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2N3019
Silicon NPN Transistor
Audio Output, Video, Driver
TO–5 Type Package

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

Collector–Emitter Voltage, V_{CEO} 80V
Collector–Base Voltage, V_{CBO} 140V
Emitter–Base Voltage, V_{EBO} 7V
Continuous Collector Current, I_C 1A
Total Device Dissipation, P_D
  T_A = +25°C 800mW
  T_C = +25°C 5W
Operating Junction Temperature Range, T_J . . . . . –65° to +200°C
Storage Temperature Range, T_{stg} . . . . . –65° to +200°C
Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 195°C/W
Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 30°C/W

Note 1. Stresses exceeding Absolute Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Electrical Characteristics: (T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 30mA	80	–	–	V
Emitter–Base Cutoff Current	I_{EBO}	V_{EB} = 5V	–	–	10	nA
		V_{EB} = 7V	–	–	10	μA
Collector–Emitter Cutoff Current	I_{CEO}	V_{CE} = 90V	–	–	10	nA
Collector–Base Cutoff Current	I_{CBO}	V_{CE} = 140V	–	–	10	μA
ON Characteristics (Note 2)						
DC Current Gain	h_{FE}	I_C = 0.1mA, V_{CE} = 10V	50	–	300	
		I_C = 10mA, V_{CE} = 10V	90	–	–	
		I_C = 150mA, V_{CE} = 10V	100	–	300	
		I_C = 500mA, V_{CE} = 10V	50	–	300	
		I_C = 1.0A, V_{CE} = 10V	15	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 150mA, I_B = 15mA	–	–	0.2	V
		I_C = 500mA, I_B = 50mA	–	–	0.5	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 150mA, I_B = 15mA	–	–	1.1	V

Note 2. Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2%.

Electrical Characteristics (Cont'd): T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Small−Signal Characteristics						
Magnitude of Small−Signal Current−Gain	$\|h_{fe}\|$	I_C = 50mA, V_{CE} = 10V, f = 20MHz	5.0	–	20	
Small−Signal Current Gain	h_{fe}	I_C = 1mA, V_{CE} = 5V, f = 1kHz	80	–	400	
Output Capacitance	C_{obo}	V_{CB} = 10V, I_E = 0, 100kHz ≤ f ≤ 1MHz	–	–	12	pF
Input Capacitance	C_{ibo}	V_{BE} = 500mV, I_C = 0,100kHz ≤ f ≤ 1MHz	–	–	60	pF
Noise Figure	NF	I_C = 100μA, V_{CE} = 10V, R_g = 1kΩ, PBW = 200Hz	–	–	4	dB
Collector−Base Time Constant	$rb'C_c$	I_C = 10mA, V_{CB} = 10V, f = 79.8MHz	–	–	400	ps
Switching Characteristics						
Pulse Response	$t_{on} + t_{off}$		–	–	30	ns