RoHS
Available on commercial versions

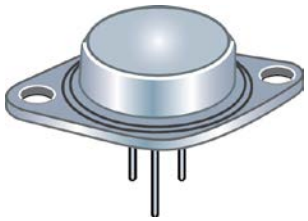
NPN Darlington Power Silicon Transistor

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.



TO-213AA
(TO-66) Package

Important: For the latest information, visit our website http://www.microsemi.com.

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)

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		$R_{\Theta JC}$	4.0	°C/W
Collector-Emitter Voltage	2N6352 2N6353	V_{CEO}	80 150	V
Collector-Base Voltage	2N6352 2N6353	V_{CBO}	80 150	V
Emitter-Base Voltage		V_{EBO1} V_{EBO2}	12 6.0	V
Total Power Dissipation	@ T_A = +25 °C (1) @ T_C = +100 °C (2)	P_T	2.0 25	W
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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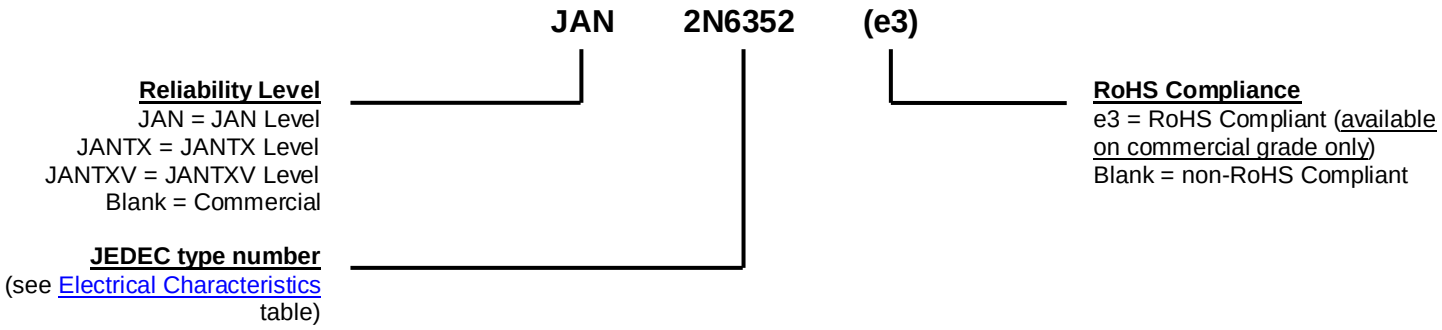
MECHANICAL and PACKAGING

- 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 °C unless otherwise noted

Characteristics		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage I_C = 25 mA , R_{B1E} = 2.2 kΩ, R_{B2E} = 100 Ω	2N6352 2N6353	$V_{(BR)CEO}$	80 150		V
Collector-Emitter Breakdown Voltage I_E = 12 mA, base 1 open I_E = 12 mA, base 2 open		$V_{(BR)EBO}$	6.0 12		V
Collector-Emitter Cutoff Current V_{CE} = 80 V, V_{EB1} = 2 V, R_{B2E} = 100 Ω V_{CE} = 150 V, V_{EB1} = 2 V, R_{B2E} = 100 Ω	2N6352 2N6353	I_{CEX}		1.0	µA
ON CHARACTERISTICS					
Forward-Current Transfer Ratio I_C = 1.0 A, V_{CE} = 5.0 V, R_{B2E} = 1 kΩ	2N6352 2N6353	h_{FE}	2,000 1,000		
I_C = 5.0 A, V_{CE} = 5.0 V, R_{B2E} = 100 Ω	2N6352 2N6353		2,000 1,000	10,000 10,000	
I_C = 10.0 A, V_{CE} = 5.0 V, R_{B2E} = 100 Ω	2N6352 2N6353		400 200		
Collector-Emitter Saturation Voltage I_C = 5.0 A, I_B = 5 mA, R_{B2E} = 100 Ω I_C = 5.0 A, I_B = 10 mA, R_{B2E} = 100 Ω		$V_{CE(sat)}$		1.5 2.5	V
Base-Emitter Voltage Non-saturated V_{CE} = 5.0 V, I_C = 5.0 A, R_{B2E} = 100 Ω		V_{BE}		2.5	V
DYNAMIC CHARACTERISTICS					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I_C = 1.0 A, V_{CE} = 10.0 V, f = 10 MHz, R_{B2E} = 100 Ω		|hfe|	5	25	
Output Capacitance V_{CB} = 10 V, 100 kHz ≤ f ≤ 1 MHz, base 2 open		Cobo		120	pF

ELECTRICAL CHARACTERISTICS @ T_C = 25 °C unless otherwise noted. (continued)

SWITCHING CHARACTERISTICS

Turn-On Time V_{CC} = 30 V, I_C = 5.0 A	t_{on}		0.5	µs
Turn-Off Time V_{CC} = 30 V, I_C = 5.0 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 ºC, t ≥ 1 second, 1 Cycle; $t_r + t_f$ = 10 µs, R_{B2E} = 100 Ω

Test 1

V_{CE} = 5.0 V, I_C = 5.0 A

Test 2

V_{CE} = 10 V, I_C = 2.5 A

Test 3

V_{CE} = 80 V, I_C = 95 mA (2N6352)

Test 4

V_{CE} = 150 V, I_C = 35 mA (2N6353)

SAFE OPERATING AREA

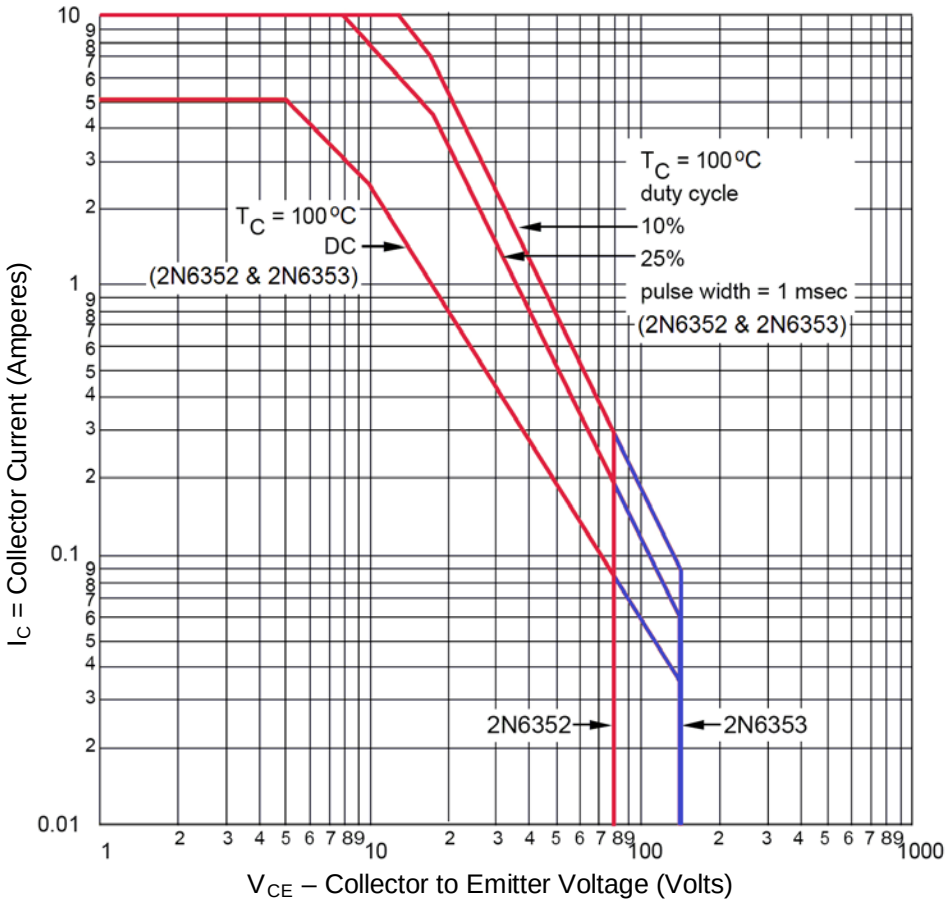


FIGURE 1
Maximum Safe Operating Area

SAFE OPERATING AREA (continued)

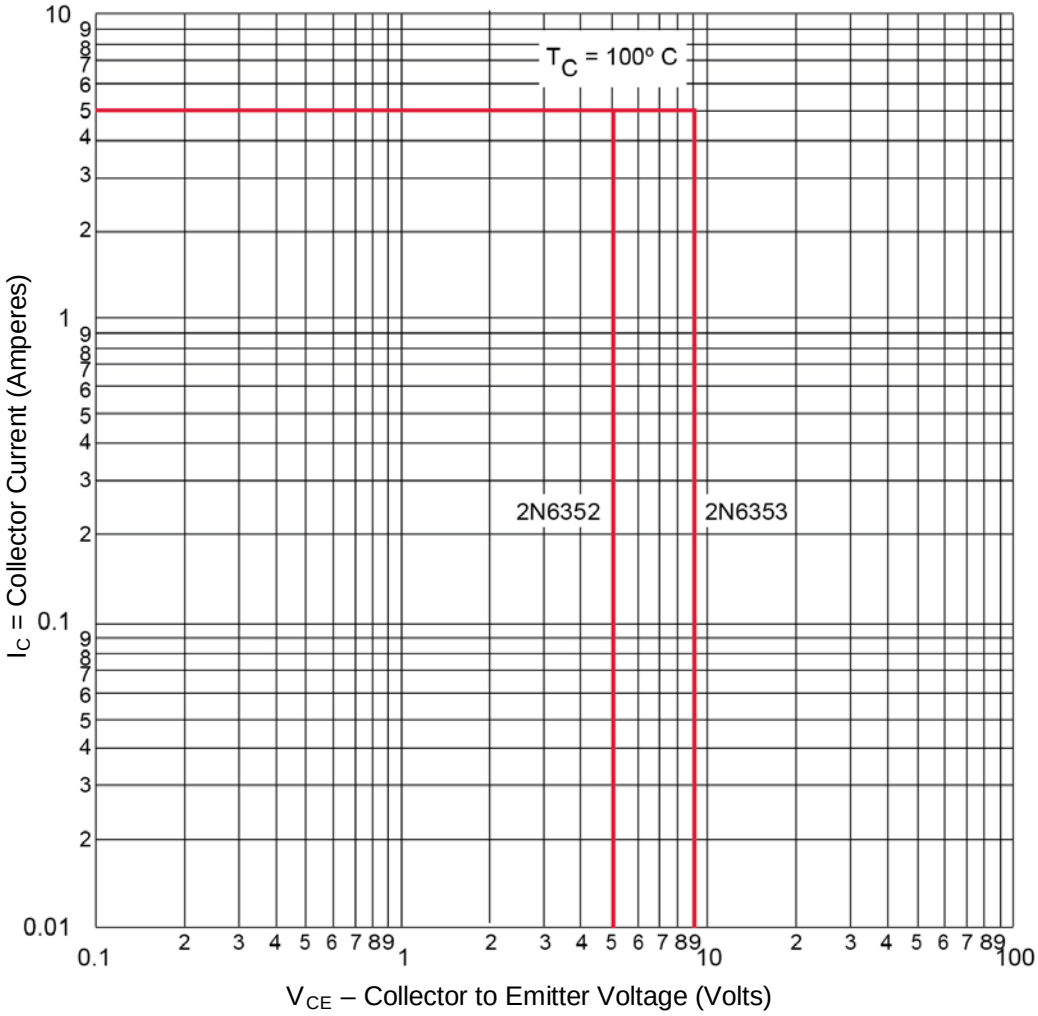
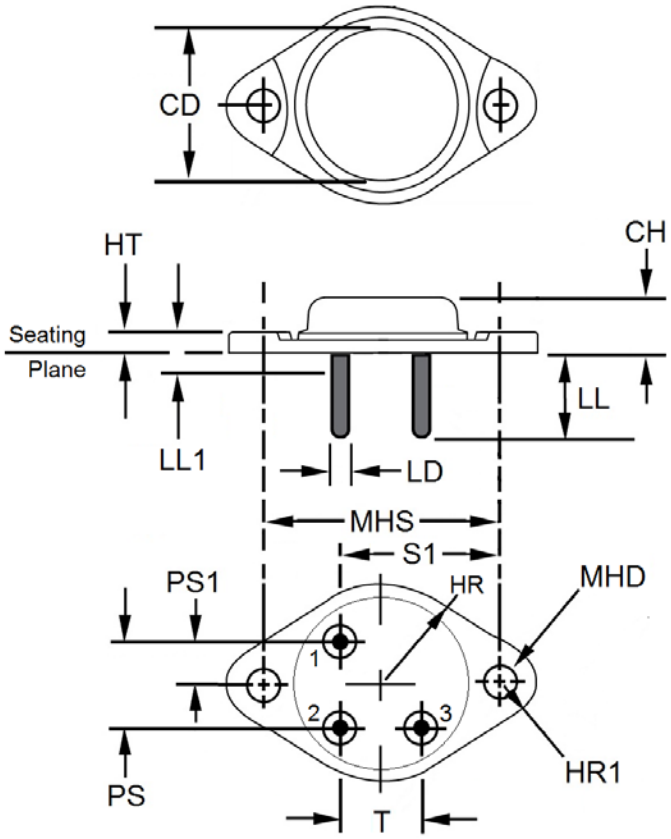


FIGURE 2
Safe Operating Area For Switching Between Saturation And Cutoff
(unclamped inductive load)

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:

1. Dimensions are in inches. Millimeters are given for information only.
2. Internal resistance (typically 750 ohms). This resistor is optional.
3. The outline contour is optional.
4. Dimension does not include sealing flanges.
5. All leads.
6. Terminal designation is as follows: 1 – emitter, 2 – base (B_1), 3 – base (B_2). The collector shall be connected to the case.
7. Shape of capweld flange is optional and cannot extend beyond dimension HR.
8. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

SCHEMATIC