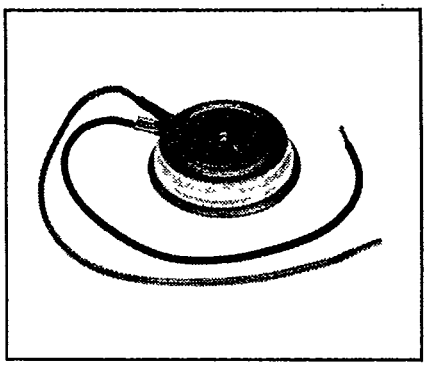
POWEREX

DA11/DB12

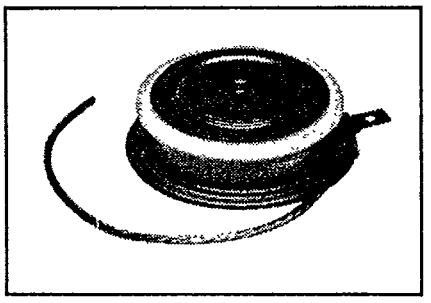
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

NPN Power Switching Darlington Transistor Sets

300-350-800 Amperes/ 400-500 Volts



D62T
NPN Power Switching
Darlington Transistors

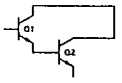
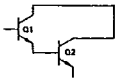
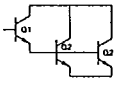
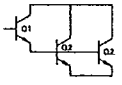


D7ST
NPN Power Switching
Darlington Transistors

Features:
- ☐ Double Sided Cooling
- ☐ 20 kHz Operation
- ☐ Both Bases Accessible
- ☐ Low Thermal Impedance
- ☐ High Currents & Voltages

Applications:
- ☐ High Current Switches
- ☐ AC Motor Controls
- ☐ DC Motor Controls
- ☐ High Frequency Inverters

Ordering Information
Example: A DA11403508 Darlington Transistor Set consists of two discrete transistors, a D62T and a D7ST with voltage, current and gain as shown in the table. These transistors must be mounted on heat sinks for proper operation.

Type	Schematics	$V_{CEO(SUS)}$ Volts (×10)	Current Rating Amperes (×10)	Gain (×10)	Darlington Composition Q1	Darlington Composition Q2
DA11403508		40	35	08	D62T	D7ST
DA11503008		50	30	08	D62T	D7ST
DB12408005		40	80	05	D7ST	2-D7ST
DB12508004		50	80	04	D7ST	2-D7ST

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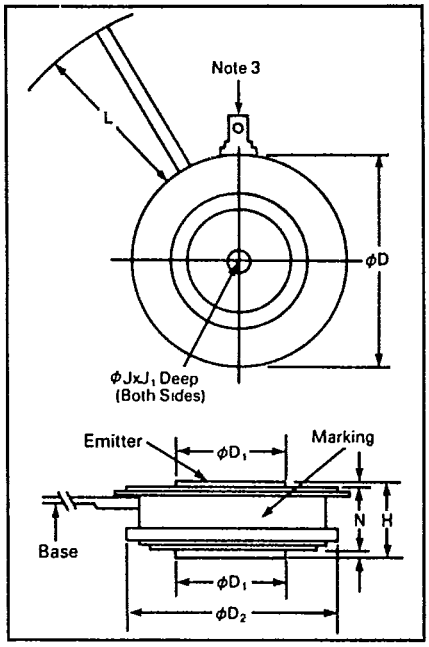
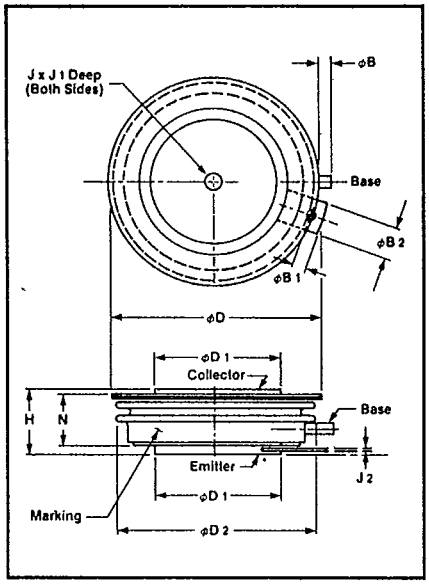
300-350-800 Amperes/400-500 Volts



D62T
Outline Drawing

Dimension	Inches Min.	Inches Max.	Millimeters Min.	Millimeters Max.
φD	1.610	1.650	40.89	41.91
$φD_1$	.745	.755	18.92	19.18
$φD_2$	1.420	1.460	36.07	37.08
H	.500	.560	12.70	14.22
φJ	.135	.145	3.43	3.68
J_1	.072	.082	1.83	2.08
L	4.000		101.6	
N	.030		.76	

Creep Distance—.34 in. min. (8.64mm)
Strike Distance—.52 in. min. (13.21mm)
(In accordance with NEMA standards.)
Finish—Nickel Plate.
Approx. Weight—2.1 oz. (60g).
1. Dimension "H" is a clamped dimension.
2. "Base Lead is No. 14 uninsulated flexible stranded wire.
3. Emitter tab for 3/16 inch fast-on terminal.



D7ST
Outline Drawing

Dimension	Inches Min.	Inches Max.	Millimeters Min.	Millimeters Max.
φB	.121	.171	3.07	4 34
$φB_1$	.097	.122	2.46	3.10
$φB_2$	.307	.317	7.80	8.05
φD	1.824	1.99	46.3	50.55
$φD_1$	1.155	1.161	29.34	29.49
$φD_2$	1.78	1.85	45.21	46.99
H	.611	.635	1.55	1.66
J_1	.136	.144	3.45	3.66
J_1	.072	.083	1.83	2.11
J_2	.067	.071	1.70	1.803
N	.433	.453	11.0	11.51

Creep Distance—.390 in. min. (9.9mm)
Strike Distance—.145 in. min. (3.6mm)
Finish—Nickel Plate.
Approx. Weight—3.7 oz. (105 g.)
Dimension H is a clamped dimension.

POWEREX

T-33-29

Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

DA11/DB12
NPN Power Switching Darlington Transistor Sets
300-350-800 Amperes/400-500 Volts

Maximum Ratings

Characteristics	Symbol	DA11/DB12	Units
Operating and Storage Temperature	T_J/T_{STG}	−65 to 200	°C
Emitter Base Voltage	V_{EBO}	7	Volts
Thermal resistance each D7ST transistor Double sided cooling,			
Junction to Case	$R_{\theta JC}$	.05	°C/W
Case to Sink Lubricated	$R_{\theta CS}$	.02	°C/W
Power Dissipation T_C =25°C each D7ST transistor	P_T	3000	Watts
Power Dissipation T_C =75°C each D7ST transistor	P_T	2000	Watts
Thermal impedance, double sided cooling D62T transistor			
Junction to Case	$R_{\theta JC}$	0.09	°C/W
Case to Sink	$R_{\theta CS}$	0.05	°C/W
Power dissipation T_C =25°C D62T transistor	P_T	1650	Watts
Power dissipation T_C =75° D62T transistor	P_T	1100	Watts
Mounting Force D62T		900	lb.
Mounting Force D62T		4.95	kN
Mounting Force D7ST		1200	lb.
Mounting Force D7ST		5.4	kN

		DA11403508	DA11503008	DB12408005	DB12508004	
Collector Emitter Sustaining Voltage①	$V_{CEO(SUS)}$	400	500	400	500	Volts
Collector Emitter Voltage V_{BE} = −1.5V	V_{CEV}	450	550	450	550	Volts
Peak Collector Current	I_C Peak	600	600	1200	1200	Amperes
Continuous Collector Current	I_C Cont.	400	400	800	800	Amperes
Continuous Base Current	I_B	20	20	75	75	Amperes

① $V_{CEO(SUS)}$ must not be measured on a curve tracer.

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DA11/DB12
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300-350-800 Amperes/400-500 Volts

Electrical and Mechanical Characteristics T_C, T_J=25°C unless otherwise specified

Characteristics		Symbol	Test Conditions	DA11/DB12 Min.	Typ.	Max.	Units
Collector Cutoff Current DA11		I_{CEV}	At Rated V_{CEV}	—	—	5	mA
(Base Emitter Reverse Biased) DB12			$V_{BE(OFF)}$=−1.5V			10	mA
Collector Cutoff Current DA11		I_{CEV}	At Rated V_{CEV}	—	—	15	mA
(Base Emitter Reverse Biased) DB12			$V_{BE(OFF)}$=−1.5V, T_J=150°C			30	mA
Emitter Cutoff Current DA11		I_{EBO}	V_{EB}=7V	—	—	150	mA
Emitter Cutoff Current DB12		I_{EBO}	V_{EB}=7V	—	—	300	mA
				DA11403508/DA11503008			
DC Current Gain DA11403508		h_{FE}	I_C=350A, V_{CE}=5V	80	—	—	—
DC Current Gain DA11503008		h_{FE}	I_C=300A, V_{CE}=5V	80	—	—	—
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	I_C=300A, I_B=10A	—	—	2.5	Volts
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	I_C=300A, I_B=10A	—	—	3.5	Volts
Resistive Load Switch Times①	Turn-On Delay	t_d	V_{CC}=300V, I_C=300A	—	—	200	ns
	Rise Time	t_r	I_{B1}=−I_{B2}=15A	—	—	2	μs
	Storage Time	t_s	t_p=50 μs	—	—	8	μs
	Fall Time	t_f	Duty Cycle<2%	—	—	1.5	μs
				DB12408005/DB12508004			
DC Current Gain DB12408005		h_{FE}	I_C=800A, V_{CE}=5V	50	—	—	—
DC Current Gain DB12508004		h_{FE}	I_C=800A, V_{CE}=5V	40	—	—	—
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	I_C=600A, I_B=25A	—	—	2.5	Volts
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	I_C=600A, I_B=25A	—	—	4.0	Volts
Resistive Load Switch Times①	Turn-On Delay	t_d	V_{CC}=300V, I_C=800A	—	—	200	ns
	Rise Time	t_r	I_{B1}=−I_{B2}=30A	—	—	5	μs
	Storage Time	t_s	t_p=50 μs	—	—	8	μs
	Fall Time	t_f	Duty Cycle<2%	—	—	10	μs

① See curve for switching with resistor between base and emitter and I_B off=0.

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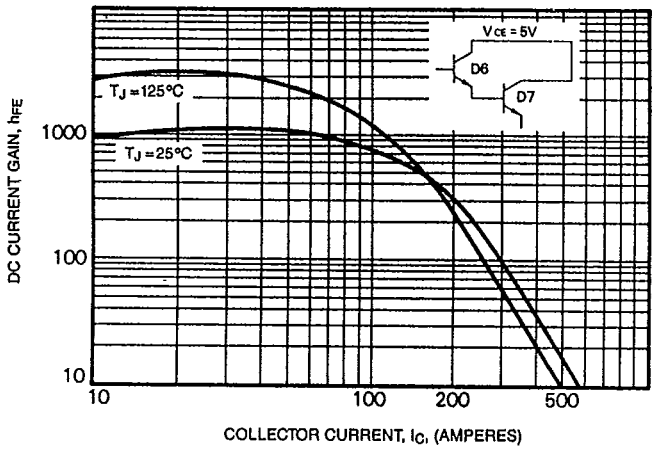
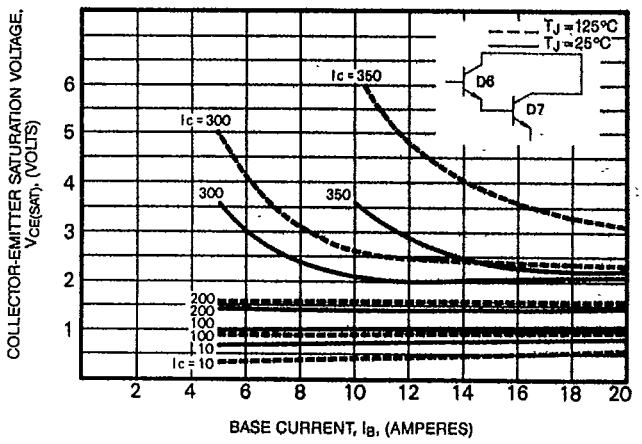
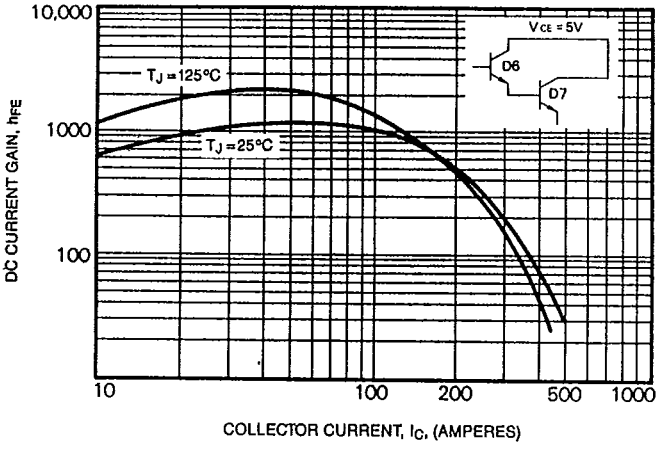
DC CURRENT GAIN (TYPICAL) DA11503008



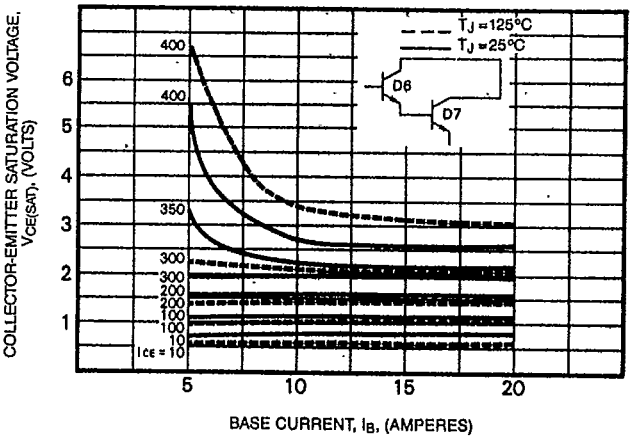
SATURATION VOLTAGE (TYPICAL) DA11503008



DC CURRENT GAIN (TYPICAL) DA11403508



SATURATION VOLTAGE (TYPICAL) DA1140350



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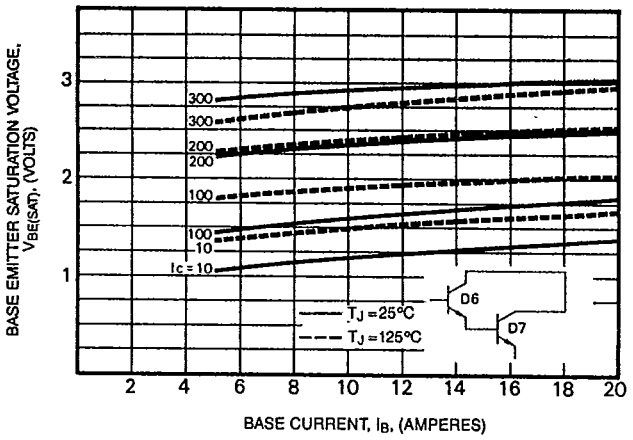
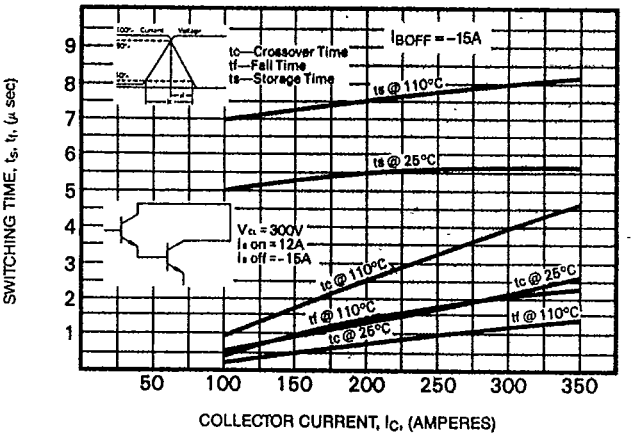
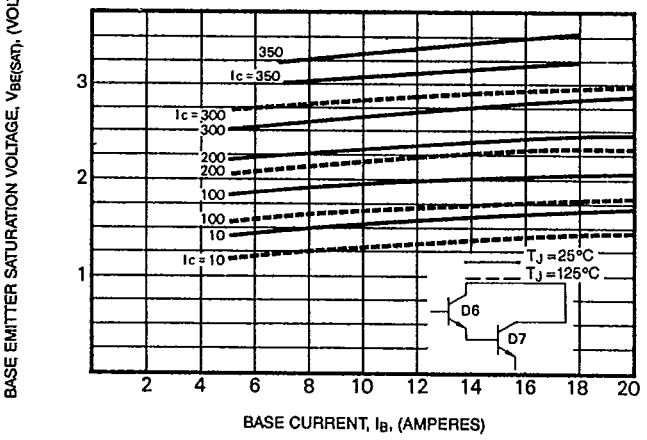
COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL) DA11503008



CLAMPED INDUCTIVE SWITCHING TIME (TYPICAL) DA11503008/DA11403508



COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL) DA11403508



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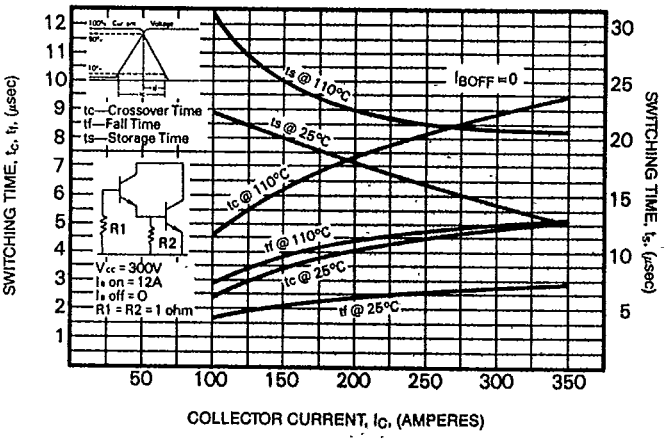

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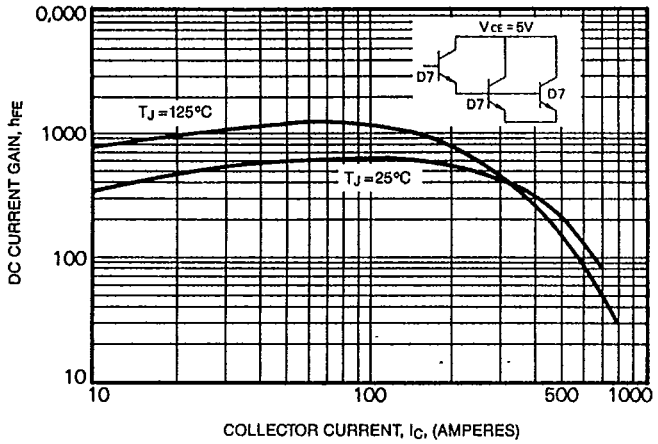
DC CURRENT GAIN (TYPICAL) DB12408005/DB12508004



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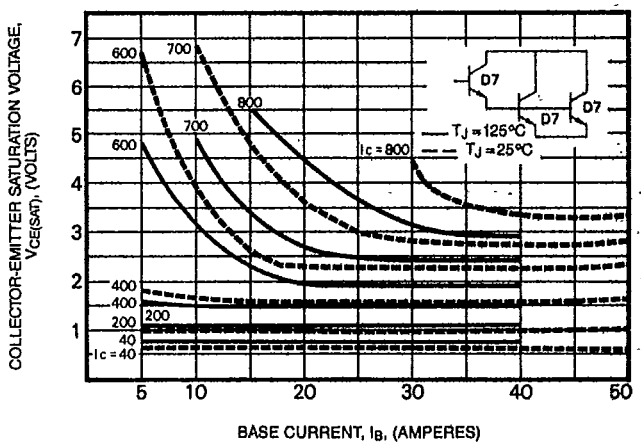
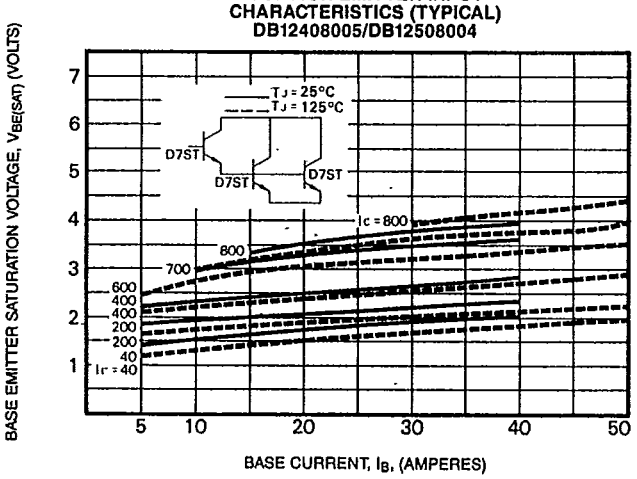
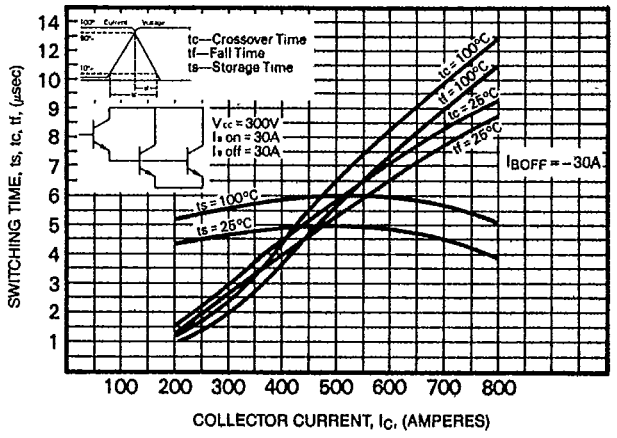


COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL) DB12408005/DB12508004



CLAMPED INDUCTIVE SWITCHING TIME (TYPICAL) DB12408005/DB12508004



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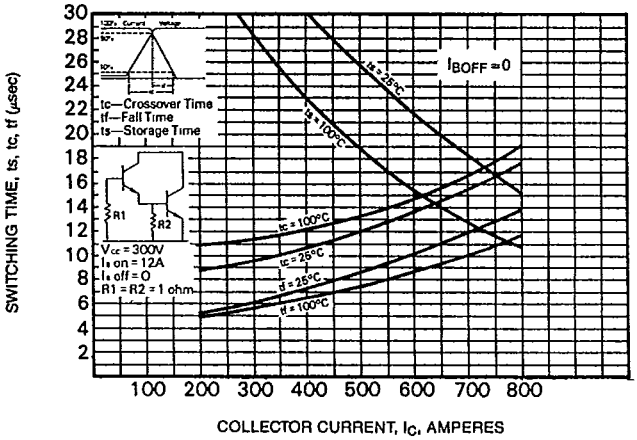

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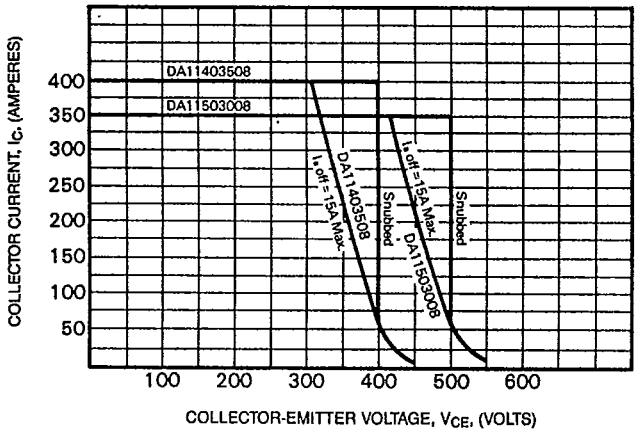
REVERSE BIAS SAFE OPERATING AREA, (RBSOA)
DA11



REVERSE BIAS SAFE OPERATING AREA, (RBSOA)
DB12