

# NEC

## SILICON POWER TRANSISTOR 2SD2162

### NPN SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION) FOR LOW-FREQUENCY POWER AMPLIFIERS AND LOW-SPEED SWITCHING

The 2SD2162 is a Darlington power transistor that can directly drive from the IC output. This transistor is ideal for motor drivers and solenoid drivers in such as OA and FA equipment.

In addition, a small resin-molded insulation type package contributes to high-density mounting and reduction of mounting cost.

#### FEATURES

- High  $h_{FE}$  due to Darlington connection  
 $h_{FE} \geq 2,000$  ( $V_{CE} = 2.0\text{ V}$ ,  $I_C = 3.0\text{ A}$ )
- Full mold package that does not require an insulating board or insulation bushing

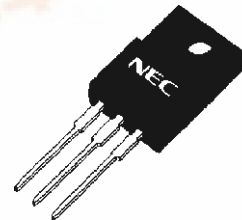
#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	$V_{CBO}$		150	V
Collector to emitter voltage	$V_{CEO}$		100	V
Emitter to base voltage	$V_{EBO}$		7.0	V
Collector current (DC)	$I_{C(DC)}$		+8.0, -5.0	A
Collector current (pulse)	$I_{C(pulse)}$	$PW \leq 10\text{ ms}$ , duty cycle $\leq 50\%$	+12, -8.0	A
Base current (DC)	$I_{B(DC)}$		0.8	A
Total power dissipation	$P_T$	$T_C = 25^\circ\text{C}$	25	W
		$T_A = 25^\circ\text{C}$	2.0	W
Junction temperature	$T_j$		150	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

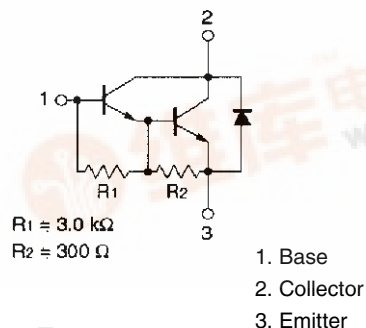
#### ORDERING INFORMATION

Ordering Name	Package
2SD2162	Isolated TO-220

(Isolated TO-220)



#### INTERNAL EQUIVALENT CIRCUIT



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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.



**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

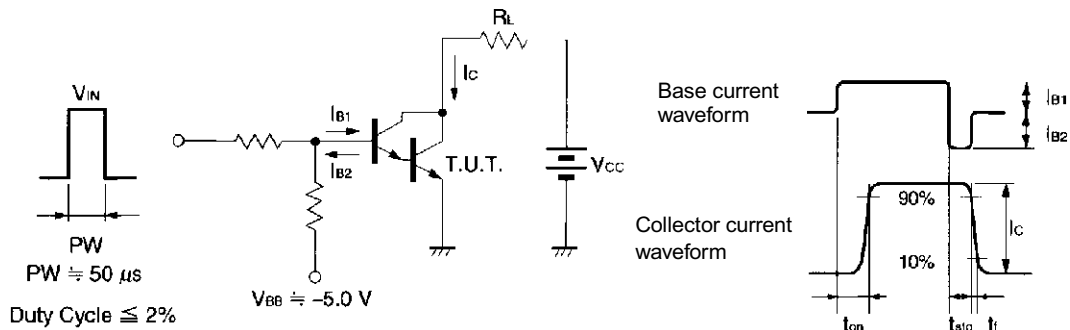
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I <sub>CB0</sub>	V <sub>CB</sub> = 100 V, I <sub>E</sub> = 0 A			1.0	μA
DC current gain	h <sub>FE1</sub>	V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 3.0 A <sup>Note</sup>	2,000		15,000	
	h <sub>FE2</sub>	V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 5.0 A <sup>Note</sup>	500			
Collector saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 3.0 mA <sup>Note</sup>		0.9	1.5	V
Base saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 3.0 mA <sup>Note</sup>		1.6	2.0	V
Gain bandwidth product	f <sub>T</sub>	V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 0.8 A		30		MHz
Collector capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 A, f = 1.0 MHz		50		pF
Turn-on time	t <sub>on</sub>	I <sub>C</sub> = 3.0 A, R <sub>L</sub> = 16.7 Ω, I <sub>B1</sub> = -I <sub>B2</sub> = 3.0 mA, V <sub>CC</sub> ≅ 50 V Refer to the test circuit.		1.0		μs
Storage time	t <sub>stg</sub>			3.5		μs
Fall time	t <sub>f</sub>			1.2		μs

**Note** Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

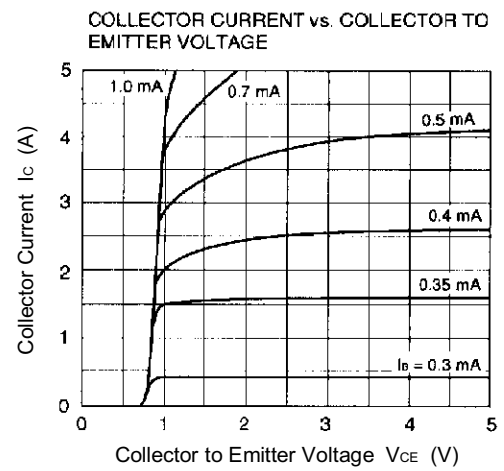
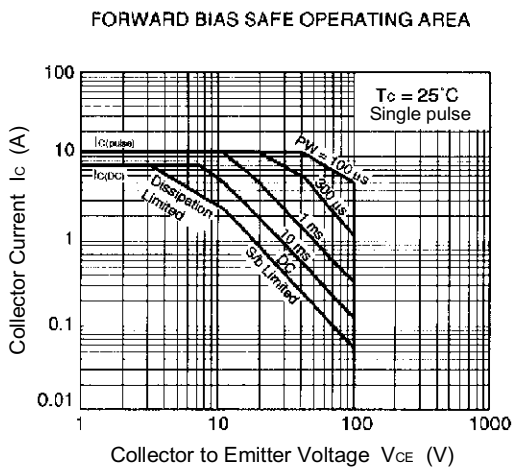
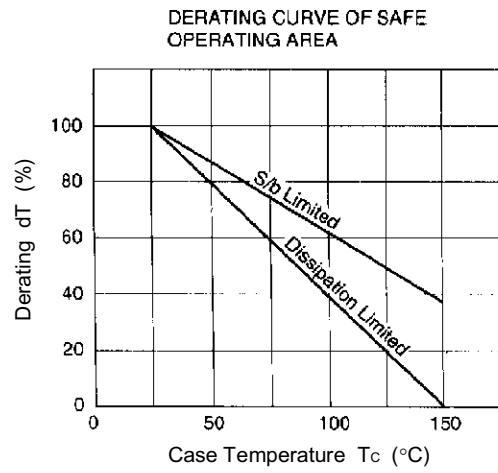
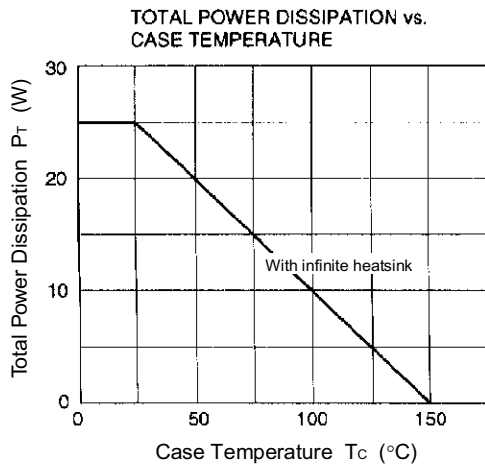
**h<sub>FE</sub> CLASSIFICATION**

Marking	M	L	K
h <sub>FE1</sub>	2,000 to 5,000	3,000 to 7,000	5,000 to 15,000

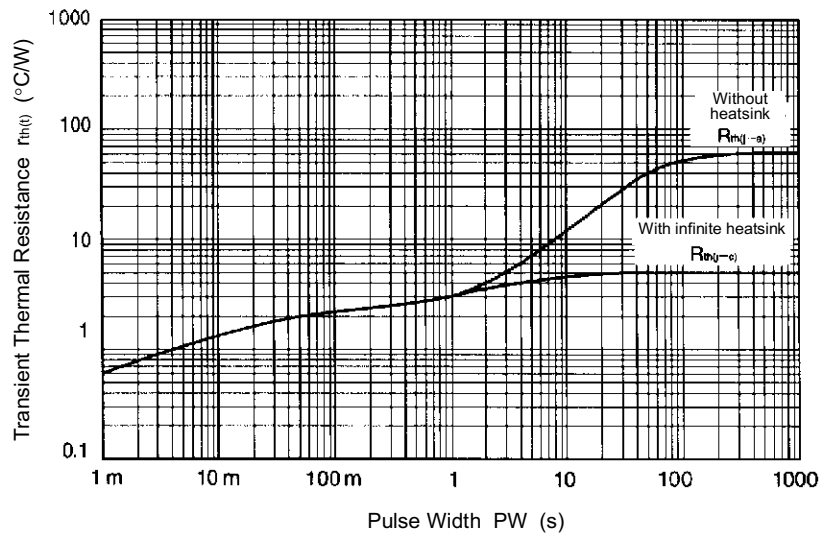
**SWITCHING TIME (t<sub>on</sub>, t<sub>stg</sub>, t<sub>f</sub>) TEST CIRCUIT**



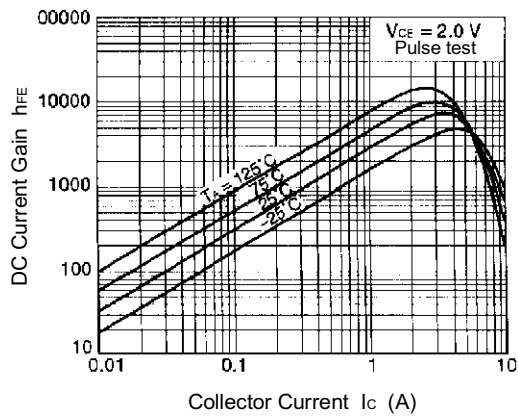
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)



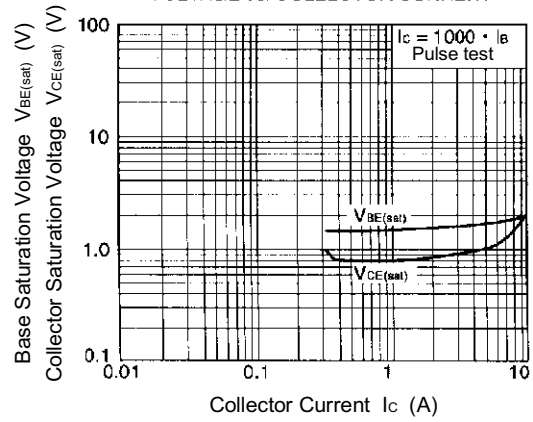
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



DC CURRENT GAIN vs. COLLECTOR CURRENT

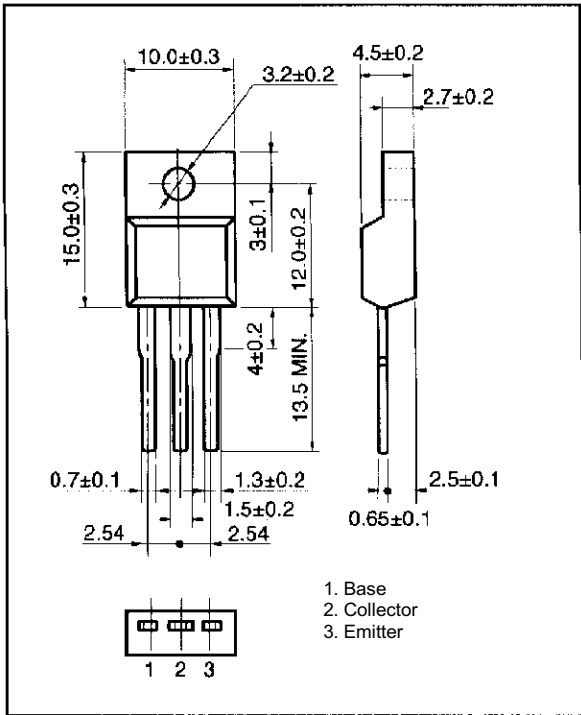


BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



PACKAGE DRAWING (UNIT: mm)

Isolated TO-220 (MP-45F)



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