

NPN Epitaxial Silicon Transistor

1 Description

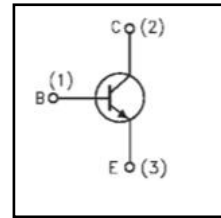
These devices are designed for high – voltage, high – speed power switching inductive circuits where fall time is critical. They are particularly suited for 115 and 220 V SWITCHMODE applications

2 Features

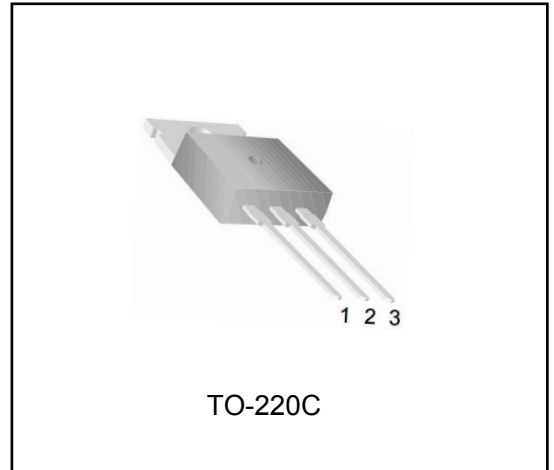
- High current output up to 12A
- Low saturation voltage
- High voltage
- High reliability

3 Applications

- Switching Regulators
- Inverters
- Motor Controls
- Solenoid/Relay drivers and Deflection circuits



$B_{VCB} = 700V$
 $B_{VCE} = 400V$
 $V_{CESAT (TYP)} = 0.24V$
 $I_C = 12A$



4 Electrical Characteristics

4.1 Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Base Voltage	V_{CBO}	700	V
Collector-Emitter Voltage	V_{CEO}	400	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	12	A
*Collector Current (Pulse)	I_{CP}	24	A
Base Current (DC)	I_B	6	A
*Base Current (Pulse)	I_{BP}	9	A
Collector Dissipation (TC=25°C)	P_C	100	W
Collector Dissipation (Ta=25°C)		2	W
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	- 55 ~ 150	°C

* PW≤10ms, Duty Cycle≤50%

4.2 Thermal Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Thermal Resistance, Junction to Case-sink	R_{thJC}	2.5	°C/W

4.3 Electrical Characteristics (Tc=25°C, unless otherwise noted)

SYMBOL	PARAMETER	Test Conditions	Min	Typ	Max	Unit
I _{CBO}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} =700V	-	-	10	μA
I _{CEO}	Collector Cut-off Current (I _B = 0)	V _{CE} =400V	-	-	50	μA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	V _{EB} =7V	-	-	10	μA
V _{(BR)CEO}	Collector-Emitter Breakdown Voltage (I _B = 0)	I _C =10mA	400	462	-	V
V _{(BR)CBO}	Collector-Base Breakdown Voltage (I _E = 0)	I _C =100μA	700	810	-	V
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E =100μA	7	15	-	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =5A I _B =1A	-	0.28	0.6	V
		I _C =8A I _B =1.6A	-	0.36	1.5	
		I _C =12A I _B =3A	-	0.55	2	
V _{BE(sat)}	Base-Emitter Saturation Voltage	I _C =5A I _B =1A	-	1.0	1.2	
		I _C =8A I _B =1.6A	-	1.1	1.5	
h _{FE}	DC Current Gain	I _C =10mA, V _{CE} =5V	10	-	40	
		I _C =5A, V _{CE} =5 V*	10	22	30	
		I _C =8A, V _{CE} =5 V	5	-	40	
f _T	Transition Frequency	V _{CE} =10V, I _C =500mA, f=10MHZ	4	-	-	MHz
TS	Storage Time	I _C =0.5A (UI9600)	2		8	μS

h_{FE}* Classification

Classification	1	2	3	4
h _{FE} *	10-15	15-20	20-25	25-30

5 Typical characteristics diagrams

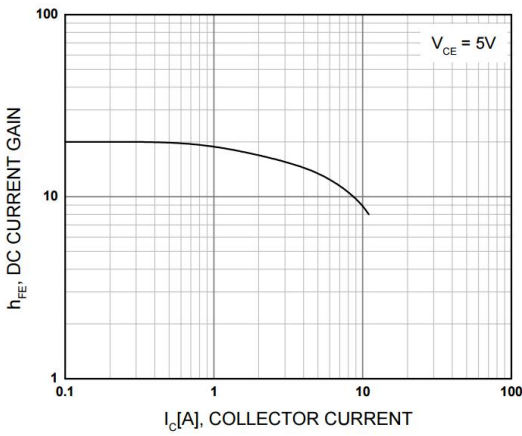
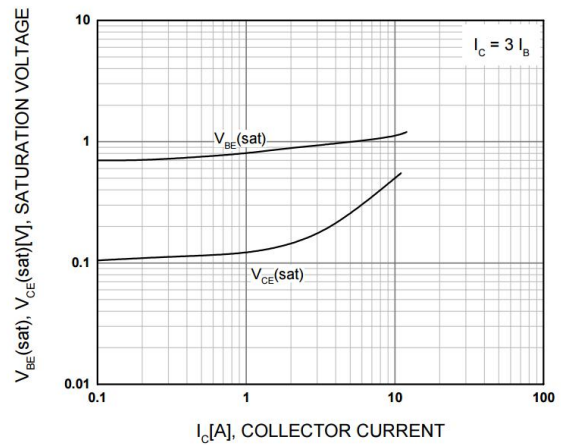


Figure 1. DC current Gain



**Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage**

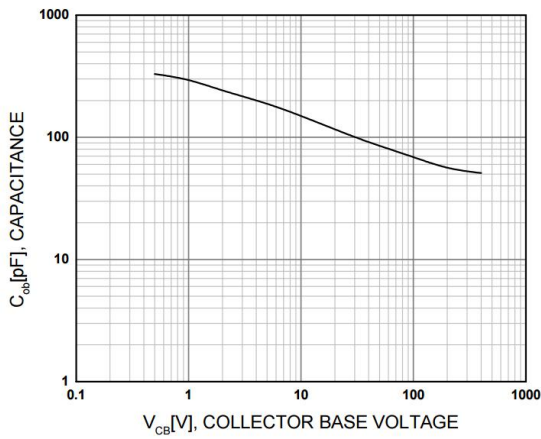


Figure 3. Collector Output Capacitance

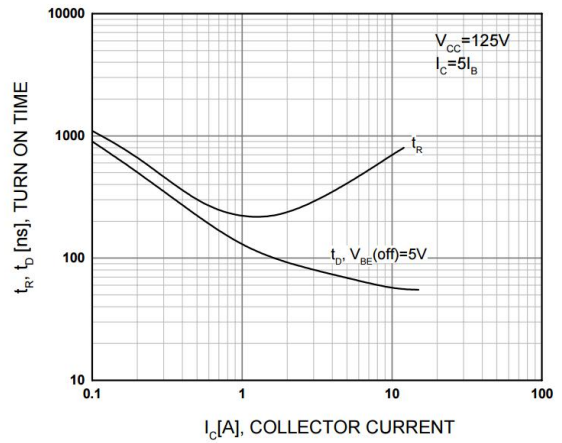


Figure 4. Turn On Time

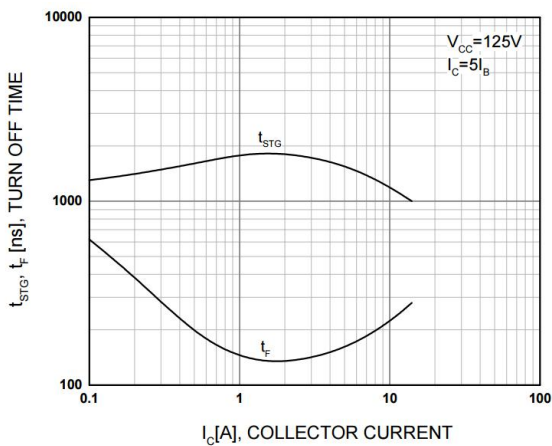


Figure 5. Turn Off Time

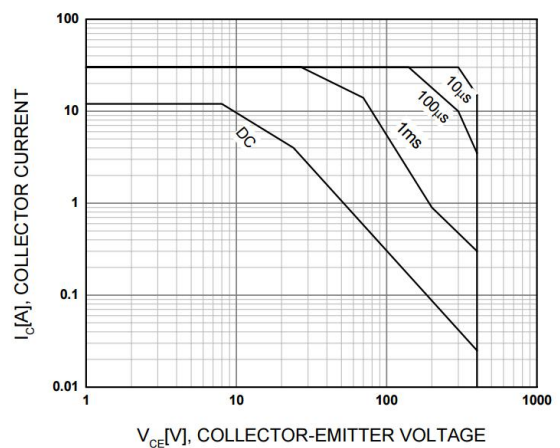


Figure 6. Forward Bias Safe Operating Area

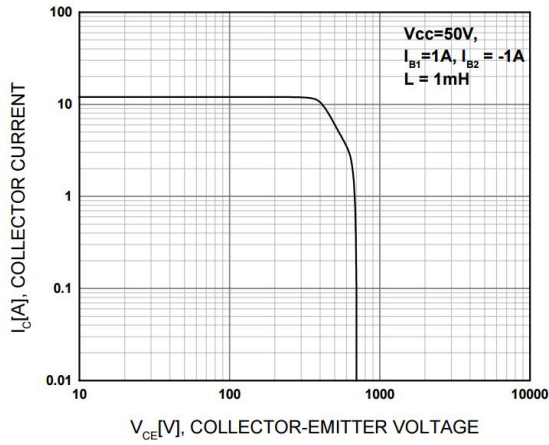


Figure 7. Reverse Bias Safe Operating Area

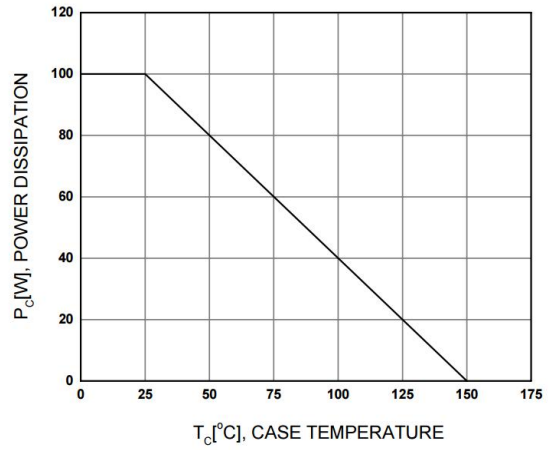


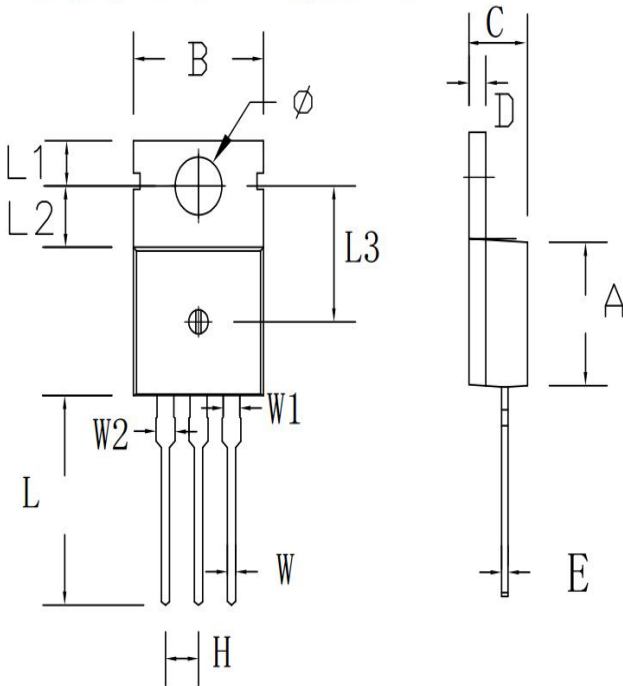
Figure 8. Power Derating

6 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
13009A6	TO-220	13009A6	Pb-free	Tube	1000//box

7 Dimensions

TO-220C PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154

8 Attentions

- ROUM Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Roma products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

9 Appendix

Revision history:

Date	REV.	Description	Page
2017.08.11	1.0	Original	