

Digital composite transistor(NPN+PNP)

Features

- ◆ 100mA output current capability
- ◆ Built-in bias resistors
- ◆ Simplifies circuit design
- ◆ Reduces component count
- ◆ Reduces pick and place costs

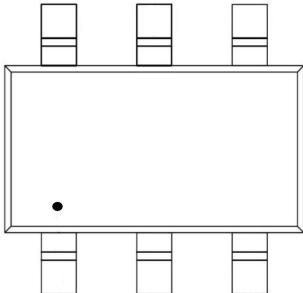
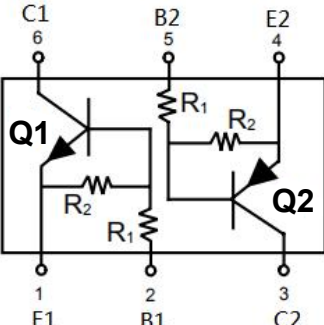
Mechanical Data

- ◆ SOT-363 Small Outline Plastic Package
- ◆ R1=10K Ω , R2=10K Ω
- ◆ Epoxy UL:94V-0

Features

- ◆ Switching applications, interface circuit and driver circuit applications.

Pin Configuration and Functions

Outline	Circuit Diagram	Description
		Q1:NPN
		Q2:PNP

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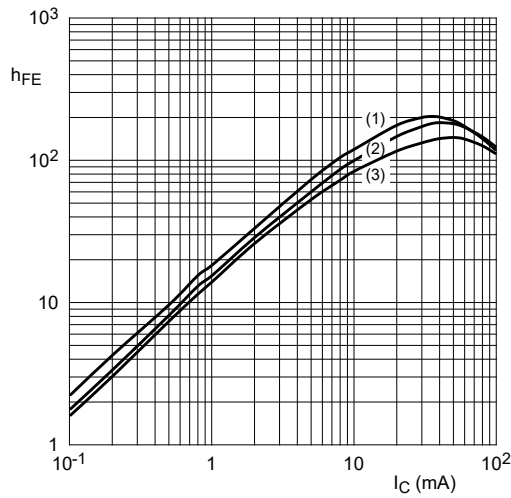
Maximum Ratings & Thermal Characteristics (Ratings at 25°C ambient temperature unless otherwise specified.)

Parameters		Symbol	NHUMD3	Unit
Collector-Base Voltage		VCBO	80	V
Collector-Emitter Voltage		VCEO	80	V
Emitter -Base Voltage		VEBO	10	V
Input Voltage	Q1	VI	-10+40	V
	Q2		-40+10	
Output Current		IO	100	mA
Total Power Dissipation @ Tamb≤25°C		Ptot*	235	mW
Thermal resistance form junction to ambient		Rth(j-a)*	532	°C/W
Total Power Dissipation @ Tamb≤25°C		Ptot*	350	mW
Thermal resistance form junction to ambient		Rth(j-a)*	358	°C/W
Junction Temperature		Tj	150	°C
Ambient Temperature		Tamb	-55~150	°C
Storage Temperature		Tstg	-65~150	°C

Electrical Characteristics (Ratings at 25°C ambient temperature unless otherwise specified).

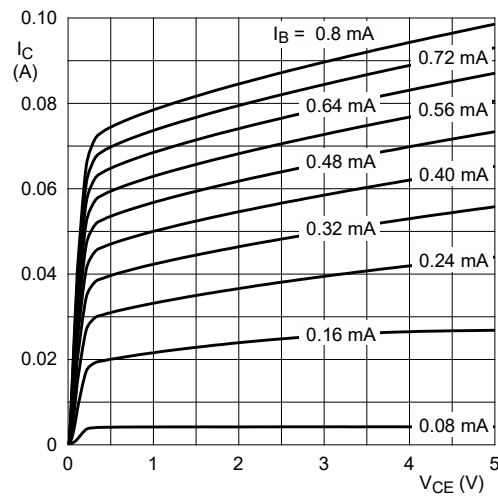
Parameter	Symbols	Test Condition	Limits			Unit
			Min	Typ	Max	
Collector-base breakdown voltage	V(BR)CBO	IC=100uA, IE=0	80			V
Collector-emitter breakdown voltage	V(BR)CEO	IC=2mA, IB=0	80			V
Collector-base cut-off current	ICBO	VCB=80V, IE=0			100	nA
Collector-emitter cut-off current	ICEO	VCE=60V, IB=0			100	nA
		VCE=60V, IB=0, Tj=150°C			5	uA
Emitter-base cut-off current	IEBO	VEB=7V, IC=0			600	uA
DC current gain	hFE	VCE=5V, IC=10mA	50			
Collector-emitter saturation voltage	VCE(sat)	IC=10mA, IB=0.5mA			100	mV
Off-state input voltage	VI(off)	VCE=5V, IC=100uA		0.8	1.15	V
On-state input voltage	VI(on)	VCE=0.3V, IC=10mA	1.8	2.5		V
Bias resistor 1 (input)	R1		7	10	13	KΩ
Bias resistor ratio	R2/R1		0.8	1	1.2	
Collector capacitance	Cc	VCB=10V, IE=0, f=1MHz	Q1		2.5	pF
			Q2		3	
Transition frequency	Ft	VCE=5V, IC=10mA, f=100MHz	Q1	170		MHz
			Q2	150		

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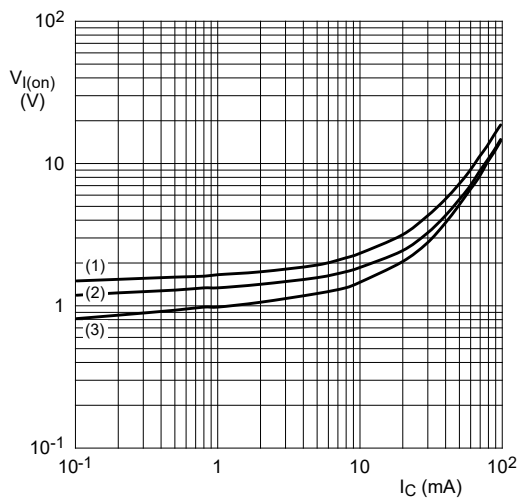
$V_{CE} = 5 \text{ V}$
 (1) $T_{amb} = 100 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -40 \text{ }^{\circ}\text{C}$

Fig. 1. Q1 (NPN): DC current gain as a function of collector current; typical values



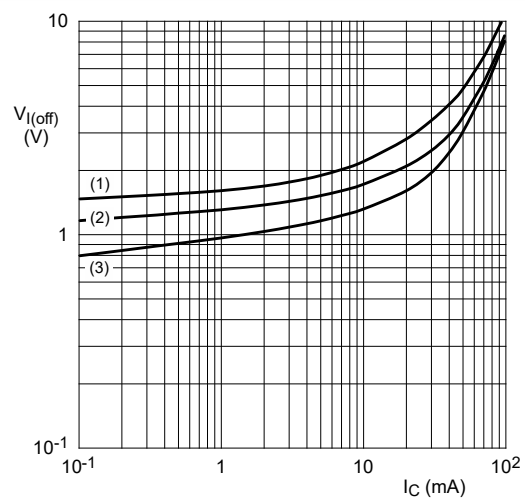
$T_{amb} = 25 \text{ }^{\circ}\text{C}$

Fig. 2. Q1 (NPN): Collector current as a function of collector-emitter voltage; typical values



$V_{CE} = 0.3 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 100 \text{ }^{\circ}\text{C}$

Fig. 3. Q1 (NPN): On-state input voltage as a function of collector current; typical values



$V_{CE} = 5 \text{ V}$
 (1) $T_{amb} = -40 \text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25 \text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 100 \text{ }^{\circ}\text{C}$

Fig. 4. Q1 (NPN): Off-state input voltage as a function of collector current; typical values

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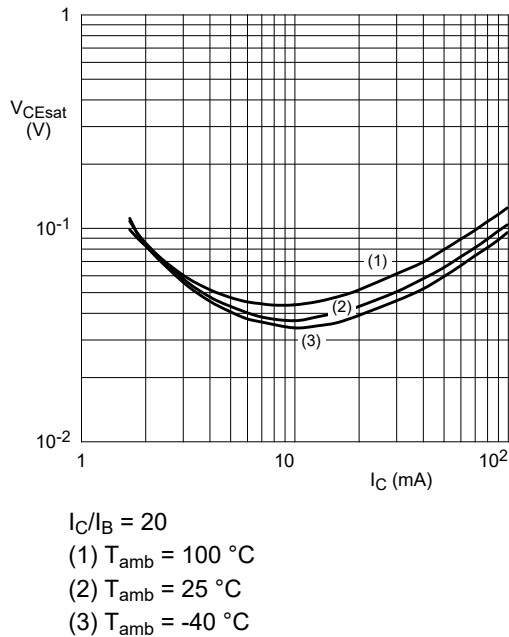


Fig. 5. Q1 (NPN): Collector-emitter saturation voltage as a function of collector current; typical values

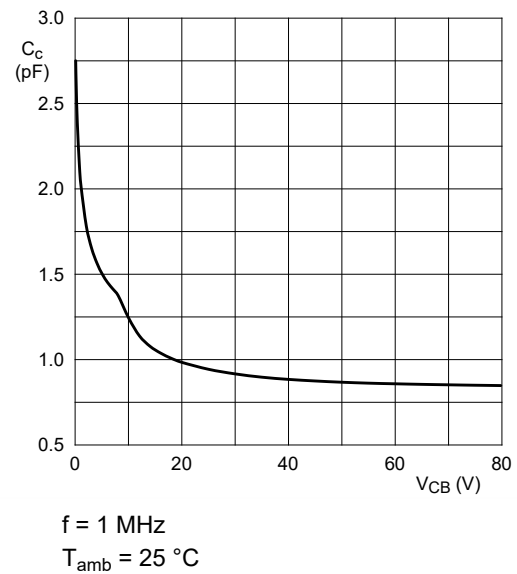


Fig. 6. Q1 (NPN): Collector capacitance as a function of collector-base voltage; typical values

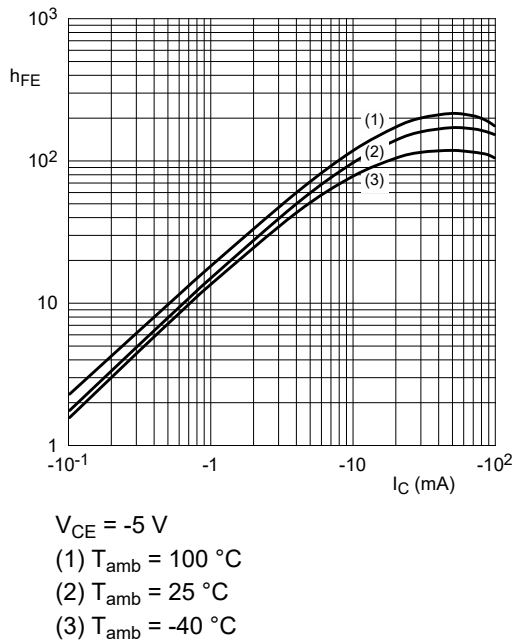


Fig. 7. Q2 (PNP): DC current gain as a function of collector current; typical values

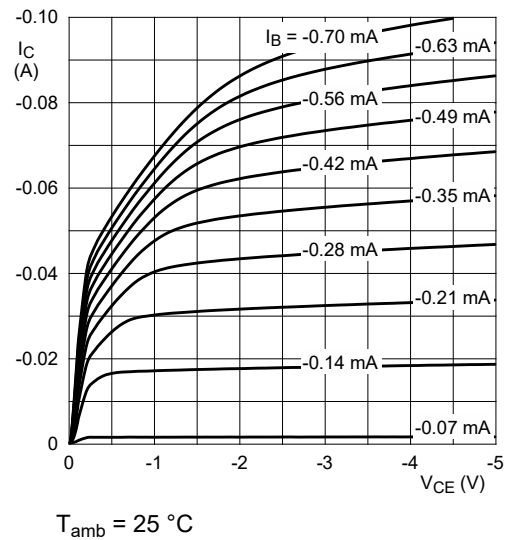
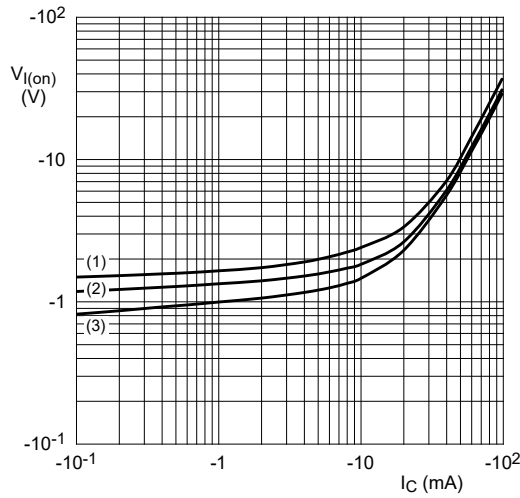


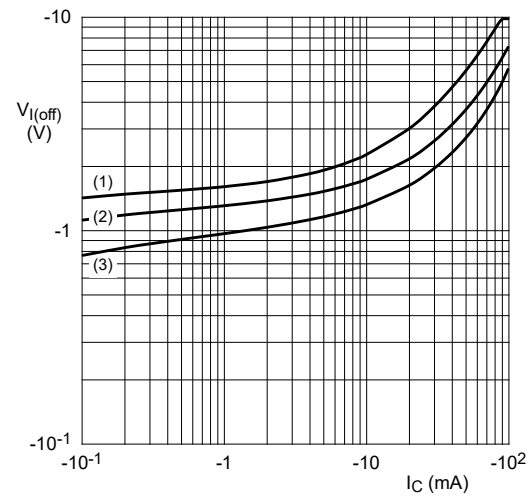
Fig. 8. Q2 (PNP): Collector current as a function of collector-emitter voltage; typical values

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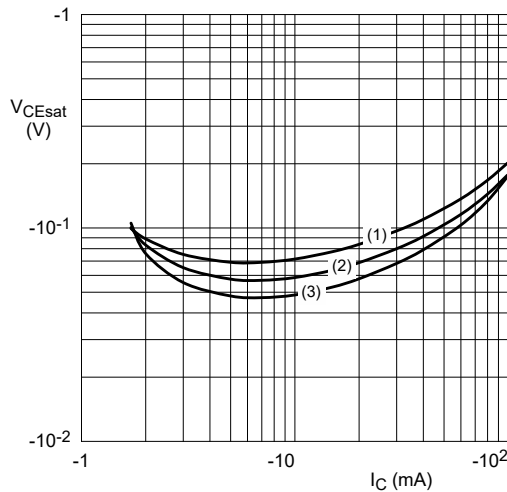
$V_{CE} = -0.3\text{ V}$
 (1) $T_{amb} = -40^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 100^\circ\text{C}$

Fig. 9. Q2 (PNP): On-state input voltage as a function of collector current; typical values



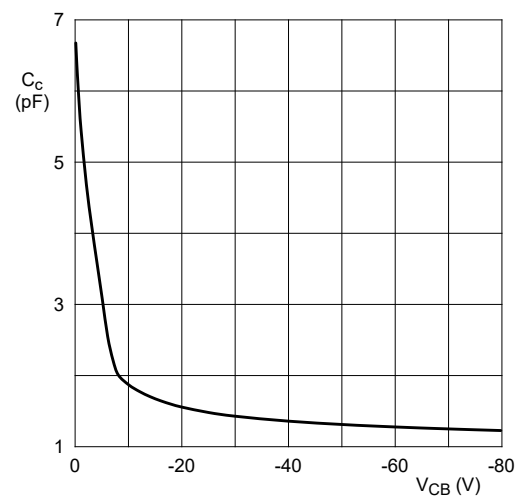
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -40^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = 100^\circ\text{C}$

Fig. 10. Q2 (PNP): Off-state input voltage as a function of collector current; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = 100^\circ\text{C}$
 (2) $T_{amb} = 25^\circ\text{C}$
 (3) $T_{amb} = -40^\circ\text{C}$

Fig. 11. Q2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values

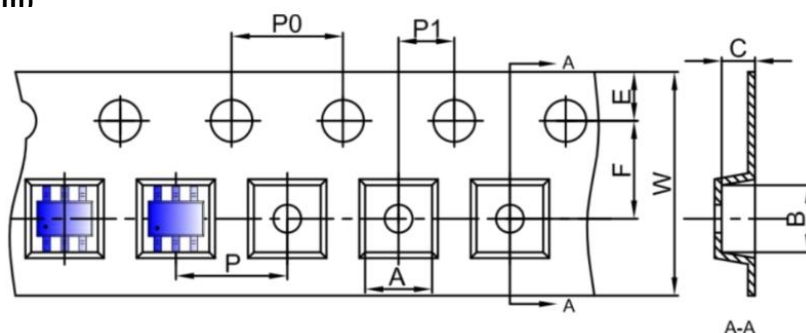


$f = 1\text{ MHz}$
 $T_{amb} = 25^\circ\text{C}$

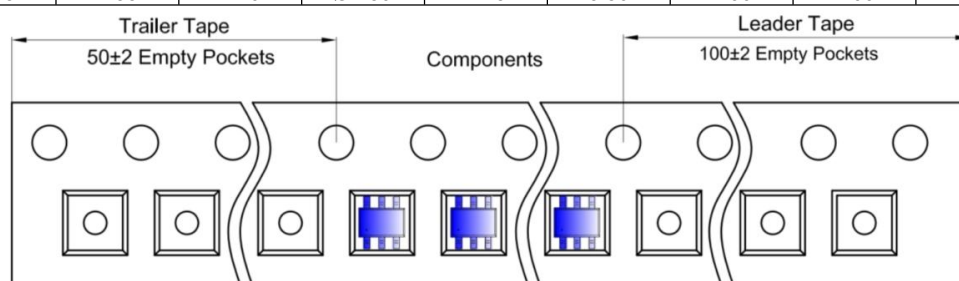
Fig. 12. Q2 (PNP): Collector capacitance as a function of collector-base voltage; typical values

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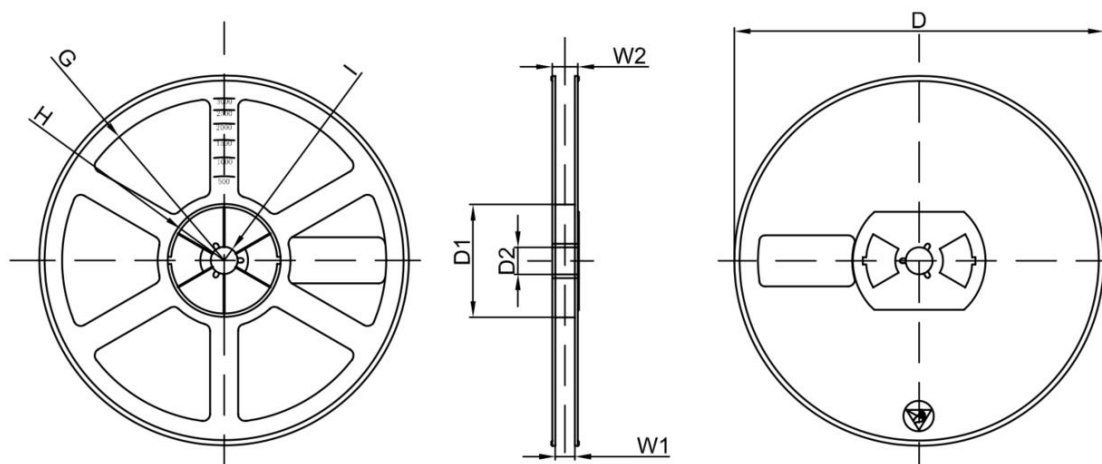
Carrier Dimension(mm)



Dimensions are in millimeter										
Pkg Type	A	B	C	d	E	F	P0	P	P1	W
SOT-363	2.25	2.55	1.20	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00



Reel Dimension(mm)



Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Φ178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30
Tolerance	±2	±1	±1	±1	±1	±1	±1	±1

Package Specifications

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
SOT363	7'	178	3	210*208*203	45	440*400*230	180