

Low Frequency Transistor (60V, 3A)

2SD2396

●Features

- 1) Low saturation voltage, typically $V_{CE(sat)} = 0.3V$ at $I_C / I_B = 2A / 50mA$.
- 2) High DC current gain.
(Typically, DC current gain = 1000 at $V_{CE} = 4V$, $I_C = 0.5A$)
- 3) $P_C = 30W$. ($T_C = 25^\circ C$)
- 4) Wide SOA (safe operating area).

●Packaging specifications and h_{FE}

Type	2SD2396
Package	TO-220FN
h_{FE}	HJK
Code	—
Basic ordering unit (pieces)	500

●Absolute maximum ratings ($T_a = 25^\circ C$)

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	80	V
Collector-emitter voltage	V_{CEO}	60	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	3	A (DC)
	I_{CP}	6	A (Pulse) *
Collector power dissipation	P_C	2	W
		30	W ($T_C = 25^\circ C$)
Junction temperature	T_J	150	$^\circ C$
Storage temperature	T_{stg}	-55~+150	$^\circ C$

* Single pulse $P_{W} = 100ms$

●Electrical characteristics ($T_a = 25^\circ C$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	80	—	—	V	$I_C = 50 \mu A$
Collector-emitter breakdown voltage	BV_{CEO}	60	—	—	V	$I_C = 1mA$
Emitter-base breakdown voltage	BV_{EBO}	6	—	—	V	$I_E = 50 \mu A$
Collector cutoff current	I_{CBO}	—	—	100	μA	$V_{CB} = 80V$
Emitter cutoff current	I_{EBO}	—	—	100	μA	$V_{CE} = 6V$
DC current transfer ratio	h_{FE}	400	—	2000	—	$V_{CE} = 4V, I_C = 0.5A$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	0.3	0.8	V	$I_C / I_B = 2A / 0.05A$
Base-emitter saturation voltage	$V_{BE(sat)}$	—	—	1.5	V	$I_C / I_B = 2A / 0.05A$
Transition frequency	f_T	—	40	—	MHz	$V_{CE} = 5V, I_E = -0.2A, f = 10MHz$
Output capacitance	C_{ob}	—	55	—	pF	$V_{CB} = 10V, I_E = 0A, f = 1MHz$

* Measured using pulse current.

(96-819-D351)

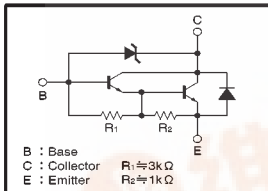
Power Transistor (90±10V, 3A)

2SC5060

●Features

- 1) Built-in zener diode between collector and base.
- 2) Zener diode has low voltage dispersion.
- 3) Strong protection against reverse power surges due to "L" loads.
- 4) Darlington connection for high DC current gain.
- 5) Built-in resistor between base and emitter.
- 6) Built-in damper diode.

●Circuit diagram



●Absolute maximum ratings ($T_a = 25^\circ C$)

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	90±10	V
Collector-emitter voltage	V_{CEO}	90±10	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	1	A (DC)
	I_{CP}	2	A (Pulse) *1
Collector power dissipation	P_C	1	W *2
Junction temperature	T_J	150	$^\circ C$
Storage temperature	T_{stg}	-55~+150	$^\circ C$

*1 Single pulse $P_{W} = 10ms$

*2 Printed circuit board: 1.7 mm thick, collector copper plating at least 100mm².

●Packaging specifications and h_{FE}

Type	2SC5060
Package	ATV
h_{FE}	M
Code	TV2
Basic ordering unit (pieces)	500

●Electrical characteristics ($T_a = 25^\circ C$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	80	—	100	V	$I_C = 50 \mu A$
Collector-emitter breakdown voltage	BV_{CEO}	80	—	100	V	$I_C = 1mA$
Collector cutoff current	I_{CBO}	—	—	10	μA	$V_{CE} = 70V$
Emitter cutoff current	I_{EBO}	—	—	3	mA	$V_{EB} = 5V$
DC current transfer ratio	h_{FE}	1000	—	2500	—	$V_{CE} = 3V, I_C = 0.5A$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	1.5	V	$I_C / I_B = 500mA / 1mA$
Base-emitter saturation voltage	$V_{BE(sat)}$	—	—	2	V	$I_C / I_B = 500mA / 1mA$
Transition frequency	f_T	—	80	—	MHz	$V_{CE} = 5V, I_E = -0.1A, f = 30MHz$
Output capacitance	C_{ob}	—	20	—	pF	$V_{CE} = 10V, I_E = 0A, f = 1MHz$
Turn-on time	t_{on}	—	0.2	—	μs	$I_C = 0.8A, R_{th} = 50\Omega$
Storage time	t_{stg}	—	5	—	μs	$I_{E1} = -I_{E2} = 3mA$
Fall time	t_f	—	0.6	—	μs	$V_{CC} = 40V$

*1 Measured using pulse current. *2 Transition frequency of the device.

(96-733-D416)