



NPN Darlington Power Silicon Transistor

Qualified per MIL-PRF-19500/472

*Qualified Levels:
JAN, JANTX, and
JANTXV*

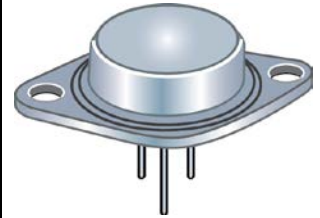
DESCRIPTION

This high speed NPN transistor is military qualified up to the JANTXV level.

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FEATURES

- JEDEC registered 2N6352 and 2N6353
- JAN, JANTX, and JANTXV qualifications are available per MIL-PRF-19500/472 (See [part nomenclature](#) for all available options)
- RoHS compliant versions available (commercial grade only)



**TO-213AA
(TO-66) Package**

APPLICATIONS / BENEFITS

- Military and other high reliability applications
- High frequency response
- TO-213AA case with isolated terminals

MAXIMUM RATINGS @ T_C = +25 °C unless otherwise noted

Parameters/Test Conditions	Symbol	Value	Unit	
Junction and Storage Temperature	T _J and T _{STG}	-65 to +200	°C	
Thermal Resistance Junction-to-Case	R _{θJC}	4.0	°C/W	
Collector-Emitter Voltage		2N6352	80	V
		2N6353	150	
Collector-Base Voltage		2N6352	80	V
		2N6353	150	
Emitter-Base Voltage		V _{EBO1}	12	V
		V _{EBO2}	6.0	
Total Power Dissipation		@ T _A = +25 °C ⁽¹⁾	2.0	W
		@ T _C = +100 °C ⁽²⁾	25	
Base Current	I _B	0.5	A	
Collector Current	I _C	5	A	

- Notes:**
1. Derate linearly 11.4 mW/°C for T_A > +25 °C
 2. Derate linearly 250 mW/°C for T_C > +100 °C
 3. Applies for t_p ≤ 10 ms, duty cycle ≤ 50 percent

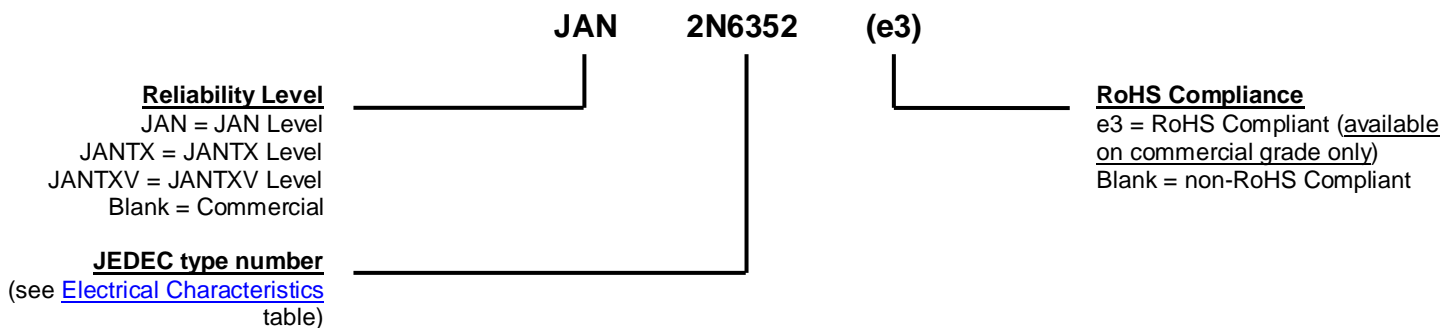
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MECHANICAL and PACKAGING

- CASE: Industry standard TO-213AA (3-pin TO-66), hermetically sealed
- FINISH: Solder dipped tin-lead over nickel plated alloy 52 or RoHS compliant matte-tin plating (on commercial grade only). Solderable per MIL-STD-750 method 2026.
- POLARITY: NPN (see [schematic](#))
- MOUNTING HARDWARE: Consult factory for optional insulator and sheet metal screws
- WEIGHT: Approximately 6 grams
- See [package dimensions](#) on last page.

PART NOMENCLATURE

SYMBOLS & DEFINITIONS

Symbol	Definition
I_B	Base current: The value of the dc current into the base terminal.
I_C	Collector current: The value of the dc current into the collector terminal.
I_E	Emitter current: The value of the dc current into the emitter terminal.
T_C	Case temperature: The temperature measured at a specified location on the case of a device.
V_{CB}	Collector-base voltage: The dc voltage between the collector and the base.
V_{CBO}	Collector-base voltage, base open: The voltage between the collector and base terminals when the emitter terminal is open-circuited.
V_{CC}	Collector-supply voltage: The supply voltage applied to a circuit connected to the collector.
V_{CE}	Collector-emitter voltage: The dc voltage between the collector and the emitter.
V_{CEO}	Collector-emitter voltage, base open: The voltage between the collector and the emitter terminals when the base terminal is open-circuited.
V_{EB}	Emitter-base voltage: The dc voltage between the emitter and the base
V_{EBO}	Emitter-base voltage, collector open: The voltage between the emitter and base terminals with the collector terminal open-circuited.

ELECTRICAL CHARACTERISTICS @ $T_A = +25^\circ\text{C}$ unless otherwise noted

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 25\text{ mA}$, $R_{B1E} = 2.2\text{ k}\Omega$, $R_{B2E} = 100\ \Omega$	2N6352 2N6353	$V_{(BR)CEO}$	80 150	V
Collector-Emitter Breakdown Voltage $I_E = 12\text{ mA}$, base 1 open $I_E = 12\text{ mA}$, base 2 open		$V_{(BR)EBO}$	6.0 12	V
Collector-Emitter Cutoff Current $V_{CE} = 80\text{ V}$, $V_{EB1} = 2\text{ V}$, $R_{B2E} = 100\ \Omega$ $V_{CE} = 150\text{ V}$, $V_{EB1} = 2\text{ V}$, $R_{B2E} = 100\ \Omega$	2N6352 2N6353	I_{CEX}	1.0	μA

ON CHARACTERISTICS

Forward-Current Transfer Ratio $I_C = 1.0\text{ A}$, $V_{CE} = 5.0\text{ V}$, $R_{B2E} = 1\text{ k}\Omega$	2N6352 2N6353	hFE	2,000 1,000	
$I_C = 5.0\text{ A}$, $V_{CE} = 5.0\text{ V}$, $R_{B2E} = 100\ \Omega$	2N6352 2N6353		2,000 1,000	10,000 10,000
$I_C = 10.0\text{ A}$, $V_{CE} = 5.0\text{ V}$, $R_{B2E} = 100\ \Omega$	2N6352 2N6353		400 200	
Collector-Emitter Saturation Voltage $I_C = 5.0\text{ A}$, $I_B = 5\text{ mA}$, $R_{B2E} = 100\ \Omega$ $I_C = 5.0\text{ A}$, $I_B = 10\text{ mA}$, $R_{B2E} = 100\ \Omega$		$V_{CE(sat)}$	1.5 2.5	V
Base-Emitter Voltage Non-saturated $V_{CE} = 5.0\text{ V}$, $I_C = 5.0\text{ A}$, $R_{B2E} = 100\ \Omega$		V_{BE}	2.5	V

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0\text{ A}$, $V_{CE} = 10.0\text{ V}$, $f = 10\text{ MHz}$, $R_{B2E} = 100\ \Omega$	$ h_{fe} $	5	25	
Output Capacitance $V_{CB} = 10\text{ V}$, $100\text{ kHz} \leq f \leq 1\text{ MHz}$, base 2 open	Cobo		120	pF

ELECTRICAL CHARACTERISTICS @ $T_C = 25^\circ\text{C}$ unless otherwise noted. (continued)
SWITCHING CHARACTERISTICS

Turn-On Time $V_{CC} = 30\text{ V}, I_C = 5.0\text{ A}$	t_{on}		0.5	μs
Turn-Off Time $V_{CC} = 30\text{ V}, I_C = 5.0\text{ A}$	t_{off}		1.2	μs

SAFE OPERATING AREA (See [Figures 1 and 2](#) and [MIL-STD-750, Test Method 3053](#))
DC Tests
 $T_C = +100^\circ\text{C}, t \geq 1\text{ second}, 1\text{ Cycle}; t_r + t_f = 10\ \mu\text{s}, R_{B2E} = 100\ \Omega$
Test 1
 $V_{CE} = 5.0\text{ V}, I_C = 5.0\text{ A}$
Test 2
 $V_{CE} = 10\text{ V}, I_C = 2.5\text{ A}$
Test 3
 $V_{CE} = 80\text{ V}, I_C = 95\text{ mA (2N6352)}$
Test 4
 $V_{CE} = 150\text{ V}, I_C = 35\text{ mA (2N6353)}$

SAFE OPERATING AREA

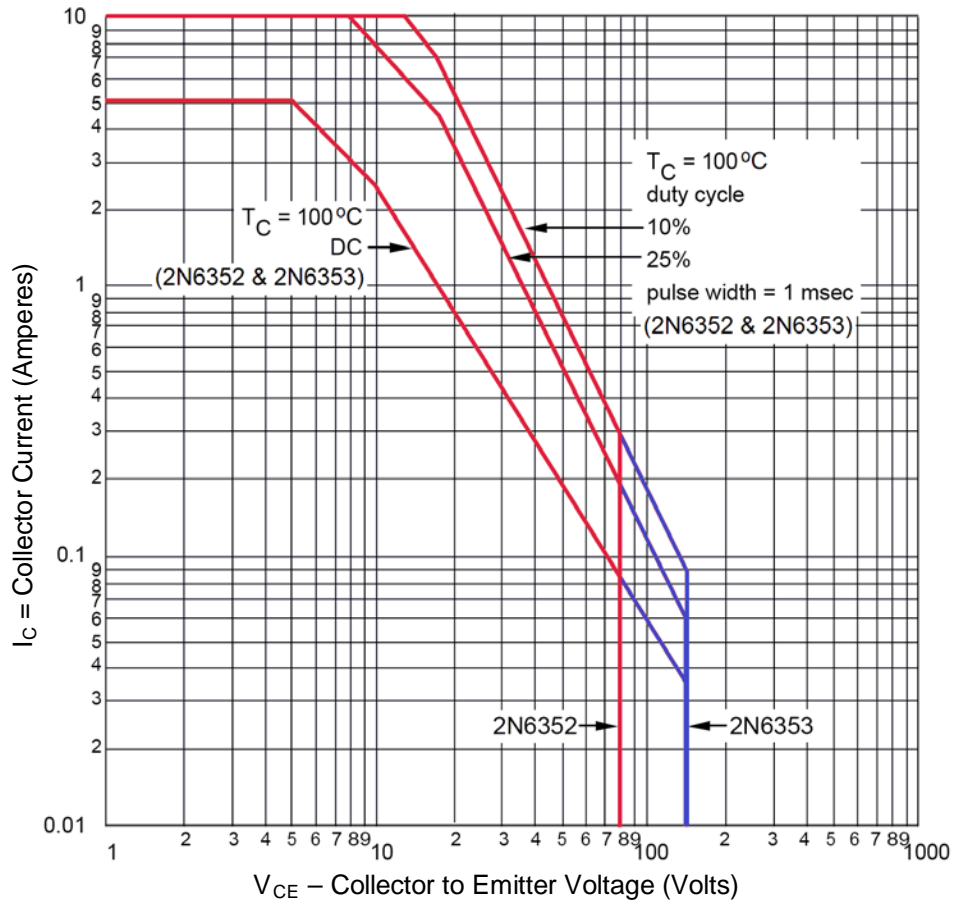


FIGURE 1
Maximum Safe Operating Area

SAFE OPERATING AREA (continued)

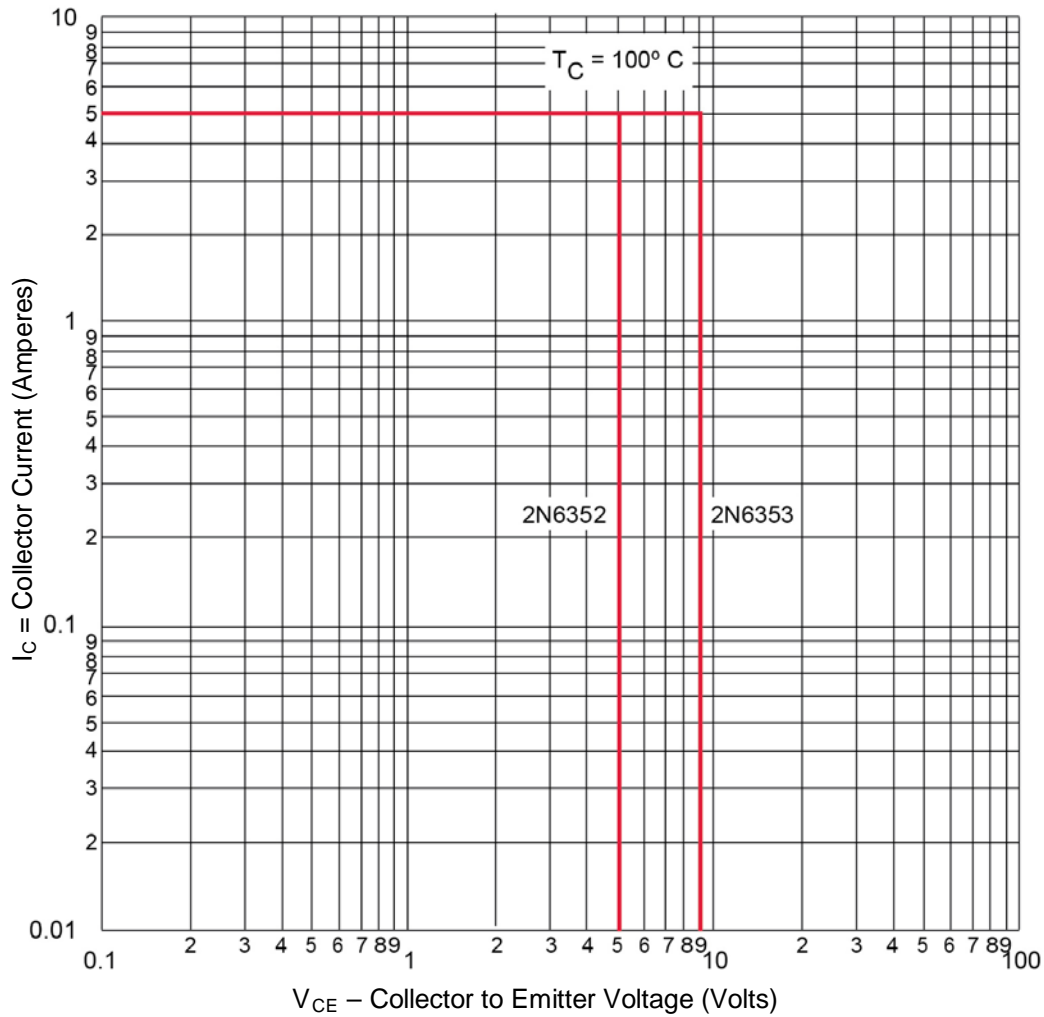
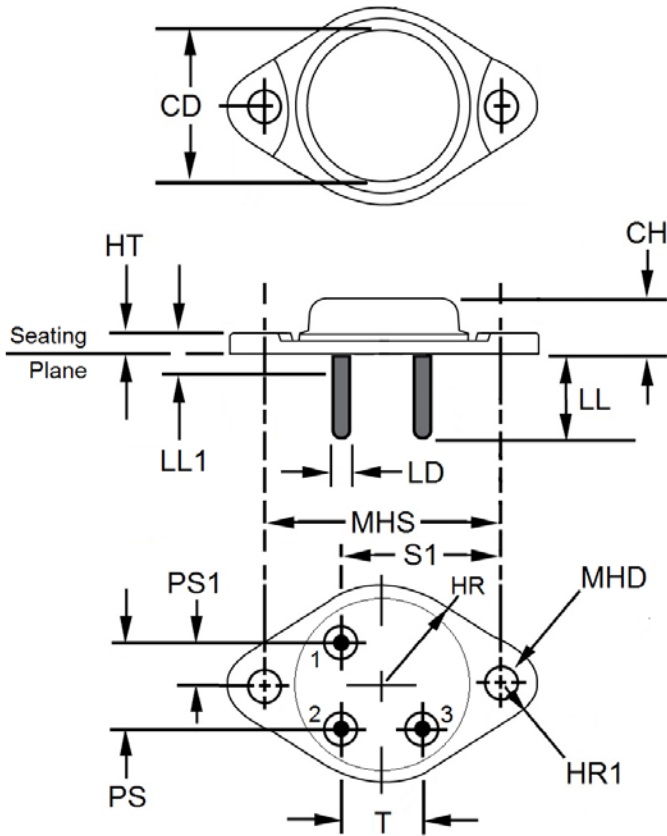


FIGURE 2
Safe Operating Area For Switching Between Saturation And Cutoff
 (unclamped inductive load)

PACKAGE DIMENSIONS

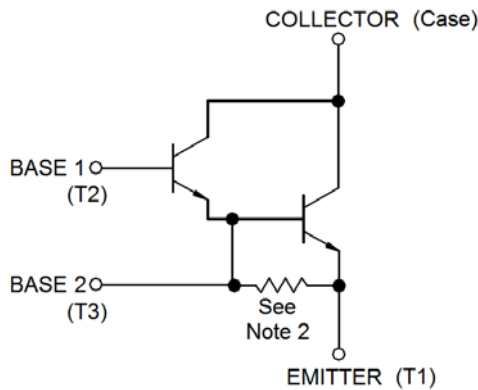


Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	-	0.620	-	15.75	
CH	0.250	0.340	6.35	8.64	
HR	-	0.350	-	8.89	
HR1	0.115	0.145	2.92	3.68	
HT	0.050	0.075	1.27	1.91	3
LD	0.028	0.034	0.711	0.863	4
LL	0.360	0.500	9.14	12.70	4
LL1	-	0.050	-	1.27	4
MHD	0.142	0.152	3.61	3.86	
MHS	0.958	0.962	24.33	24.43	
PS	0.190	0.210	4.83	5.33	
PS1	0.093	0.105	2.36	2.67	
S1	0.570	0.590	14.48	14.99	
T	0.190	0.210	4.83	5.33	
T1	Emitter				
T2	Base (B ₁)				
T3	Base (B ₂)				
Case	Collector				

NOTES:

- Dimensions are in inches. Millimeters are given for information only.
- Internal resistance (typically 750 ohms). This resistor is optional.
- The outline contour is optional.
- Dimension does not include sealing flanges.
- All leads.
- Terminal designation is as follows: 1 – emitter, 2 – base (B₁), 3 – base (B₂). The collector shall be connected to the case.
- Shape of capweld flange is optional and cannot extend beyond dimension HR.
- In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

SCHEMATIC



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