



**BI-POLAR POWER TRANSISTORS**

Diffused by SEMEFAB in Glenrothes and built by SEMELAB in Lutterworth are two ranges of high energy Bi-Polar transistors:

- G170 series of 4 die designed for use in very fast switching high voltage applications.
- G130 series of 4 die intended for use in lower voltage applications featuring extremely low saturation voltages.

Both series have been designed to offer the best performance currently available from Bi-Polar technologies which improves over that offered by MOS in many areas. applications and costs.

---

**G170 SERIES.**

Constructed using the SEMEFAB designed Distributed Base Technology, the range achieves:-

- Very fast switching times ( $t_f$  typically 20ns).
- High voltage operation,  $V_{CBO}$  range from 550 volts to 1000 volts.
- Very good saturation voltages.
- Excellent heat management across the active area – leading to very good reliability in high energy applications.

Packages used range from D-PAK for the smallest die, through industry standard metal and plastic styles, up to substantial Power Modules in either Plastic or Hermetic Metal.

**APPLICATIONS**

- Very highly efficient medium to high voltage Power Supplies.
- Fast high voltage energy pulse applications.
- Fast Switching Motor drive systems.
- Consumer lighting inverter systems directly from mains supplies.
- Cost efficient in most applications due to low losses in circuit and reduced silicon area compared to most other solutions.

---

**G130 SERIES**

This series offers the extremely efficient use of silicon in lower voltage systems and features:-

- Extremely low saturation voltages – on resistance for the G133 series is better than  $2m\Omega$ .
- Fast switching for lower voltage applications.
- Very good linearity.
- A robust device with good thermal management.
- Cost efficient when compared with MOS power solutions due to reduced silicon area and electrical efficiency in most circuits.



**BI-POLAR POWER TRANSISTORS**

**DIE PRODUCTS**

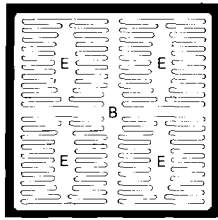
All SEMEFAB die are available in die form for use in Hybrid Circuits, Multi-chip assemblies, Modules and in the manufacture of individual packages. All the die supplied by SEMELAB are available qualified for use in :-

- Space Applications
- Military Applications
- Hi-Rel systems
- Industrial and Professional systems
- High Volume commercial and consumer applications

For Quality Screening Options, see the SEMELAB High Reliability and Screening Options booklet.

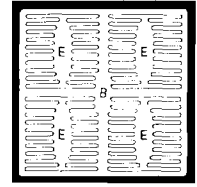
Die can be supplied in whole wafer form, sawn wafer on expanded film or in wafer trays.

<b>G133 FAMILY OF HIGH CURRENT, FAST SWITCHING, VERY LOW SATURATION NPN POWER TRANSISTORS</b>									
<b>DIE CHARACTERISTICS</b>									
		<b>G533A</b>	<b>G633A</b>	<b>G733A</b>	<b>G333A</b>	<b>G433A</b>	<b>G233A</b>	<b>G933A</b>	<b>Units</b>
$V_{CE0}$	$I_C = 1mA, I_B = 0$	75	100	125	160	200	250	300	V
$BV_{CBO}$		200	250	300	350	400	500	600	V
$I_{C(cont)}$		150	135	125	120	100	90	80	A
$I_{CEX}$	$V = V_{CE0}$ $V_{BE} = -1.5V$	0.1	0.1	0.1	0.1	0.1	0.1	0.1	(mA) (max)
$I_{EBO}$	$V_{EB} = 8V, I_C = 0$	0.1	0.1	0.1	0.1	0.1	0.1	0.1	mA
$h_{FE}$	@50% $I_{C(cont)}$ $V_{CE} = 4V$	45	40	30	30	20	20	20	min
$V_{CE(SAT)}$	@50% $I_{C(cont)}$	0.4	0.4	0.4	0.4	0.5	0.5	0.5	V
<b>Prime Types</b>									



DIE SIZE - 340 x 340 mils  
METALISATION: Top - Al  
Back - Ti/Ni/Ag

<b>G135 FAMILY OF HIGH CURRENT, FAST SWITCHING, VERY LOW SATURATION NPN POWER TRANSISTORS</b>									
<b>DIE CHARACTERISTICS</b>									
		<b>G535A</b>	<b>G635A</b>	<b>G735A</b>	<b>G335A</b>	<b>G435A</b>	<b>G235A</b>	<b>G935A</b>	<b>Units</b>
$V_{CE0}$	$I_C = 1mA, I_B = 0$	75	100	125	160	200	250	300	V
$BV_{CBO}$		200	250	300	350	400	500	600	V
$I_{C(cont)}$		100	90	85	80	70	60	55	A
$I_{CEX}$	$V = V_{CE0}$ $V_{BE} = -1.5V$	0.1	0.1	0.1	0.1	0.1	0.1	0.1	(mA) (max)
$I_{EBC}$	$V_{EB} = 8V, I_C = 0$	0.1	0.1	0.1	0.1	0.1	0.1	0.1	mA
$h_{FE}$	@50% $I_{C(cont)}$ $V_{CE} = 4V$	45	40	30	30	20	20	20	min
$V_{CE(SAT)}$	@50% $I_{C(cont)}$	0.4	0.4	0.4	0.4	0.5	0.5	0.5	V
<b>Prime Types</b>		<b>BUP48</b>	<b>BUP49</b>	<b>BUP50</b>	<b>BUP51</b>	<b>BUP52</b>	<b>BUP53</b>	<b>BUP54</b>	

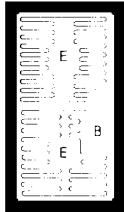


DIE SIZE - 280 x 280 mils  
METALISATION: Top - Al  
Back - Ti/Ni/Ag



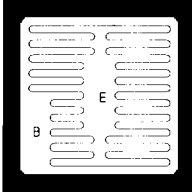
**BI-POLAR POWER TRANSISTORS**

G136 FAMILY OF HIGH CURRENT, FAST SWITCHING, VERY LOW SATURATION NPN POWER TRANSISTORS								
DIE CHARACTERISTICS								
		G536A	G636A	G736A	G336A	G436A	G236A	Units
$V_{CE0}$	$I_C = 1mA, I_B = 0$	75	100	125	160	200	250	V
$BV_{CBO}$		200	250	300	350	400	500	V
$I_{C(cont)}$		55	50	45	45	40	35	A
$I_{CEX}$	$V = V_{CE0}$ $V_{BE} = -1.5V$	0.1	0.1	0.1	0.1	0.1	0.1	mA (max)
$I_{EBO}$	$V_{EB} = 8V, I_C = 0$	0.1	0.1	0.1	0.1	0.1	0.1	mA
$h_{FE}^*$	@ 50% $I_{C(cont)}$ $V_{CE} = 4V$	45	40	30	30	20	20	min
$V_{CE(SAT)}^*$	@ 50% $I_{C(cont)}$	0.4	0.4	0.4	0.4	0.5	0.5	V
<b>Prime Types</b>		<b>BUP46</b>	<b>BUP47</b>				<b>BUP55</b>	



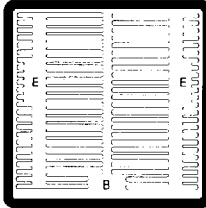
DIE SIZE - 175 x 310 mils  
METALISATION: Top - Al  
Back - Ti/Ni/Ag

G137 FAMILY OF HIGH CURRENT, FAST SWITCHING, VERY LOW SATURATION NPN POWER TRANSISTORS								
DIE CHARACTERISTICS								
		G537A	G637A	G737A	G337A	G437A	G237A	Units
$V_{CE0}$	$I_C = 1mA, I_B = 0$	75	100	125	160	200	250	V
$BV_{CBO}$		200	250	300	350	400	500	V
$I_{C(cont)}$		35	30	25	25	20	15	A
$I_{CEX}$	$V = V_{CE0}$ $V_{BE} = -1.5V$	0.1	0.1	0.1	0.1	0.1	0.1	mA (max)
$I_{EBO}$	$V_{EB} = 8V, I_C = 0$	0.1	0.1	0.1	0.1	0.1	0.1	mA
$h_{FE}^*$	@ 50% $I_{C(cont)}$ $V_{CE} = 4V$	45	40	30	30	20	20	min
$V_{CE(SAT)}^*$	@ 50% $I_{C(cont)}$	0.4	0.4	0.4	0.4	0.5	0.5	V
<b>Prime Types</b>		<b>BUP56</b>	<b>BUP57</b>				<b>BUP58</b>	



DIE SIZE - 175 x 175 mils  
METALISATION: Top - Al  
Back - Ti/Ni/Ag

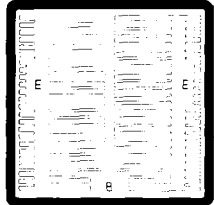
G171 FAMILY OF HIGH ENERGY, FAST SWITCHING, NPN BI-POLAR TRANSISTORS						
DIE CHARACTERISTICS						
		G271A	G971A	GB71A	GC71DE	Units
$V_{CE0}$	$I_C = 1mA, I_B = 0$	250	300	400	500	V
$BV_{CBO}$		500	600	800	1000	V
$I_{C(cont)}$		60	50	25	25	A
$I_{CBO}$	$V = V_{CE0}$	100	100	100	100	$\mu A$
$I_{EBO}$	$V_{EB} = 5V$ $I_C = 0$	10	10	10	10	$\mu A$
$h_{FE}^*$	@ 50% $I_{C(cont)}$ $V_{CE} = 4V$	15	15	15	15	min
$V_{CE(SAT)}^*$	@ 50% $I_{C(cont)}$	0.5	0.5	0.5	0.5	V
<b>Prime Types</b>		<b>BUL47B</b>	<b>BUL47A</b>	<b>BUL46B</b>	<b>BUL46A</b>	

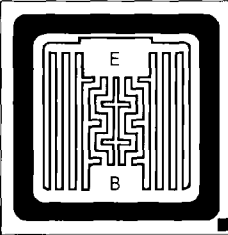



DIE SIZE - 275 x 275 mils  
METALISATION: Top - Al  
Back - Ti/Ni/Ag



**BI-POLAR POWER TRANSISTORS**

<b>G172 FAMILY OF HIGH ENERGY, FAST SWITCHING, NPN BI-POLAR TRANSISTORS</b>										
<b>DIE CHARACTERISTICS</b>										
		G572A	G672A	G372A	G272A	G972A	GB72A	GC72DE	Units	 <p>DIE SIZE - 229 x 229 mils METALISATION: Top - Al Back - Ti/Ni/Ag</p>
$V_{CE0}$	$I_C = 1mA$ $I_B = 0$	75	100	160	250	300	400	500	V	
$BV_{CBO}$		200	250	350	500	600	800	1000	V	
$I_{C(cont)}$		50	45	35	40	30	15	15	A	
$I_{CBO}$	$V = V_{CE0}$	100	100	100	100	100	100	100	$\mu A$	
$I_{EBO}$	$V_{EB} = 11V$ $I_C = 0$	10	10	10	10	10	10	10	$\mu A$	
$h_{FE}^*$	@ 50% $I_{C(cont)}$ $V_{CE} = 4V$	20	20	20	15	15	15	15	min	
$V_{CE(SAT)}^*$	@ 50% $I_{C(cont)}$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	V	
<b>Prime Types</b>				<b>BUL49B</b>	<b>BUL49A</b>	<b>BUL48B</b>	<b>BUL48A</b>			

<b>G175 FAMILY OF HIGH ENERGY, FAST SWITCHING, NPN BI-POLAR TRANSISTORS</b>										
<b>DIE CHARACTERISTICS</b>										
		G575A	G675A	G375A	G275A	G975A	GB75A	GC75A	Units	 <p>DIE SIZE - 126 x 126 mils METALISATION: Top - Al Back - Ti/Ni/Ag</p>
$V_{CE0}$	$I_C = 1mA$ $I_B = 0$	75	100	160	250	300	400	500	V	
$BV_{CBO}$		200	250	350	500	600	800	1000	V	
$I_{C(cont)}$		15	10	7	5	4	3	2	A	
$I_{CBO}$	$V = V_{CE0}$	100	100	100	100	100	100	100	$\mu A$	
$I_{EBO}$	$V_{EB} = 9V$ $I_C = 0$	10	10	10	10	10	10	10	$\mu A$	
$h_{FE}^*$	@ 50% $I_{C(cont)}$ $V_{CE} = 4V$	20	20	20	20	15	15	15	min	
$V_{CE(SAT)}^*$	@ 50% $I_{C(cont)}$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	V	
<b>Prime Types</b>		<b>BUL59A, BUL58B</b>	<b>BUL58A</b>	<b>BUL55B</b>	<b>BUL55A</b>	<b>BUL54B</b>	<b>BUL54A</b>			

<b>G177 FAMILY OF HIGH ENERGY, FAST SWITCHING, NPN BI-POLAR TRANSISTORS</b>										
<b>DIE CHARACTERISTICS</b>										
		G577A	G677A	G377A	G877A	G977A	GB77A	GC77A	Units	 <p>DIE SIZE - 90 x 90 mils METALISATION: Top - Al Back - Ti/Ni/Ag</p>
$V_{CE0}$	$I_C = 1mA$ $I_B = 0$	75	100	160	250	300	400	500	V	
$BV_{CBO}$		200	250	350	500	600	800	1000	V	
$I_{C(cont)}$		15	10	7	5	4	3	2	A	
$I_{CBO}$	$V = V_{CE0}$	100	100	100	100	100	100	100	$\mu A$	
$I_{EBO}$	$V_{EB} = 9V$ $I_C = 0$	10	10	10	10	10	10	10	$\mu A$	
$h_{FE}^*$	@ 50% $I_{C(cont)}$ $V_{CE} = 4V$	20	20	20	20	15	15	15	min	
$V_{CE(SAT)}^*$	@ 50% $I_{C(cont)}$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	V	
<b>Prime Types</b>		<b>BUL59A BUL58B</b>	<b>BUL58A</b>	<b>BUL55B</b>	<b>BUL55A</b>	<b>BUL54B</b>	<b>BUL54A</b>			