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## D40K2 Silicon NPN Transistor Darlington Power Amplifier TO-202 Type Package

**Description:**

The D40K2 is a silicon NPN Darlington transistor in a TO-202 type package designed for amplifier and driver applications where high gain is an essential requirement, low power lamp and relay drivers and power drivers for high-current applications such as voltage regulators.

**Features:**

- Low Collector-Emitter Saturation Voltage:  $V_{CE(sat)} = 1.5V \text{ Max @ } I_C = 1.5A$
- TO-202 Type Package: 2W Free Air Dissipation @  $T_A = +25^\circ C$

**Absolute Maximum Ratings:**

Collector-Emitter Voltage, $V_{CEO}$ .....	50V
Collector-Emitter Voltage, $V_{CES}$ .....	50V
Emitter-Base Voltage, $V_{EBO}$ .....	13V
Collector Current, $I_C$	
Continuous .....	2A
Peak (Note 1) .....	3A
Continuous Base Current, $I_B$ .....	100mA
Total Power Dissipation ( $T_A = +25^\circ C$ ), $P_D$ .....	1.67W
Derate Above $25^\circ C$ (Note 2) .....	13.3mW/ $^\circ C$
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	10W
Derate Above $25^\circ C$ .....	80mW/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	$75^\circ C/W$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	$12.5^\circ C/W$

Note 1. Pulse Width  $\leq 25ms$ , Duty Cycle  $\leq 50\%$ .

Note 2. The actual power dissipation capability of the TO202 type package is 2W @  $T_A = +25^\circ C$ .

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$ , Note 3	50	–	–	V
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 50\text{V}$ , $I_E = 0$ , $T_J = +150^\circ\text{C}$	–	–	20	$\mu\text{A}$
	$I_{CES}$	$V_{CE} = 50\text{V}$ , $V_{BE} = 0$	–	–	0.5	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 13\text{V}$ , $I_C = 0$	–	–	100	nA
<b>ON Characteristics</b> (Note 4)						
DC Current Gain	$h_{FE}$	$I_C = 200\text{mA}$ , $V_{CE} = 5\text{V}$	10000	–	–	
		$I_C = 1.5\text{A}$ , $V_{CE} = 5\text{V}$	1000	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 1.5\text{A}$ , $I_B = 3\text{mA}$	–	–	1.5	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 1.5\text{A}$ , $I_B = 3\text{mA}$	–	–	2.5	V
<b>Dynamic Characteristics</b>						
Collector Capacitance	$C_{cb}$	$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$	–	–	10	pF
High Frequency Current Gain	$ h_{fe} $	$I_C = 20\text{mA}$ , $V_{CE} = 5\text{V}$ , $f = 100\text{MHz}$	1.0	–	–	

Note 3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

