



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.

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 @ $T_C = +25^\circ\text{C}$ unless otherwise noted

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-65 to +200	$^\circ\text{C}$
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	4.0	$^\circ\text{C/W}$
Collector-Emitter Voltage	V_{CEO}	80	V
		150	
Collector-Base Voltage	V_{CBO}	80	V
		150	
Emitter-Base Voltage	V_{EBO1}	12	V
	V_{EBO2}	6.0	
Total Power Dissipation	P_T	2.0	W
		25	
Base Current	I_B	0.5	A
Collector Current	I_C	5	A

- Notes:**
1. Derate linearly 11.4 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$
 2. Derate linearly 250 mW/ $^\circ\text{C}$ for $T_C > +100^\circ\text{C}$
 3. Applies for $t_p \leq 10$ ms, duty cycle ≤ 50 percent



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

MSC – Lawrence
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Lawrence, MA 01841
1-800-446-1158
(978) 620-2600
Fax: (978) 689-0803

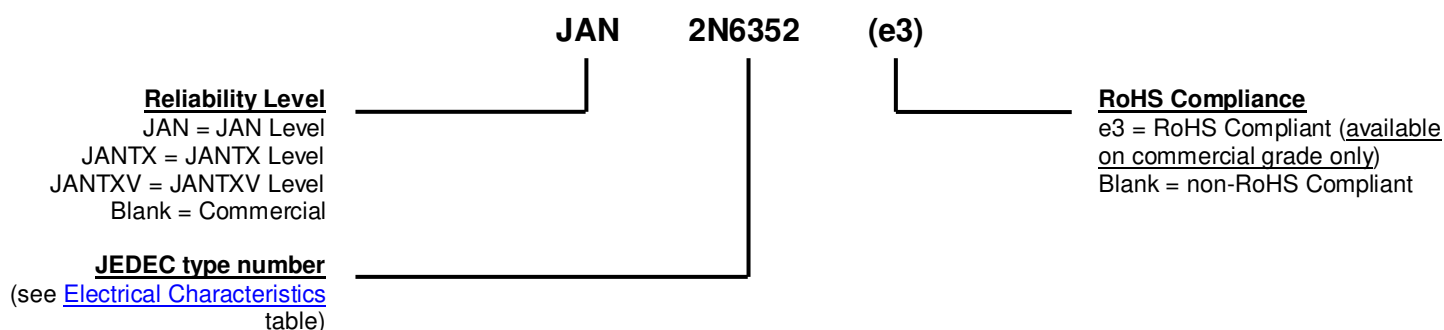
MSC – Ireland
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Ennis, Co. Clare, Ireland
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Website:
www.microsemi.com

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 $I_C = 25\text{ mA}$, $R_{B1E} = 2.2\text{ k}\Omega$, $R_{B2E} = 100\text{ }\Omega$	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 $V_{CE} = 80\text{ V}$, $V_{EB1} = 2\text{ V}$, $R_{B2E} = 100\text{ }\Omega$ $V_{CE} = 150\text{ V}$, $V_{EB1} = 2\text{ V}$, $R_{B2E} = 100\text{ }\Omega$	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	h_{FE}	2,000 1,000	
$I_C = 5.0\text{ A}$, $V_{CE} = 5.0\text{ V}$, $R_{B2E} = 100\text{ }\Omega$	2N6352 2N6353		2,000 1,000	10,000 10,000
$I_C = 10.0\text{ A}$, $V_{CE} = 5.0\text{ V}$, $R_{B2E} = 100\text{ }\Omega$	2N6352 2N6353		400 200	
Collector-Emitter Saturation Voltage $I_C = 5.0\text{ A}$, $I_B = 5\text{ mA}$, $R_{B2E} = 100\text{ }\Omega$ $I_C = 5.0\text{ A}$, $I_B = 10\text{ mA}$, $R_{B2E} = 100\text{ }\Omega$		$V_{CE(sat)}$	1.5 2.5	V
Base-Emitter Voltage Non-saturated $V_{CE} = 5.0\text{ V}$, $I_C = 5.0\text{ A}$, $R_{B2E} = 100\text{ }\Omega$		V_{BE}	2.5	V

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0\text{ A}$, $V_{CE} = 10.0\text{ V}$, $f = 10\text{ MHz}$, $R_{B2E} = 100\text{ }\Omega$	$ 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 Cycle; $t_r + t_f = 10\text{ }\mu\text{s}$, $R_{B2E} = 100\text{ }\Omega$ **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)

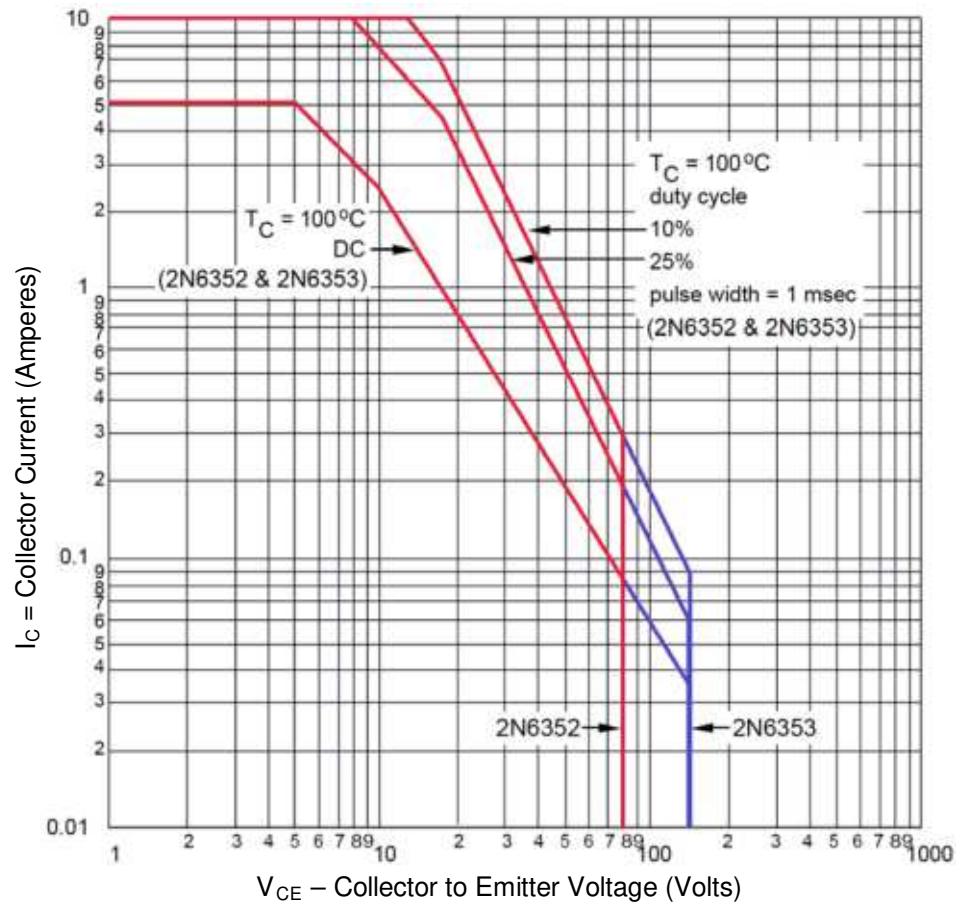
SAFE OPERATING AREA


FIGURE 1
Maximum Safe Operating Area

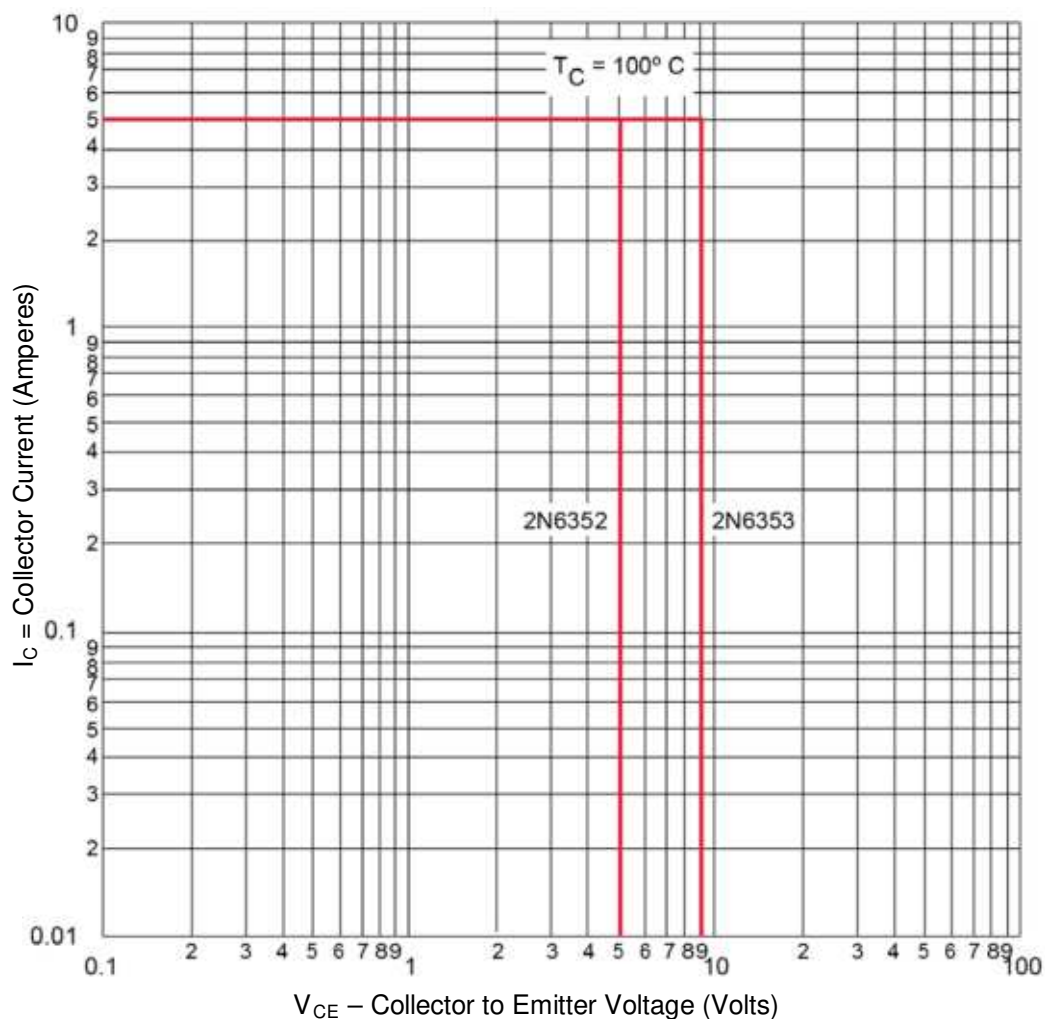
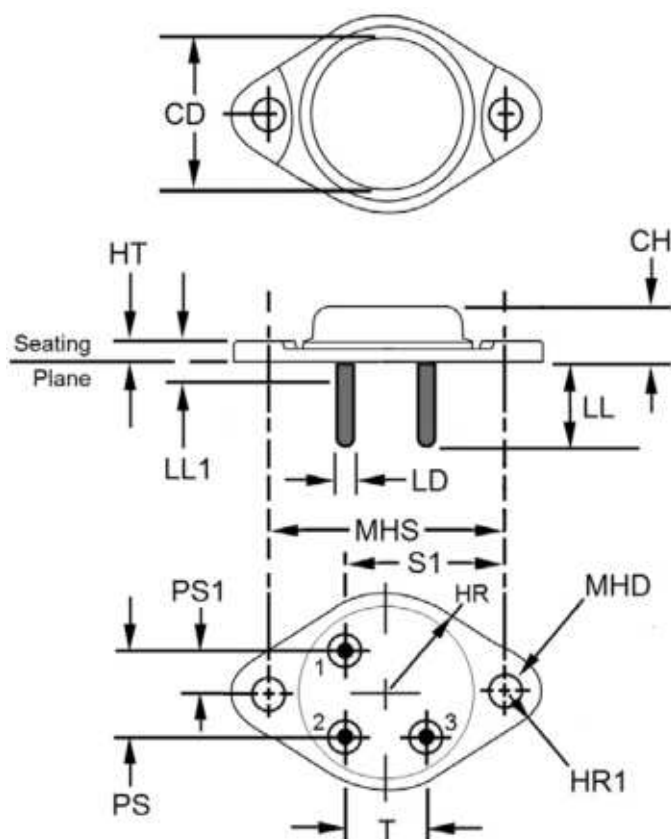
SAFE OPERATING AREA (continued)


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:

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 (B₁), 3 – base (B₂). 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 Φ x symbology.

SCHEMATIC
