

**Power Transistor (31±4V, 2A)**

2SD2167

## ●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 low loads.
- 4)  $P_C=2\text{ W}$  (on  $40\times 40\times 0.7\text{ mm}$  ceramic board)

●Packaging specifications and  $h_{FE}$ 

Type	2SD2167
Package	MPT3
$h_{FE}$	NPQ
Marking	DL*
Code	T100
Basic ordering unit (pieces)	1000

\* Denotes  $h_{FE}$ ●Electrical characteristics ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	31±4	V
Collector-emitter voltage	$V_{CEO}$	31±4	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	2	A (DC)
		3	A (Pulse) *1
Collector power dissipation	$P_C$	0.5	W
		2	W *2
Junction temperature	$T_J$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55~+150	$^\circ\text{C}$

\*1  $P_w=20\text{ ms}$ ,  $duty=1/2$ \*2 When mounted on a  $40\times 40\times 0.7\text{ mm}$  ceramic board.●Absolute maximum ratings ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	27	—	35	V	$I_C=50\ \mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CEO}$	27	—	35	V	$I_C=1\text{ mA}$
Emitter-base breakdown voltage	$BV_{EBO}$	5	—	—	V	$I_E=50\ \mu\text{A}$
Collector cutoff current	$I_{CBO}$	—	—	1	$\mu\text{A}$	$V_{CB}=20\text{ V}$
Emitter cutoff current	$I_{EBO}$	—	—	1	$\mu\text{A}$	$V_{EB}=5\text{ V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	1	V	$I_C/I_E=2\text{ A}/0.2\text{ A}$
		—	0.25	0.5	V	$I_C/I_E=1\text{ A}/50\text{ mA}$
DC current transfer ratio	$h_{FE}$	56	—	270	—	$V_{CE}/I_C=3\text{ V}/0.5\text{ A}$
Transition frequency	$f_T$	—	100	—	MHz	$V_{CE}=3\text{ V}$ , $I_E=-0.5\text{ A}$ , $f=30\text{ MHz}$
Output capacitance	$C_{ob}$	—	25	—	pF	$V_{CB}=10\text{ V}$ , $I_E=0\text{ A}$ , $f=1\text{ MHz}$

\* Measured using pulse current.

(92S-358-D310)

**Power Transistor (60V, 3A)**

2SD2394 / 2SD2576

## ●Features

- 1) Low saturation voltage, typically  $V_{CE(sat)}=0.3\text{ V}$  at  $I_C/I_E=2\text{ A}/0.2\text{ A}$ .
- 2) Excellent DC current gain characteristics.
- 3) Wide SOA (safe operating area).

●Packaging specifications and  $h_{FE}$ 

Type	2SD2394	2SD2576
Package	TO-220FN	TO-220FN
$h_{FE}$	EF	F
Code	—	—
Basic ordering unit (pieces)	500	500

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

Parameter	Symbol	Limits	Unit
Collector-base voltage	$V_{CBO}$	80	V
Collector-emitter voltage	$V_{CEO}$	60	V
Emitter-base voltage	$V_{EBO}$	7	V
Collector current	$I_C$	3	A (DC)
		6	A (Pulse) *
Collector power dissipation	$P_C$	2	W
		25	W ( $T_C=25^\circ\text{C}$ )
Junction temperature	$T_J$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55~+150	$^\circ\text{C}$

\* Single pulse,  $P_w=100\text{ ms}$ ●Absolute maximum ratings ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$BV_{CBO}$	80	—	—	V	$I_C=50\ \mu\text{A}$
Collector-emitter breakdown voltage	$BV_{CEO}$	60	—	—	V	$I_C=1\text{ mA}$
Emitter-base breakdown voltage	$BV_{EBO}$	7	—	—	V	$I_E=50\ \mu\text{A}$
Collector cutoff current	$I_{CBO}$	—	—	10	$\mu\text{A}$	$V_{CB}=60\text{ V}$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu\text{A}$	$V_{EB}=7\text{ V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	1	V	$I_C/I_E=2\text{ A}/0.2\text{ A}$
		—	—	0.8	V	
Base-emitter saturation voltage	$V_{BE(sat)}$	—	—	1.5	V	$I_C/I_E=2\text{ A}/0.2\text{ A}$
DC current transfer ratio	$h_{FE}$	100	—	320	—	$V_{CE}/I_C=5\text{ V}/0.5\text{ A}$
		160	—	320	—	
Transition frequency	$f_T$	—	8	—	MHz	$V_{CE}=5\text{ V}$ , $I_E=-0.5\text{ A}$ , $f=5\text{ MHz}$
Output capacitance	$C_{ob}$	—	35	—	pF	$V_{CB}=10\text{ V}$ , $I_E=0\text{ A}$ , $f=1\text{ MHz}$

\*1 Measured using pulse current.

(94L-1098-D348)