



**TO-220F Plastic-Encapsulate Transistors**

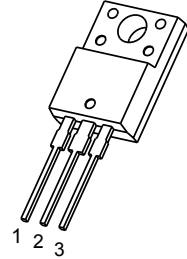
**2SD2137** TRANSISTOR (NPN)

**FEATURES**

- High Forward Current Transfer Ratio  $h_{FE}$  which Has Satisfactory Linearity
- Low Collector to Emitter Saturation Voltage  $V_{CE(sat)}$
- Allowing Supply with the Radial Taping

**TO-220F**

1. BASE
2. COLLECTOR
3. EMITTER



**MAXIMUM RATINGS** ( $T_a=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage	60	V
$V_{CEO}$	Collector-Emitter Voltage	60	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current -Continuous	3	A
$P_C$	Collector Power Dissipation	2	W
$T_J, T_{stg}$	Operation Junction and Storage Temperature Range	-55-150	$^\circ\text{C}$

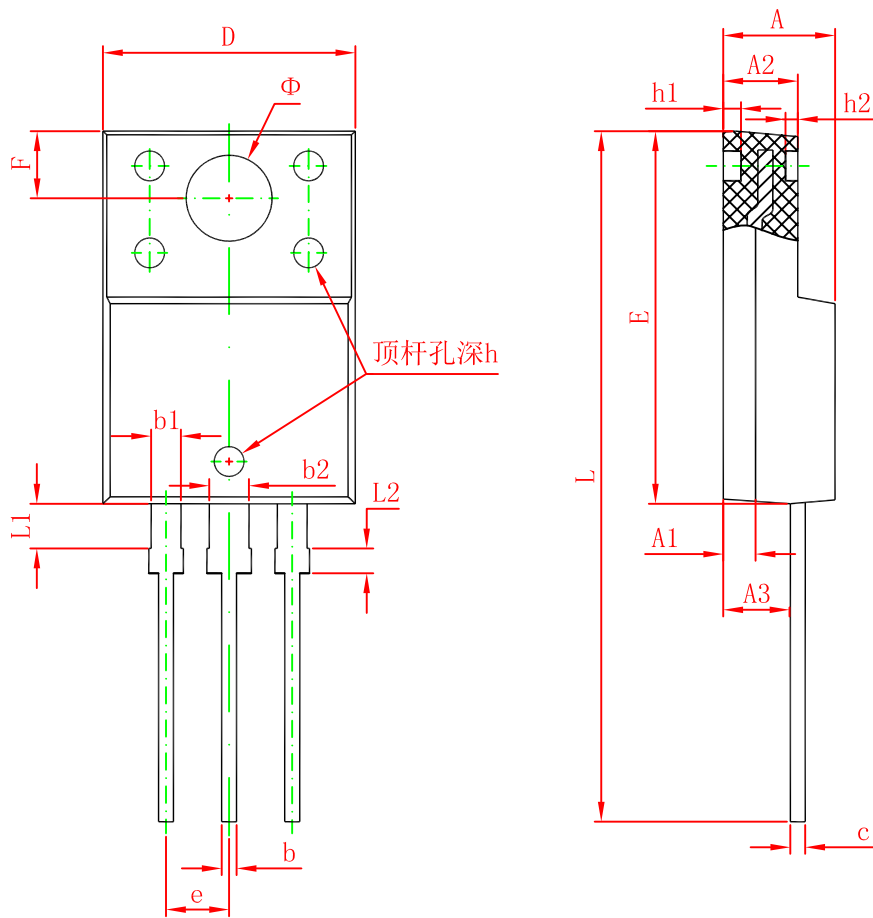
**ELECTRICAL CHARACTERISTICS** ( $T_a=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C=0.1\text{mA}, I_E=0$	60			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C=30\text{mA}, I_B=0$	60			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=0.1\text{mA}, I_C=0$	6			V
Collector cut-off current	$I_{CBO}$	$V_{CB}=60\text{V}, I_E=0$			100	$\mu\text{A}$
Collector cut-off current	$I_{CEO}$	$V_{CE}=30\text{V}, I_B=0$			100	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=6\text{V}, I_C=0$			100	$\mu\text{A}$
DC current gain	$h_{FE(1)}$	$V_{CE}=4\text{V}, I_C=1\text{A}$	70		320	
	$h_{FE(2)}$	$V_{CE}=4\text{V}, I_C=3\text{A}$	10			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=3\text{A}, I_B=375\text{mA}$			1.2	V
Base-emitter voltage	$V_{BE}$	$V_{CE}=4\text{V}, I_C=3\text{A}$			1.8	V
Transition frequency	$f_T$	$V_{CE}=5\text{V}, I_C=0.2\text{A}, f=10\text{MHz}$		30		MHz
Switch time	Turn-on time	$V_{CC}=50\text{V}, I_C=1\text{A}, I_{B1}=-I_{B2}=0.1\text{A}$		0.3		$\mu\text{s}$
	Storage time			2.5		$\mu\text{s}$
	Fall time			0.2		$\mu\text{s}$

**CLASSIFICATION OF  $h_{FE(1)}$**

Rank	Q	P	O
Range	70-150	120-250	160-320

# TO-220F Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP.		0.100 TYP.	
F	2.700 REF.		0.106 REF.	
$\Phi$	3.500 REF.		0.138 REF.	
h	0.000	0.300	0.000	0.012
h1	0.800 REF.		0.031 REF.	
h2	0.500 REF.		0.020 REF.	
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	0.900	1.100	0.035	0.043