Transistor, NPN
TO-3

Description:

The 2N6547 transistor is designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for 115 and 220V line operated switch-mode applications.

Features:

- High temperature performance specified for:
  - Reversed biased SOA with inductive loads.
  - Switching time with inductive loads.
  - Saturation voltages.
  - Leakage currents.

Applications:

Switching regulators.
PWM inverters and motor controls.
Solenoid and relay drivers.
Deflection circuits.

Maximum Ratings

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO\ (SUS)}$	400	V DC
Collector-Emitter Voltage	$V_{CEX\ (SUS)}$	450	
Collector-Emitter Voltage	V_{CEV}	850	
Emitter-Base Voltage	V_{EB}	9	
Collector Current - Continuous - Peak	I_C I_{CM}	15 30	A DC
Base Current - Continuous - Peak	I_B I_{BM}	10 20	
Emitter Current - Continuous - Peak	I_E I_{EM}	25 35	
Total Power Dissipation at T_C = 25°C at T_C = 100°C Derate above 25°C	P_D	 175 100 1	 W W/°C
Operating and Storage Junction Temperature Range	T_J T_{stg}	-65 to +200	°C

Thermal Characteristics

Characteristics	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	1	°C/W
Max. Lead Temperature for Soldering Purposes 1/8" from Case for 5 Seconds	T_L	275	°C

Electrical Characteristics (TC = 25°C unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Unit
Off Characteristics (1)				
Collector-Emitter Sustaining Voltage (I_C = 100mA, I_B = 0)	$V_{EO\ (sus)}$	400	-	V DC
Collector-Emitter Sustaining Voltage (I_C = 8A, V_{clamp} = Rated V_{CEX}, T_C = 100°C) (I_C = 15A, V_{clamp} = Rated V_{CEO} = 100V, T_C = 100°C)	$V_{CEX\ (sus)}$	450 300	-	
Collector Cut off Current (V_{CEV} = Rated Value, $V_{BE\ (off)}$ = 1.5V DC) (V_{CEV} = Rated Value, $V_{BE\ (off)}$ = 1.5V DC, T_C = 100°C)	I_{CEV}	-	1 4	mA DC
Collector Cut off Current (V_{CE} = Rated V_{CEV}, $R_{BE,}$ = 50Ω, T_C = 100°C)	I_{CER}	-	5	
Emitter Cut off Current (V_{EB} = 9V DC, I_C = 0)	I_{ERO}	-	1	
Second Breakdown				
Second Breakdown Collector Current with Base Forward Biased t = 1s (Non-repetitive) (V_{CE} = 100V DC)	$I_{S/b}$	0.2	-	A DC
On Characteristic (1)				
DC Current Gain (I_C = 5A DC, V_{CE} = 2V DC) (I_C = 10A DC, V_{CE} = 2V DC)	h_{FE}	12 6	60 30	-
Collector-Emitter Saturation Voltage (I_C = 10A DC, I_B = 2A DC) (I_C = 15A DC, I_B = 3A DC) (I_C = 10A DC, I_B = 2A DC, T_C = 100°C)	$V_{CE\ (sat)}$	-	1.5 5 2.5	V DC
Base-Emitter Saturation Voltage (I_C = 10A DC, I_B = 2A DC) (I_C = 10A DC, I_B = 2A DC, T_C = 100°C	$V_{BE\ (sat)}$	-	1.6	
Dynamic Characteristics				
Current-Gain-Bandwidth Product (I_C = 500mA DC, V_{CE} = 10V DC, f_{test} = 1MHz)	f_T	6	28	MHz
Output Capacitance (V_{CB} = 10V DC, I_E = 0, f_{test} = 1MHz)	C_{ob}	125	500	pF

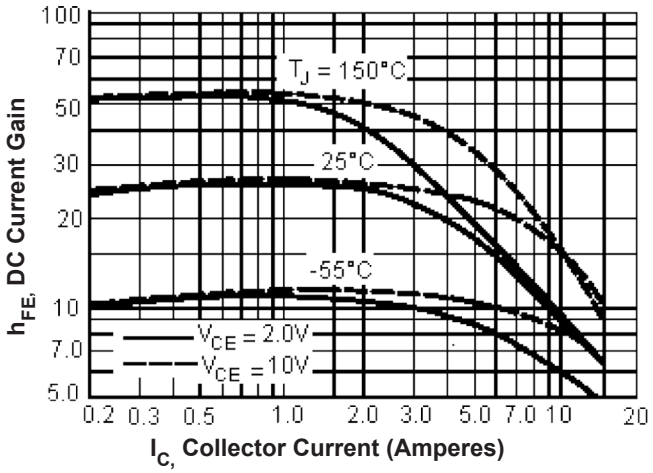
Indicates JEDEC Registered Data.
(1) Pulse Test: Pulse Width = 300µs, Duty Cycle = 2%.

Switching Characteristics

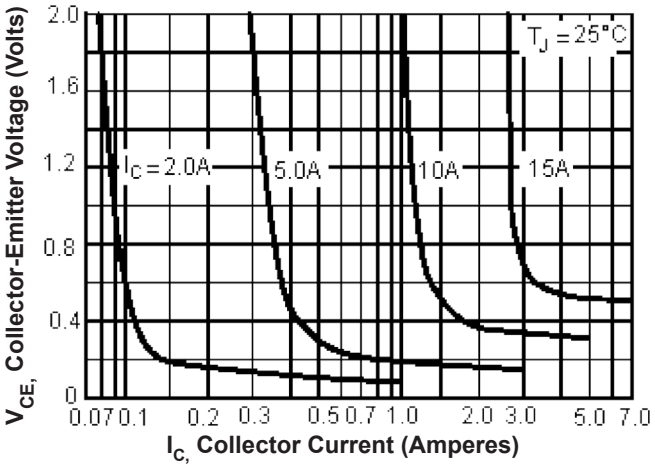
Resistive Load					
Delay Time	(V_{CC} = 250V, I_C = 10A, I_{B1} = I_{B2} = 2A, t_p = 100µS, Duty Cycle ≤2%)	t_d	-	0.05	µs
Rise Time		t_r	-	1	
Storage Time		t_s	-	4	
Fall Time		t_f	-	0.7	
Inductive Load, Clamped					
Storage Time	(I_C = 10A (pk), V_{clamp} = Rated V_{CEX}, I_{B1} = 2A, $V_{BE\ (off)}$ = 5V DC, T_C = 100°C)	t_s	-	5	µs
Fall Time		t_f	-	1.5	
Storage Time	(I_C = 10A (pk), V_{clamp} = Rated V_{CEX}, I_{B1} = 2A, $V_{BE\ (off)}$ = 5V DC, T_C = 25°C)	t_s	Typical 2		µs
Fall Time		t_f	Typical 0.09		

Typical Electrical Characteristics

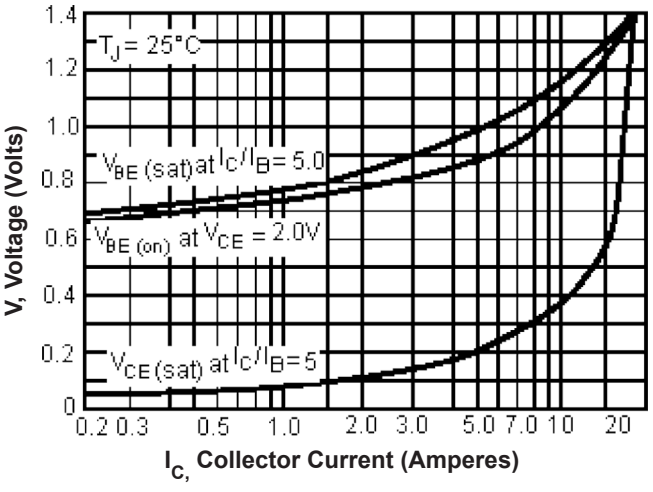
DC Current Gain



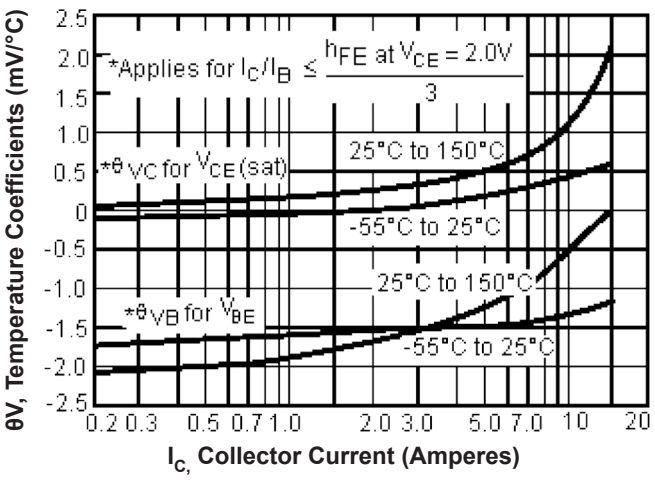
Collector Saturation Region



"On" Voltages



Temperature Coefficients



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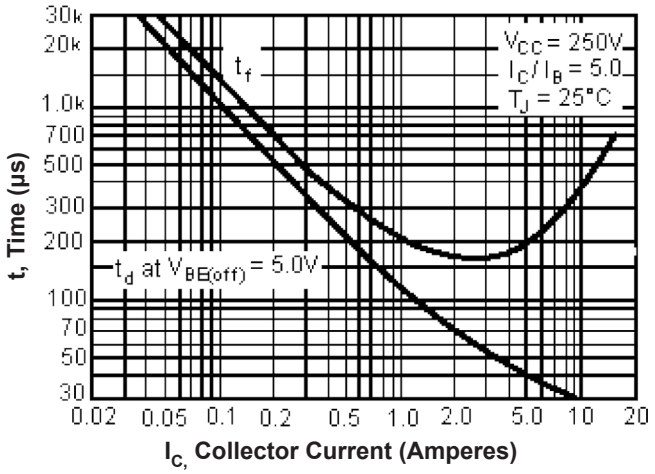
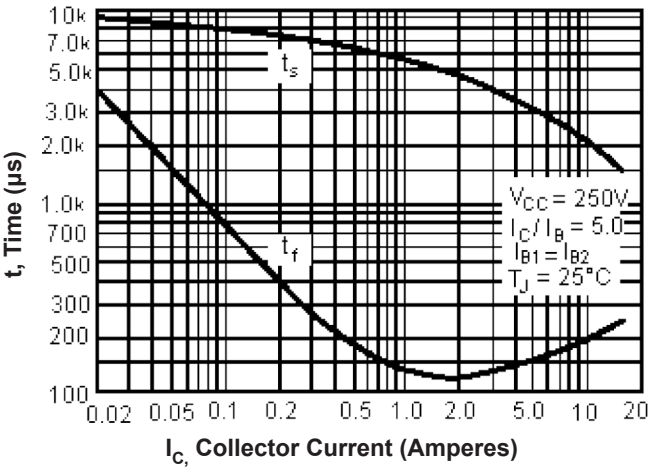
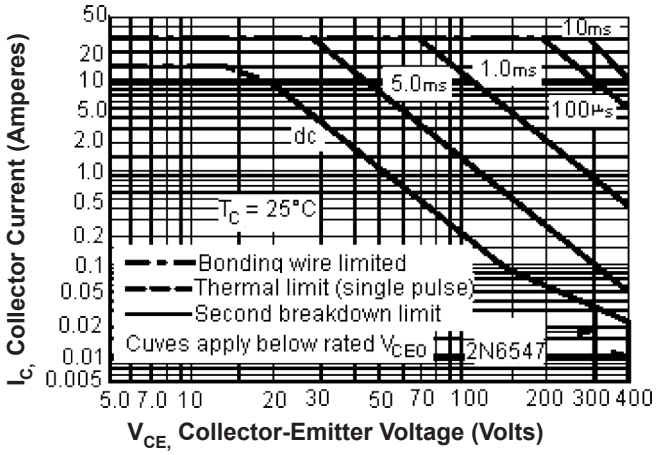
Turn-On Time



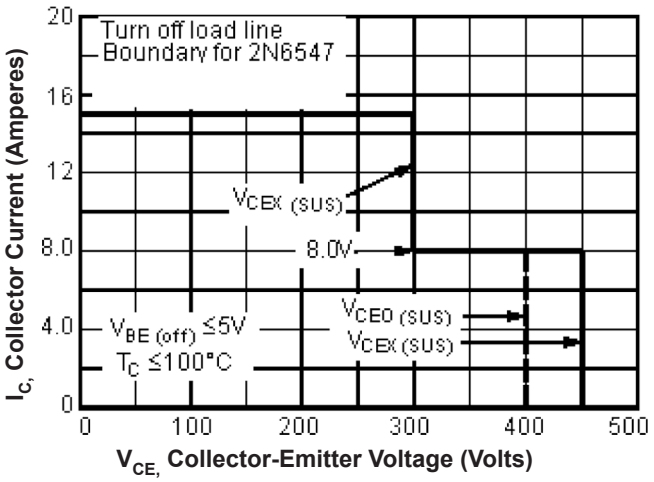
Turn-Off Time



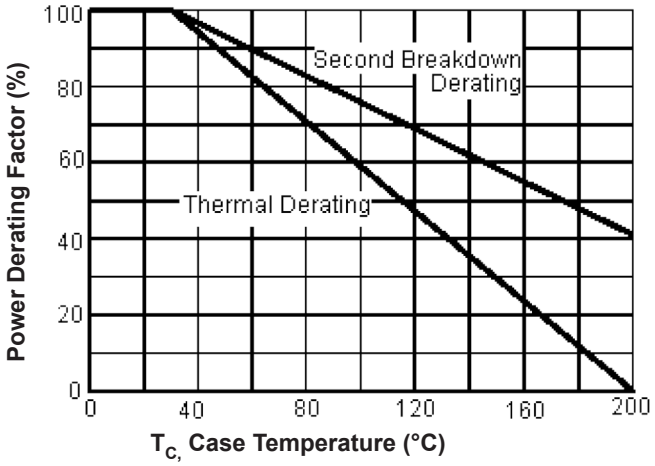
Forward Bias Safe Operating Area



Reverse Bias Safe Operating Area



Power Derating



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data is based on T_C = 25°C; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% but must be derated when T_C ≥25°C. Second breakdown limitations do not derate the same as thermal limitations. Allowable current at the voltages shown may be found at any case temperature by using the appropriate curve.$T_{J(pk)}$ may be calculated from the data. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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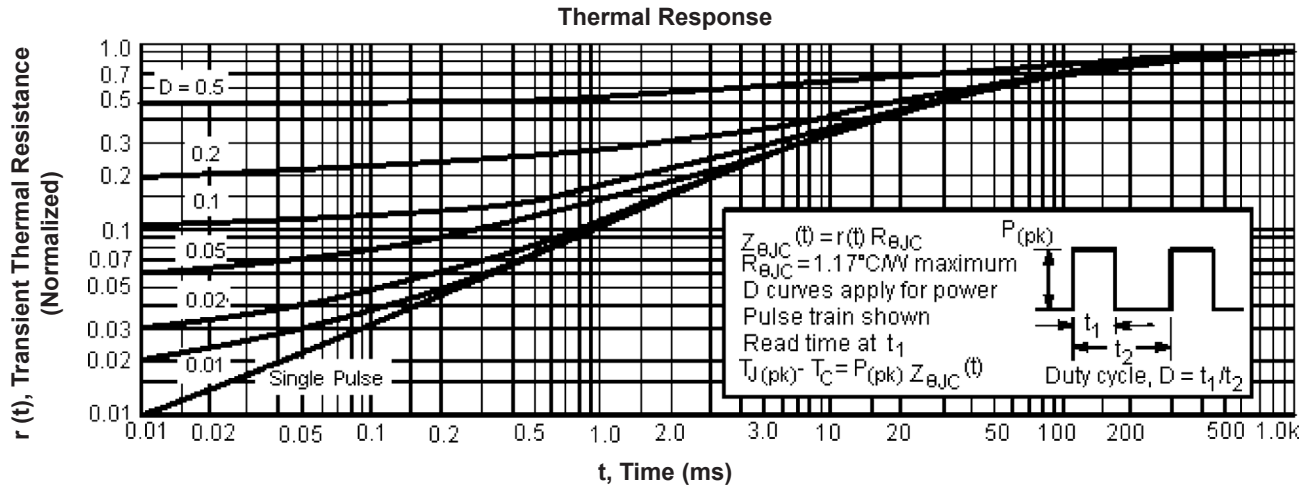
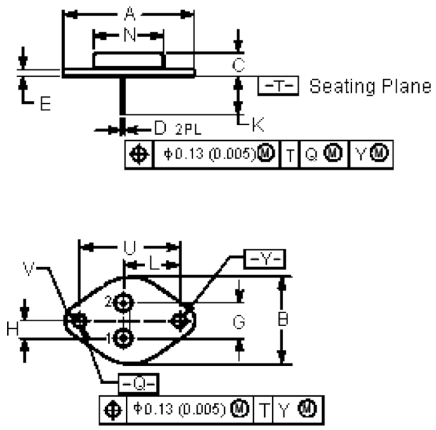
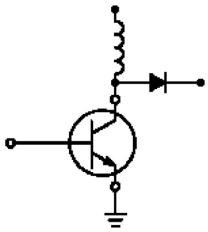


Dimensions

TO-204 (TO-3)





Dim.	Min.	Max.
A	1.55 (39.37) Reference	
B	-	1.05 (26.67)
C	0.25 (6.35)	0.335 (8.51)
D	0.038 (0.97)	0.043 (1.09)
E	0.055 (1.4)	0.07 (1.77)
G	0.43 (10.92) BSC	
H	0.215 (5.46) BSC	
K	0.44 (11.18)	0.48 (12.19)
L	0.665 (16.89) BSC	
N	-	0.83 (21.08)
Q	0.151 (3.84)	0.165 (4.19)
U	1.187 (30.15) BSC	
V	0.131 (3.33)	0.188 (4.77)

Dimensions : Inches (Millimetres)

Pin Configuration

Pin 1. Base
2. Emitter
Collector (Case)

Part Number Table

Description	Part Number
Transistor, NPN, TO-3	2N6547