

## NPN SILICON POWER TRANSISTOR

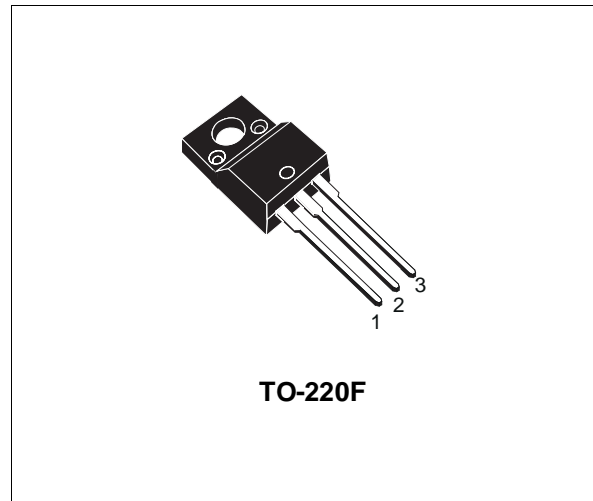
- HIGH DC CURRENT GAIN
- LOW SATURATION VOLTAGE
- INSULATED PACKAGE FOR EASY MOUNTING

### APPLICATIONS

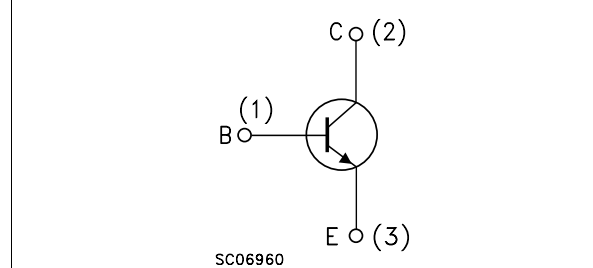
- GENERAL PURPOSE POWER AMPLIFIERS
- GENERAL PURPOSE SWITCHING

### DESCRIPTION

The 2SD2012 is a silicon NPN power transistor housed in TO-220F insulated package. It is intended for power linear and switching applications.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	60	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	60	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	3	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	6	A
$I_B$	Base Current	0.5	A
$P_{tot}$	Total Dissipation at $T_c \leq 25$ °C	25	W
$V_{isol}$	Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink	1500	V
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

**THERMAL DATA**

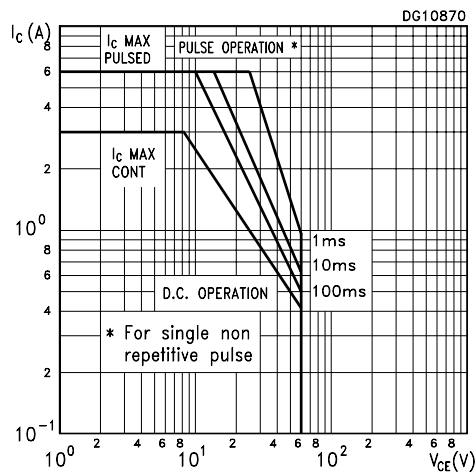
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	5	°C/W
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**ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

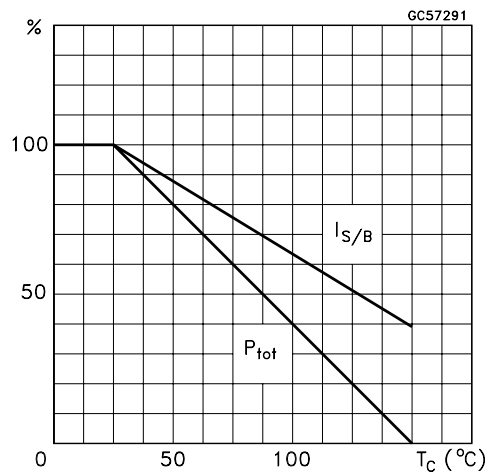
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 60 V			100	μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 7 V			100	μA
V <sub>(BR)CEO</sub> *	Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 50 mA	60			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 2 A      I <sub>B</sub> = 0.2 A		0.4	1	V
V <sub>BE</sub> *	Base-Emitter Voltage	I <sub>C</sub> = 0.5 A      V <sub>CE</sub> = 5 V		0.75	1	V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 0.5 A      V <sub>CE</sub> = 5 V I <sub>C</sub> = 2 A      V <sub>CE</sub> = 5 V	100 20		320	
f <sub>T</sub>	Transition frequency	V <sub>CE</sub> = 5 V      I <sub>C</sub> = 0.5 A		3		MHz
C <sub>CB0</sub>	Collector-Base Capacitance	V <sub>CB</sub> = 10 V    I <sub>E</sub> = 0      f = 1 MHz		35		pF

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

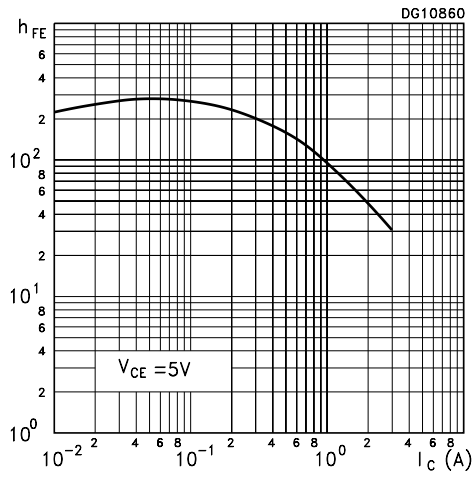
**Safe Operating Area**



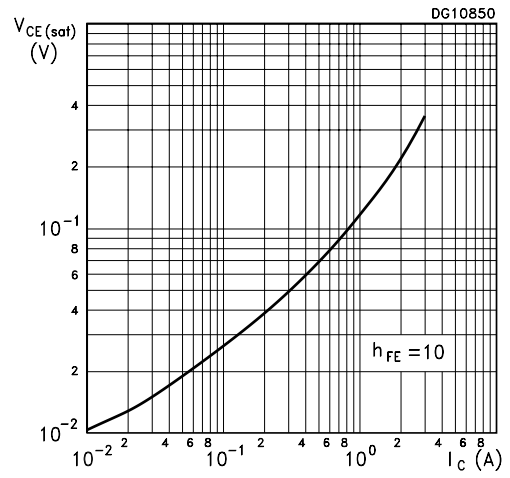
**Derating Curve**



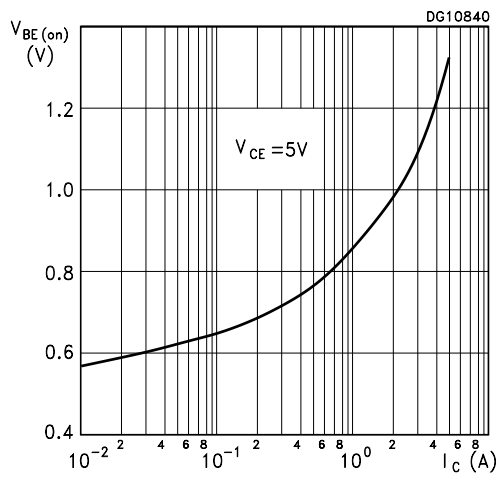
DC Current Gain



Collector Emitter Saturation Voltage

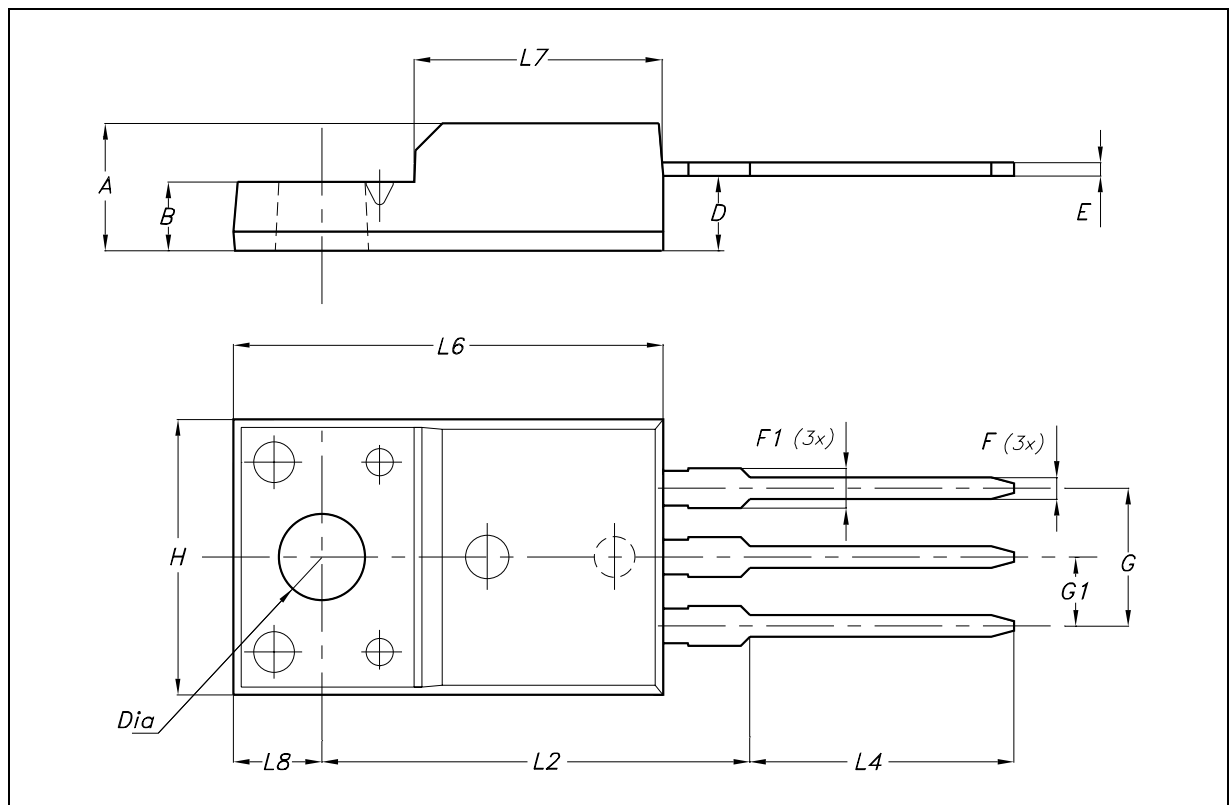


Base Emitter On Voltage



**TO-220F MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.50		4.90	0.177		0.193
B	2.34		2.74	0.092		0.108
D	2.56		2.96	0.101		0.117
E	0.45	0.50	0.60	0.018	0.020	0.024
F	0.70		0.90	0.028		0.035
F1			1.47			0.058
G		5.08			0.200	
G1	2.34	2.54	2.74	0.092	0.100	0.108
H	9.96		10.36	0.392		0.408
L2		15.80			0.622	
L4	9.45		10.05	0.372		0.396
L6	15.67		16.07	0.617		0.633
L7	8.99		9.39	0.354		0.370
L8		3.30			0.130	
Dia	3.08		3.28	0.121		0.129



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