10V, I_E=0A, f=1MHz$

● DEVICE MARKING

2SD1781KQ=AFQ	2S1781KR=AFR
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Item	Q	R
$h_{FE}$	120~270	180~390

●Electrical characteristic curves

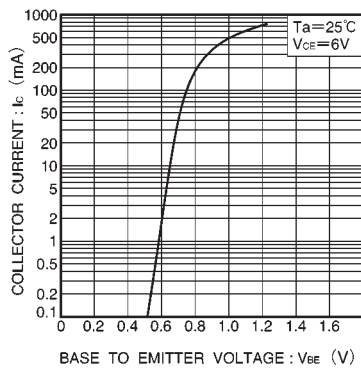


Fig.1 Grounded emitter propagation characteristics

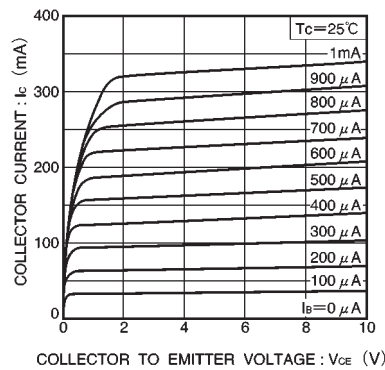


Fig.2 Grounded emitter output characteristics

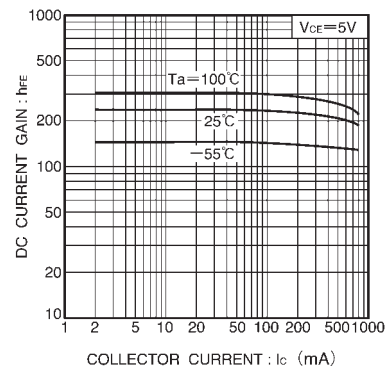


Fig.3 DC current gain vs. collector current



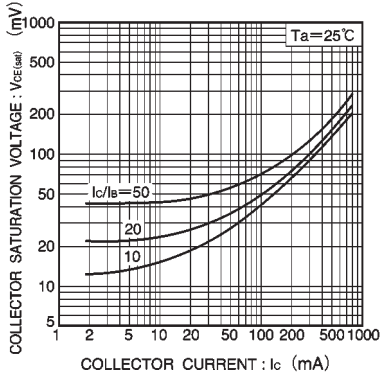


Fig.4 Collector-emitter saturation voltage vs. collector current ( I )

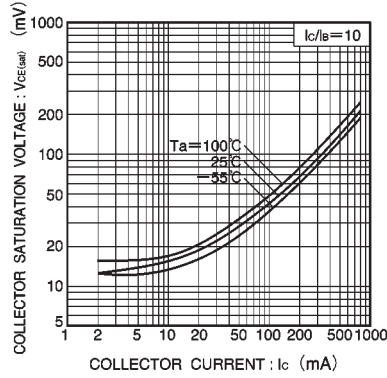


Fig.5 Collector-emitter saturation voltage vs. collector current ( II )

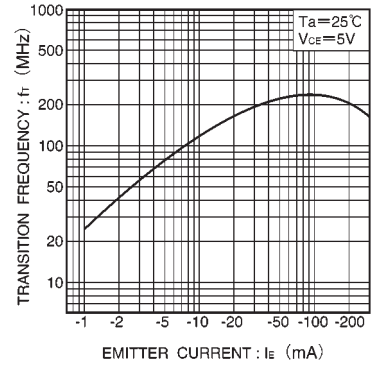


Fig.6 Gain bandwidth product vs. emitter current

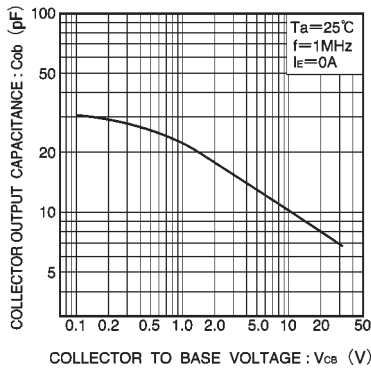


Fig.7 Collector output capacitance vs. collector-base voltage

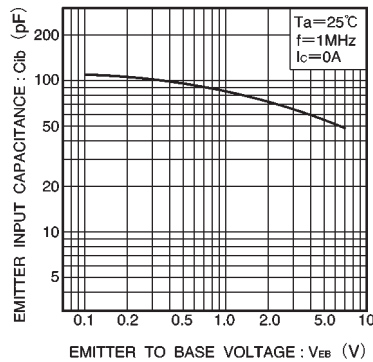
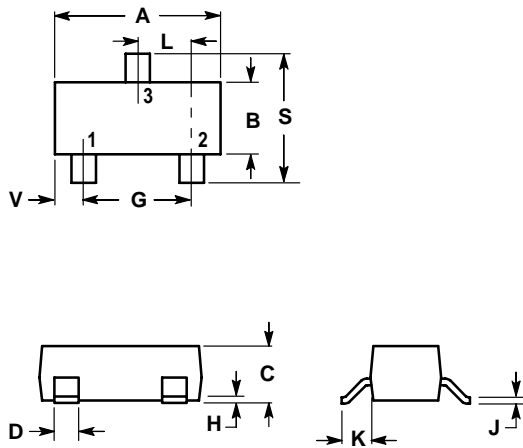


Fig.8 Emitter input capacitance vs. emitter-base voltage



**SOT-23**



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

- PIN 1. BASE
- 2. EMITTER
- 3. COLLECTOR

