

# New Jersey Semi-Conductor Products, Inc.

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## SWITCHMODE SERIES NPN SILICON POWER TRANSISTORS

These devices are designed for high-voltage, high-speed, power switching inductive circuits where fall time is critical. They are particularly suited for 115 and 220 volt line operated SWITCHMODE applications such as:

- \* Switching Regulators
- \* PWM Inverters and Motor Controls
- \* Solenoid and Relay Drivers
- \* Deflection Circuits

### Specification Features-

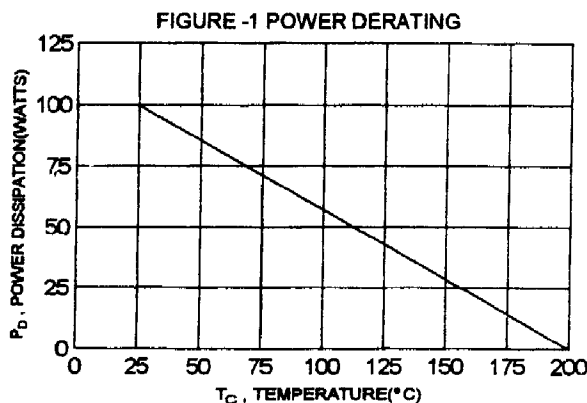
High Temperature Performance Specified for: Reversed Biased SOA with inductive loads  
 Switching Times with inductive Loads  
 Saturation Voltages, Leakage Currents.

### MAXIMUM RATINGS

Characteristic	Symbol	2N6542	2N6543	Unit
Collector-Emitter Voltage	$V_{CEO(sus)}$	300	400	V
Collector-Emitter Voltage	$V_{CEV}$	650	850	V
Collector-Base Voltage	$V_{EBC}$	8.0		V
Collector current - Continuous	$I_C$	5.0		A
- Peak	$I_{CM}$	10		
Base current - Continuous	$I_B$	5		A
Emitter current - Continuous	$I_E$	10		A
- Peak	$I_{EM}$	20		
Total Power Dissipation @ $T_C = 25^\circ C$	$P_D$	100		W
Derate above $25^\circ C$		0.57		W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +200		$^\circ C$

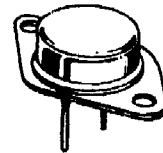
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.75	$^\circ C/W$

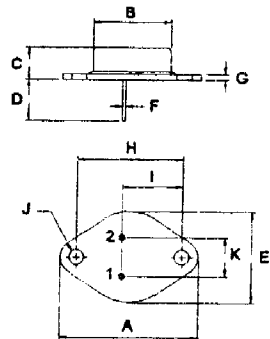


**NPN**  
**2N6542**  
**2N6543**

**5 AMPERE**  
**NPN SILICON**  
**POWER TRANSISTORS**  
**300 - 400 VOLTS**  
**100 WATTS**



**TO-3**



PIN 1. BASE  
 2. EMITTER  
 COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	28.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

2N6542, 2N6543 NPN

ELECTRICAL CHARACTERISTICS (  $T_c = 25^\circ\text{C}$  unless otherwise noted )

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector - Emitter Sustaining Voltage (1) ( $I_C = 100 \text{ mA}$ , $I_B = 0$ )	2N6542 2N6543	$V_{CE(sus)}$	300 400	V
Collector Cutoff Current ( $V_{CEV} = 650 \text{ V}$ , $V_{BE(off)} = 1.5 \text{ V}$ ) ( $V_{CEV} = 850 \text{ V}$ , $V_{BE(off)} = 1.5 \text{ V}$ ) ( $V_{CEV} = 650 \text{ V}$ , $V_{BE(off)} = 1.5 \text{ V}$ , $T_c = 100^\circ\text{C}$ ) ( $V_{CEV} = 850 \text{ V}$ , $V_{BE(off)} = 1.5 \text{ V}$ , $T_c = 100^\circ\text{C}$ )	2N6542 2N6543 2N6542 2N6543	$I_{CEV}$	0.5 0.5 3.0 3.0	mA
Emitter Cutoff Current ( $V_{EB} = 8.0 \text{ V}$ , $I_C = 0$ )		$I_{EBO}$	1.0	mA

ON CHARACTERISTICS(1)

DC Current Gain ( $I_C = 1.5 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_C = 3.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ )		hFE	12 7.0	60 35	
Collector-Emitter Saturation Voltage ( $I_C = 3.0 \text{ A}$ , $I_B = 0.6 \text{ A}$ ) ( $I_C = 5.0 \text{ A}$ , $I_B = 1.0 \text{ A}$ )		$V_{CE(sat)}$		1.0 5.0	V
Base-Emitter Saturation Voltage ( $I_C = 3.0 \text{ A}$ , $I_B = 0.6 \text{ A}$ )		$V_{BE(sat)}$		1.4	V

DYNAMIC CHARACTERISTICS

Current Gain Bandwidth (2) ( $I_C = 200 \text{ mA}$ , $V_{CE} = 10 \text{ V}$ , $f = 1.0 \text{ MHz}$ )		$f_T$	6.0	35	MHz
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SWITCHING CHARACTERISTICS

Delay Time	$V_{CC} = 250 \text{ V}$ $I_C = 3.0 \text{ A}$ $I_{B1} = I_{B2} = 0.6 \text{ A}$ $t_p = 0.1 \text{ ms}$ Duty Cycle $\leq 2.0\%$	$t_d$		0.05	us
Rise Time		$t_r$		0.7	us
Storage Time		$t_s$		4.0	us
Fall Time		$t_f$		0.8	us

(1) Pulse Test: Pulse width = 300 us , Duty Cycle  $\leq 2.0\%$

(2)  $f_T = |h_{r_o}| \cdot f_{test}$