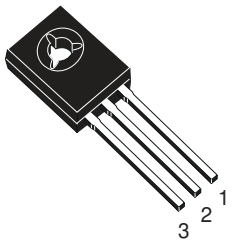
BD677/A/679/A/681
BD678/A/680/A/682

COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

- STMicroelectronics PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- MONOLITHIC DARLINGTON CONFIGURATION
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

APPLICATION

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT



SOT-32

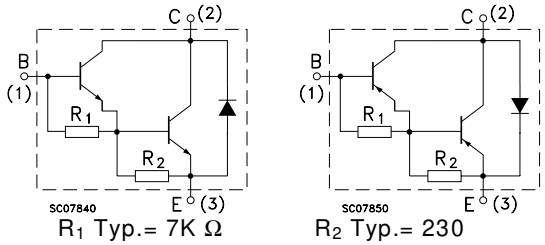
DESCRIPTION

The BD677, BD677A, BD679, BD679A and BD681 are silicon epitaxial-base NPN power transistors in monolithic Darlington configuration mounted in Jedec SOT-32 plastic package.

They are intended for use in medium power linar and switching applications

The complementary PNP types are BD678, BD678A, BD680, BD680A and BD682 respectively.

INTERNAL SCHEMATIC DIAGRAM



R_1 Typ.= 7K Ω R_2 Typ.= 230

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value			Unit
		NPN	BD677/A	BD679/A	BD681	
		PNP	BD678/A	BD680/A	BD682	
V_{CBO}	Collector-Base Voltage (I_E = 0)		60	80	100	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)		60	80	100	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)		5			V
I_C	Collector Current		4			A
I_{CM}	Collector Peak Current		6			A
I_B	Base Current		0.1			A
P_{tot}	Total Dissipation at $T_c \leq 25\ ^oC$		40			W
T_{stg}	Storage Temperature		-65 to 150			^oC
T_j	Max. Operating Junction Temperature		150			^oC

For PNP types voltage and current values are negative.

THERMAL DATA

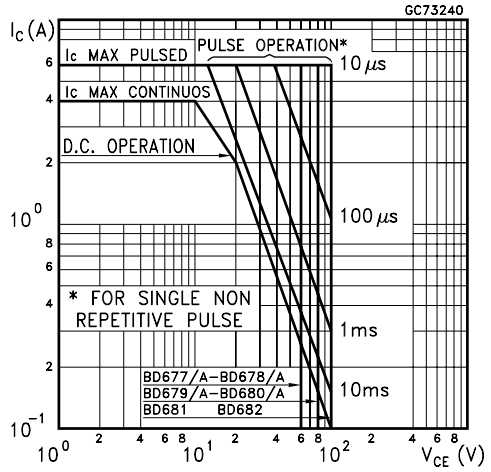
$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	3.12	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient	Max	100	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

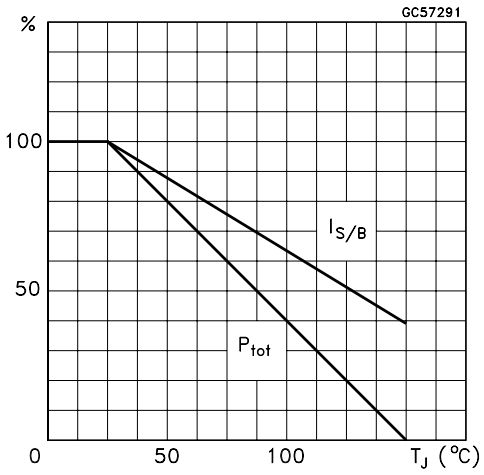
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current (I_E = 0)	V_{CE} = rated V_{CBO} V_{CE} = rated V_{CBO} T_C = 100 °C			0.2 2	mA mA
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = half rated V_{CEO}			0.5	mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			2	mA
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage	I_C = 50 mA for **BD677/677A/678/678A** for **BD679/679A/680/680A** for **BD681/682**	 60 80 100			 V V V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	for **BD677/678/679/680/681/682** I_C = 1.5 A I_B = 30 mA for **BD677A/678A/679A/680A** I_C = 2 A I_B = 40 mA			 2.5 2.8	 V V
V_{BE}*	Base-Emitter Voltage	for **BD677/678/679/680/681/682** I_C = 1.5 A V_{CE} = 3 V for **BD677A/678A/679A/680A** I_C = 2 A V_{CE} = 3 V			 2.5 2.5	 V V
h_{FE}*	DC Current Gain	for **BD677/678/679/680/681/682** I_C = 1.5 A V_{CE} = 3 V for **BD677A/678A/679A/680A** I_C = 2 A V_{CE} = 3 V	 750 750			
h_{fe}	Small Signal Current Gain	I_C = 1.5 A V_{CE} = 3 V f = 1MHz	1			

* Pulsed: Pulse duration = 300 ms, duty cycle 1.5 %

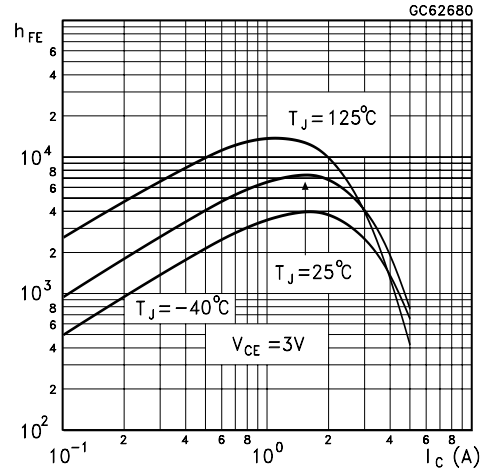
Safe Operating Areas



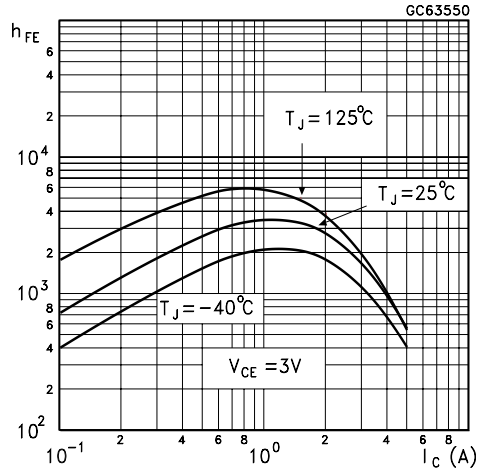
Derating Curve



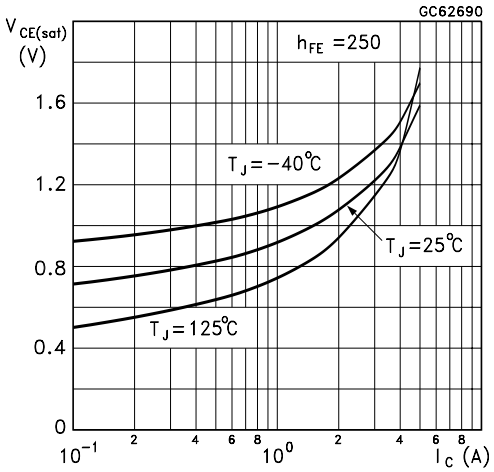
DC Current Gain (NPN type)



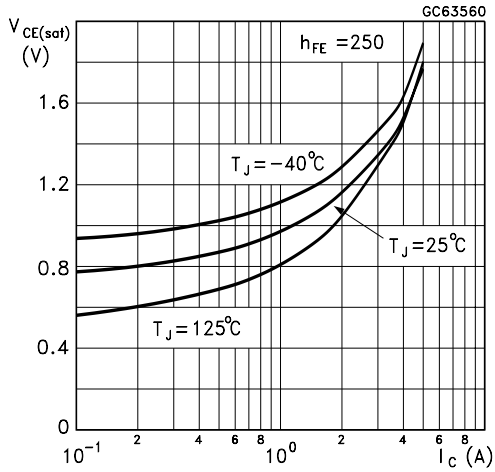
DC Current Gain (PNP type)



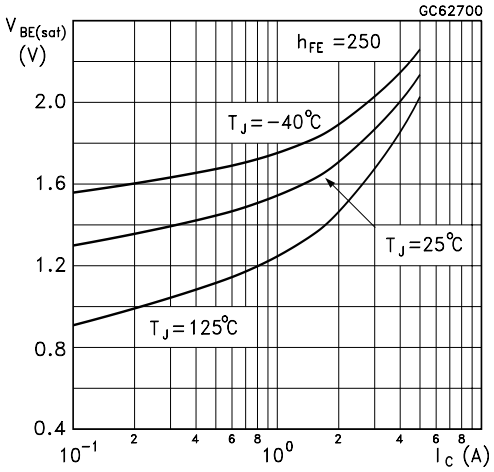
Collector-Emitter Saturation Voltage (NPN type)



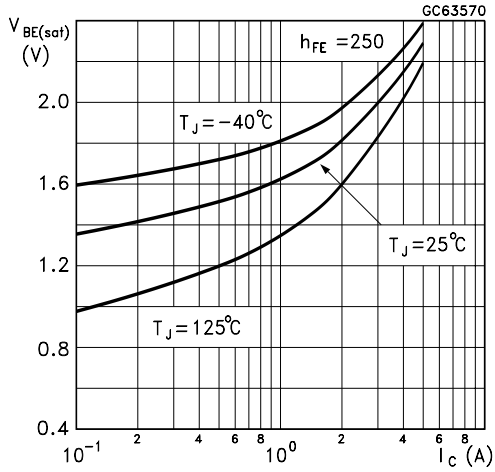
Collector-Emitter Saturation Voltage (PNP type)



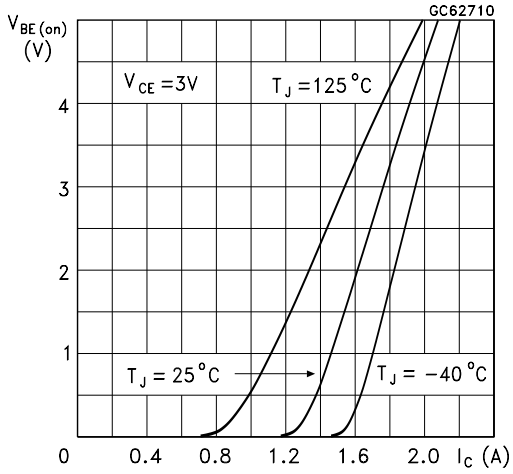
Base-Emitter Saturation Voltage (NPN type)



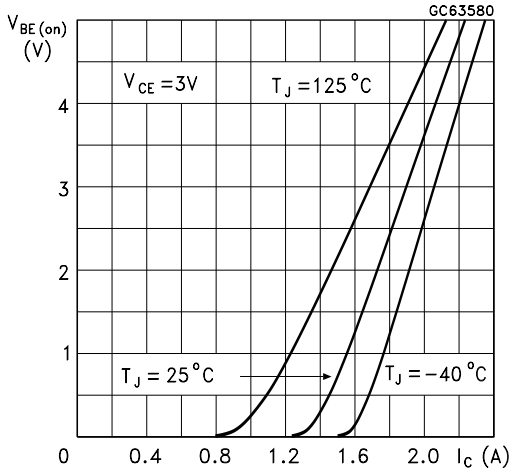
Base-Emitter Saturation Voltage (PNP type)



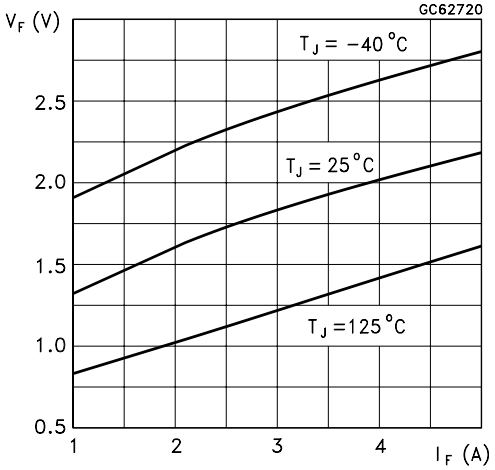
Base-Emitter On Voltage (NPN type)



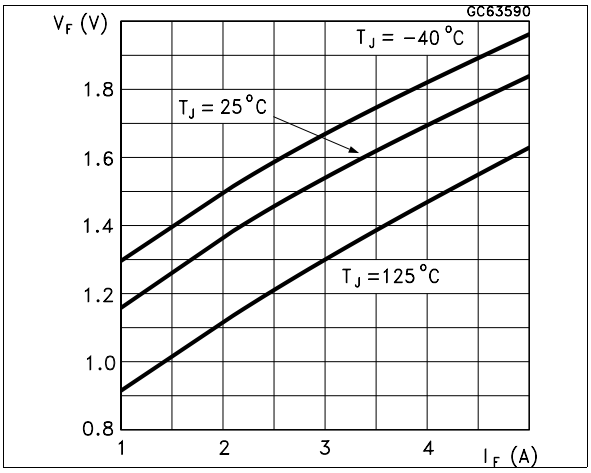
Base-Emitter On Voltage (PNP type)



Freewheel Diode Forward Voltage (NPN types)



Freewheel Diode Forward Voltage (PNP types)



SOT-32 (TO-126) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	7.4		7.8	0.291		0.307
B	10.5		10.8	0.413		0.445
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.040		0.106
c1	1.0		1.3	0.039		0.050
D	15.4		16.0	0.606		0.629
e		2.2			0.087	
e3	4.15		4.65	0.163		0.183
F		3.8			0.150	
G	3		3.2	0.118		0.126
H			2.54			0.100