



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

DESCRIPTION

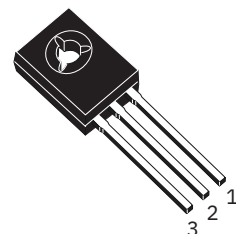
The BD677, BD677A, BD679, BD679A and
 BD681 are silicon epitaxial-base NPN power
 transistors in monolithic Darlington
 configuration mounted in Jedec SOT-32 plastic
 package.

They are intended for use in medium power

linear

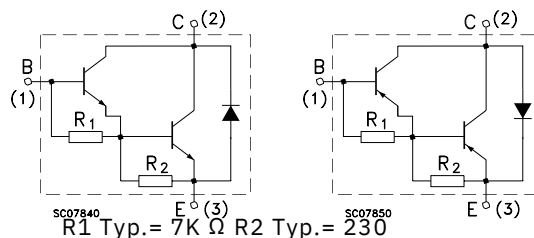
and switching applications

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



SO T-3 2

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

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

For PNP types voltage and current values are negative.

BD677/677A/678/678A/679/679A/680/680A/681/682

THERMAL DATA

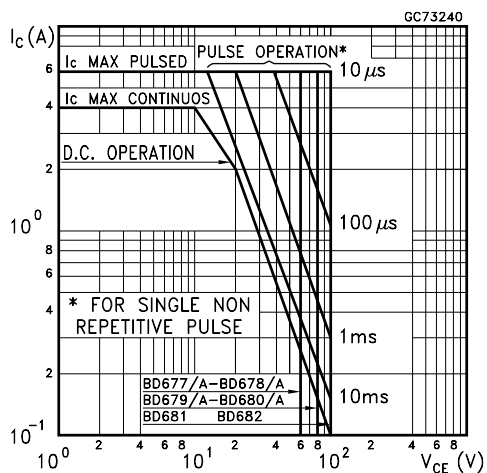
R_{thj-} R_{case} R_{thj-} R_{amb}	Thermal Resistance Junction-case Max Thermal Resistance Junction-ambient Max	3.1 2 100	$^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$
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ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

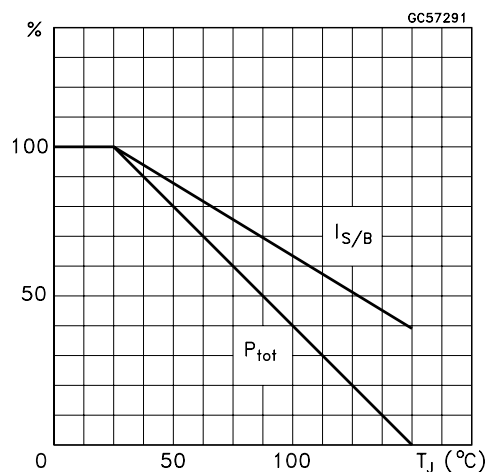
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
ICBO	Collector Cut-off Current (IE = 0)	VCE = rated VCE V = rated VCE VCE TC = 100 °C			0.2 2	mA
ICEO	Collector Cut-off Current (IB = 0)	VCE = half rated VCE			0.5	mA
IEBO	Emitter Cut-off Current (IC = 0)	VEB = 5 V			2	mA
VCEO(sus) *	Collector-Emitter Sustaining Voltage	IC = 50 mA for BD677/677A/678/678A 60 for BD679/679A/680/680A 80 for BD681/682 100 for BD677/678/679/680/681/682				V V V
VCE(sat) *	Collector-Emitter Saturation Voltage	IC = 1.5 A IB = 30 mA for BD677A/678A/679A/680A IC = 2 A IB = 40 mA for BD677/678/679/680/681/682			2. 5	V V
VBE *	Base-Emitter Voltage	IC = 1.5 A VCE = 3 V for BD677A/678A/679A/680A IC = 2 A VCE = 3 V for BD677/678/679/680/681/682			2. 8	V V
hFE	DC Current Gain	IC = 1.5 A VCE = 3 V f = 50 Hz for BD677A/678A/679A/680A IC = 2 A VCE = 3 V f = 50 Hz for BD677/678/679/680/681/682			2. 5	
hfe	Small Signal Current Gain	IC = 1.5 A VCE = 3 V f = 1 MHz			2. 5	

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

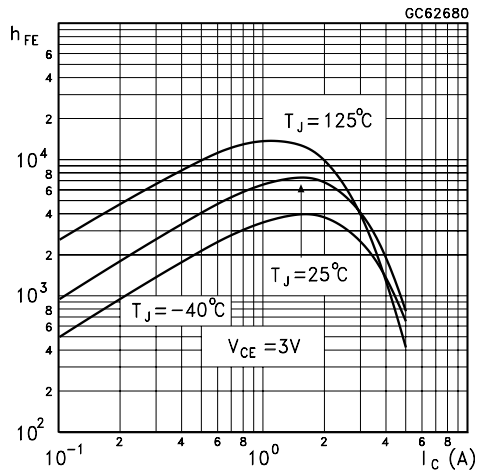
Safe Operating Areas



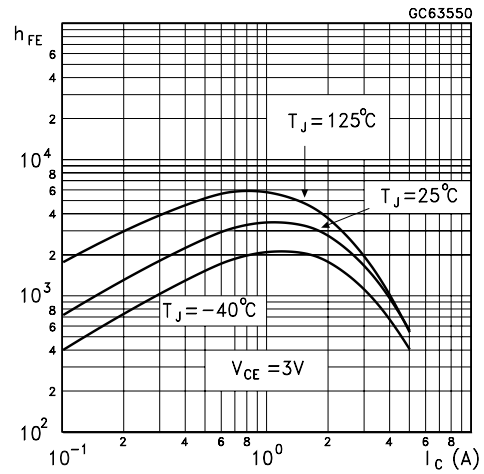
Derating Curve



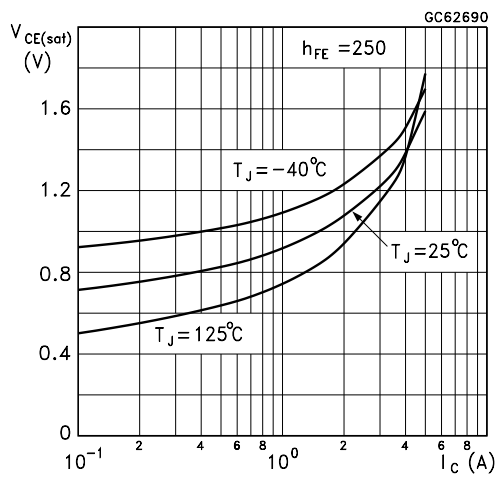
DC Current Gain (NPN type)



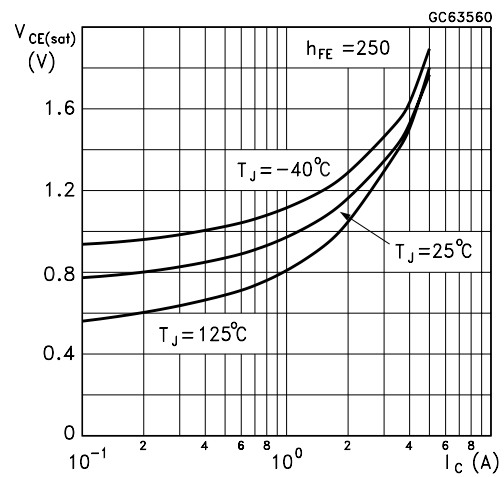
DC Current Gain (PNP type)



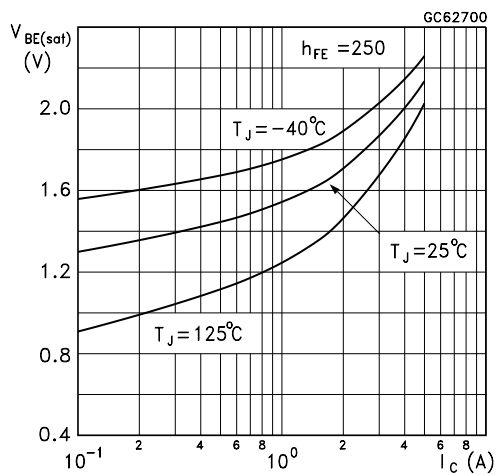
Collector-Emitter Saturation Voltage (NPN type)



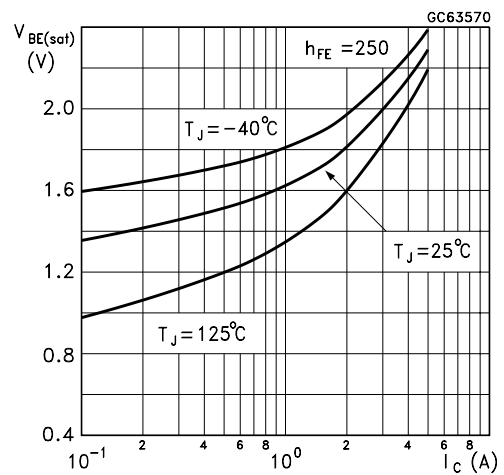
Collector-Emitter Saturation Voltage (PNP type)



Base-Emitter Saturation Voltage (NPN type)

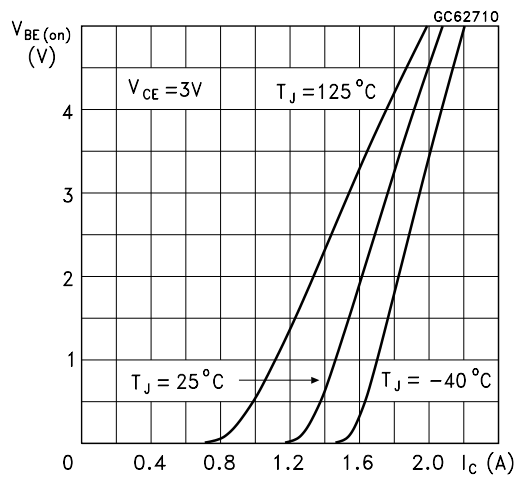


Base-Emitter Saturation Voltage (PNP type)

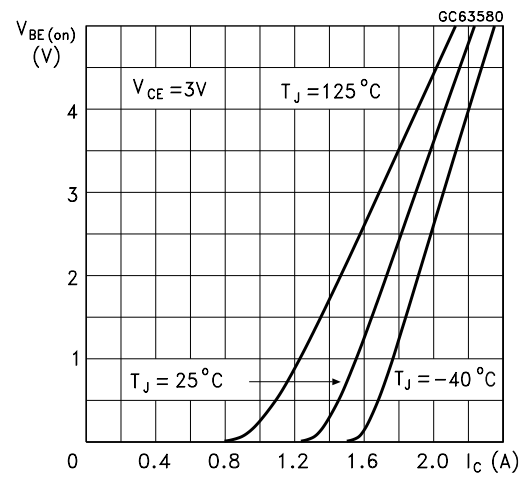


BD677/677A/678/678A/679/679A/680/680A/681/682

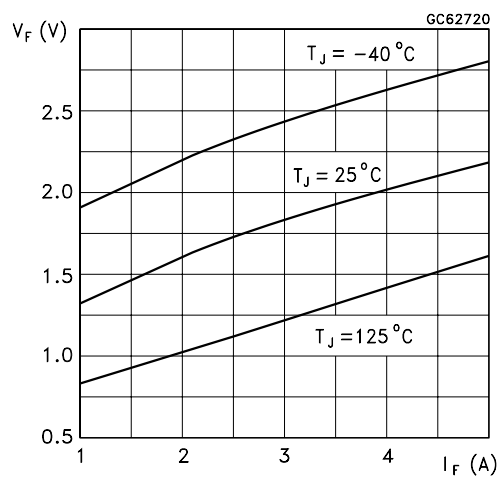
Base-Emitter On Voltage (NPN type)



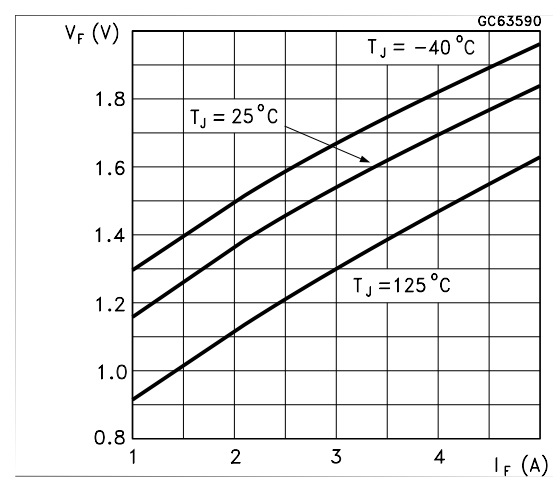
Base-Emitter On Voltage (PNP type)



Freewheel Diode Forward Voltage (NPN types)

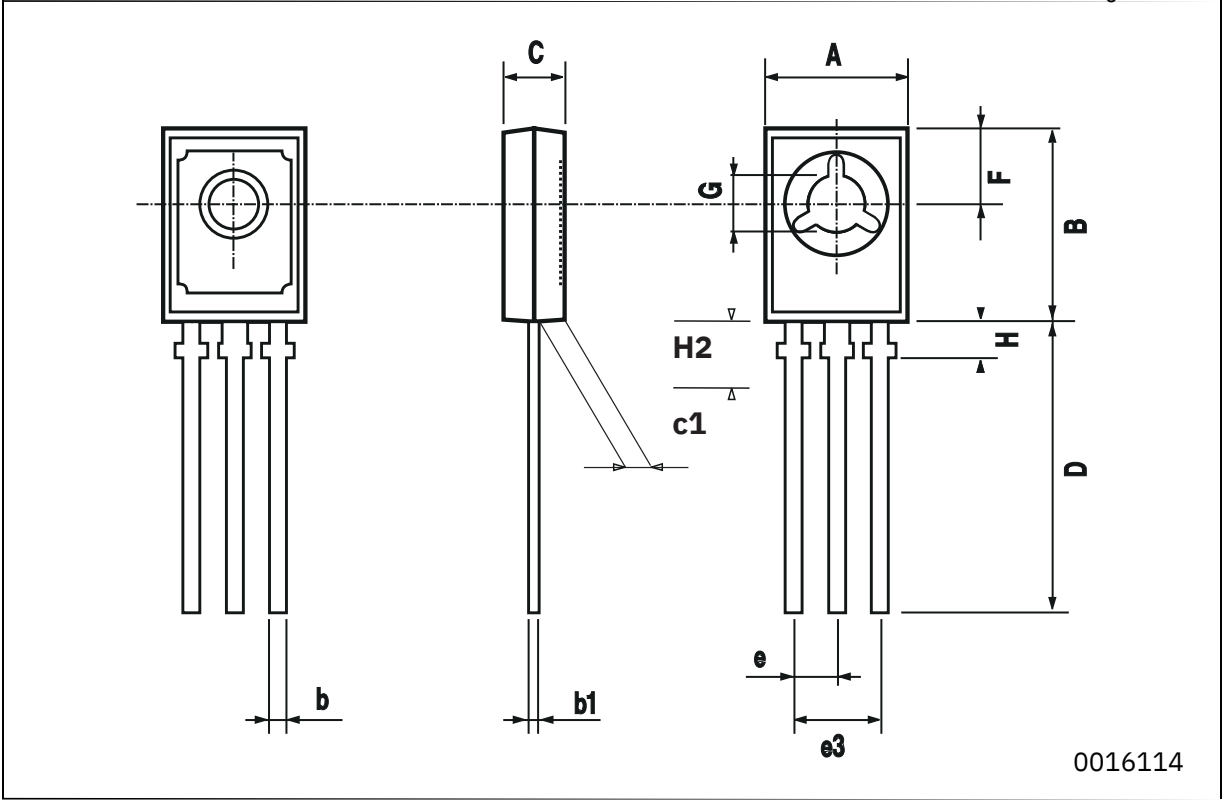


Freewheel Diode Forward Voltage (PNP types)



SOT-32 (TO-126) MECHANICAL DATA

DIM.	mm			inch		
	MIN	TYP.	MAX.	MIN.	TYP.	MAX.
A	. 7.4		7.8	0.29		0.30
B	10.5		10.8	1		7
b	0.7		0.9	0.41		0.44
b	0.49		0.75	3		5
1	2.4		2.7	0.02		0.03
C	1.0		1.3	8		5
c1	15.4		16.0	0.01		0.03
D		2.2		9	0.087	0
e	4.15		4.65	0.04 0.163		0.10 0.183
e		3.8		0	0.150	6
3	3		3.2	0.03 0.118		0.05 0.12
F			2.5	9		0
G				0.60		6 0.62
H			4	6		9 0.10 9 0



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