

# KSC5305DF

## NPN Silicon Transistor

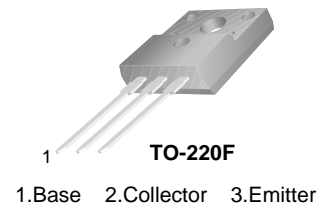
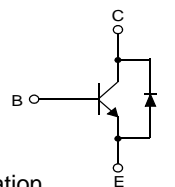
### Features

- High Voltage High Speed Power Switch

### Application

- Built-in Free-wheeling Diode makes efficient anti saturation operation
- Suitable for half bridge light ballast Applications
- No need to interest an  $h_{FE}$  value because of low variable storage-time spread even though corner spirit product
- Low base drive requirement

Equivalent Circuit



### Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector Base Voltage	800	V
$V_{CEO}$	Collector Emitter Voltage	400	V
$V_{EBO}$	Emitter Base Voltage	12	V
$I_C$	Collector Current (DC)	5	A
$I_{CP}$	*Collector Current (Pulse)	10	A
$I_B$	Base Current (DC)	2	A
$I_{BP}$	*Base Current (Pulse)	4	A
$P_C$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	40	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature range	-65 to +150	$^\circ\text{C}$

### Thermal Characteristics

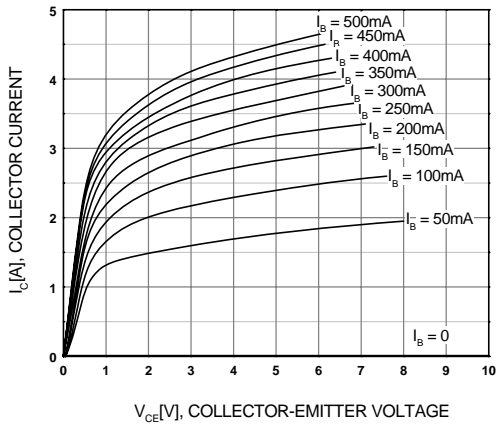
Symbol	Parameter	Rating	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.125	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	69.5	$^\circ\text{C/W}$

**Electrical Characteristics**  $T_A=25^\circ\text{C}$  unless otherwise noted

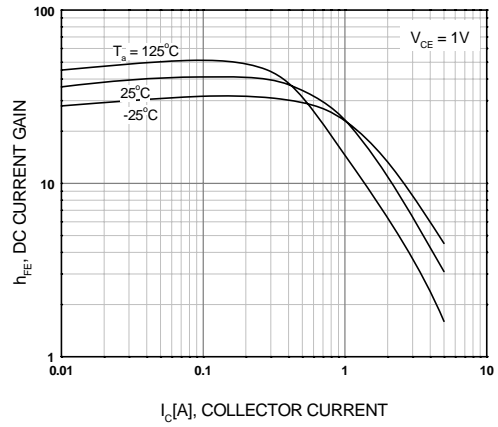
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C=1\text{mA}, I_E=0$	800	-	-	V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C=5\text{mA}, I_B=0$	400	-	-	V
$BV_{EBO}$	Emitter Cut-off Current	$I_E=1\text{mA}, I_C=0$	12	-	-	V
$I_{CBO}$	Collector Cut-off Current	$V_{CB}=500\text{V}, I_E=0$	-	-	10	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 9\text{V}, I_C = 0$	-	-	10	$\mu\text{A}$
$h_{FE1}$ $h_{FE2}$	DC Current Gain	$V_{CE}=1\text{V}, I_C=0.8\text{A}$ $V_{CE}=1\text{V}, I_C=2\text{A}$	22 8	- -	- -	
$V_{CE}(\text{sat})$	Collector-Emitter Saturation Voltage	$I_C=0.8\text{A}, I_B=0.08\text{A}$ $I_C=2\text{A}, I_B=0.4\text{A}$	- -	- -	0.4 0.5	V V
$V_{BE}(\text{sat})$	Base-Emitter Saturation Voltage	$I_C=0.8\text{A}, I_B=0.08\text{A}$ $I_C=2\text{A}, I_B=0.4\text{A}$	- -	- -	1.0 1.0	V V
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{V}, f=1\text{MHz}$	-	-	75	pF
$t_{ON}$	Turn On Time	$V_{CC}=300\text{V}, I_C=2\text{A}$ $I_{B1} = 0.4\text{A}, I_{B2}=-1\text{A}$ $R_L = 150\Omega$	-	-	150	ns
$t_{STG}$	Storage Time		-	-	2	$\mu\text{s}$
$t_F$	Fall Time		-	-	0.2	$\mu\text{s}$
$t_{STG}$	Storage Time	$V_{CC}=15\text{V}, V_Z=300\text{V}$ $I_C = 2\text{A}, I_{B1} = 0.4\text{A}$ $I_{B2} = -0.4\text{A}, L_C=200\mu\text{H}$	-	-	2.25	$\mu\text{s}$
$t_F$	Fall Time		-	-	150	ns
$V_F$	Diode Forward Voltage	$I_F = 1\text{A}$ $I_F = 2\text{A}$	- -	- -	1.5 1.6	V V
$t_{rr}$	* Reverse recovery time ( $di/dt = 10\text{A}/\mu\text{s}$ )	$I_F = 0.4\text{A}$ $I_F = 1\text{A}$ $I_F = 2\text{A}$	- - -	800 1.4 1.9	- - -	ns $\mu\text{s}$ $\mu\text{s}$

\* Pulse Test : Pulse Width=5mS, Duty cycles  $\leq 10\%$

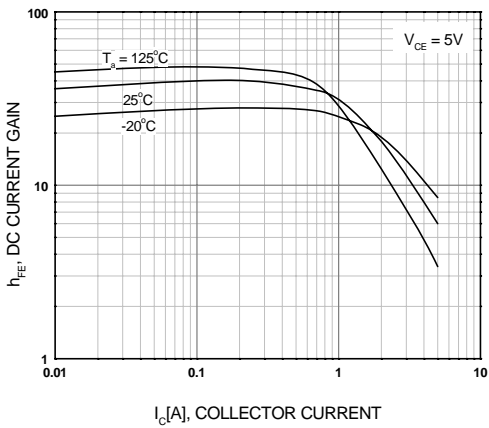
## Typical Performance Characteristics



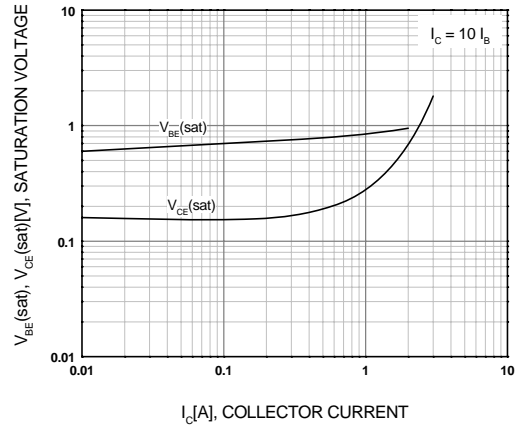
**Figure 1. Static Characteristic**



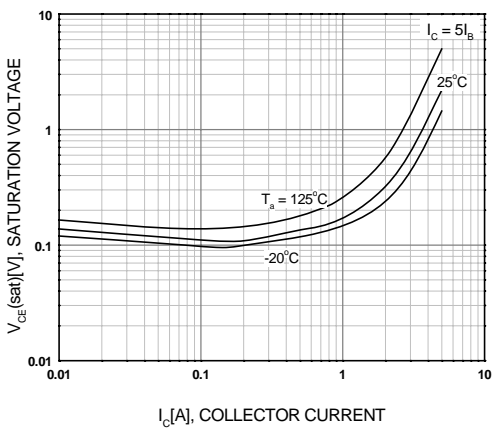
**Figure 2. DC current Gain**



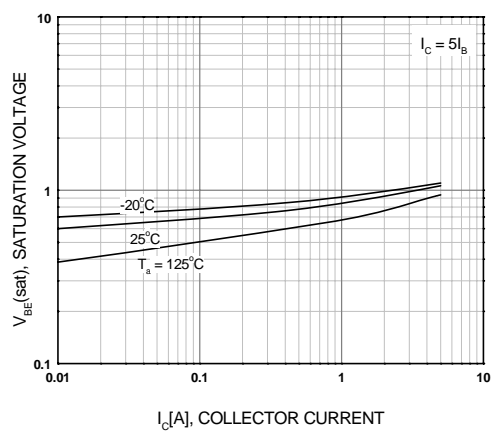
**Figure 3. DC current Gain**



**Figure 4. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage**



**Figure 5. Collector-Emitter Saturation Voltage**



**Figure 6. Base-Emitter Saturation Voltage**

Typical Performance Characteristics

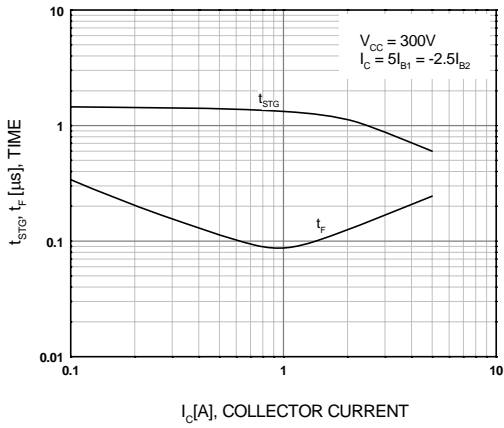


Figure 7. Switching Time

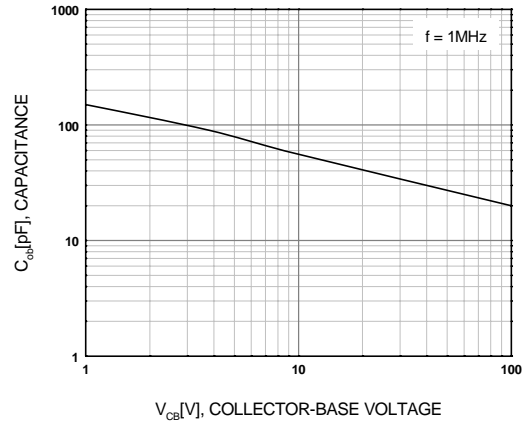


Figure 8. Collector Output Capacitance

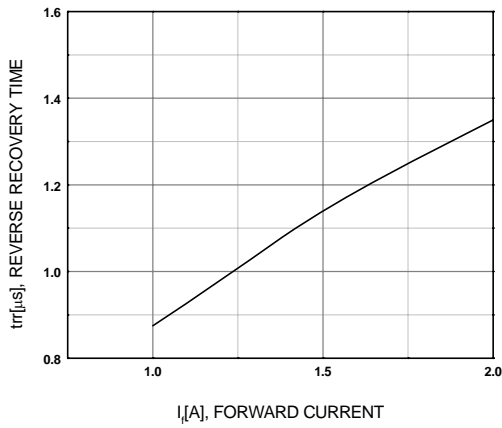


Figure 9. Reverse Recovery Time

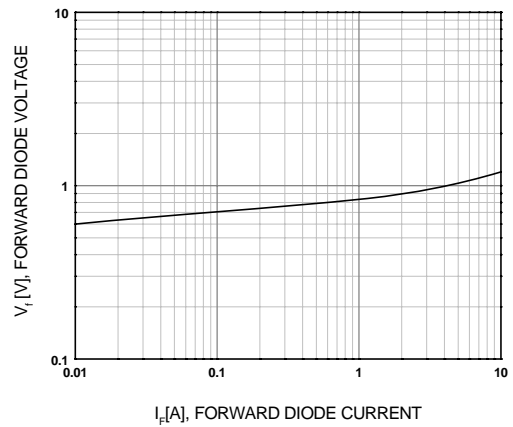


Figure 10. Forward Diode Voltage

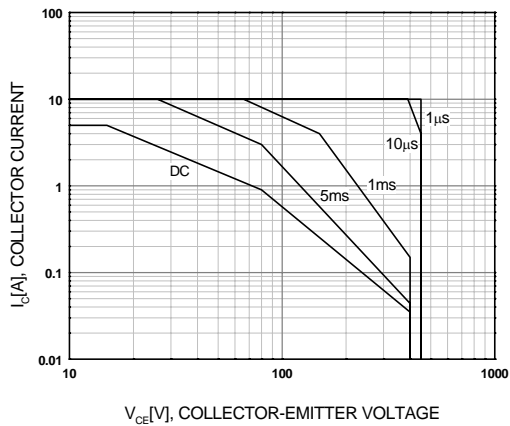


Figure 11. Safe Operating Area

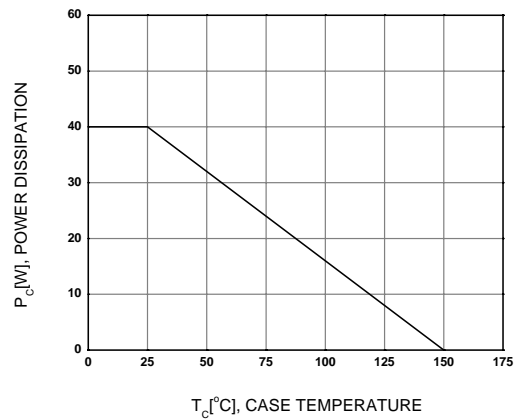
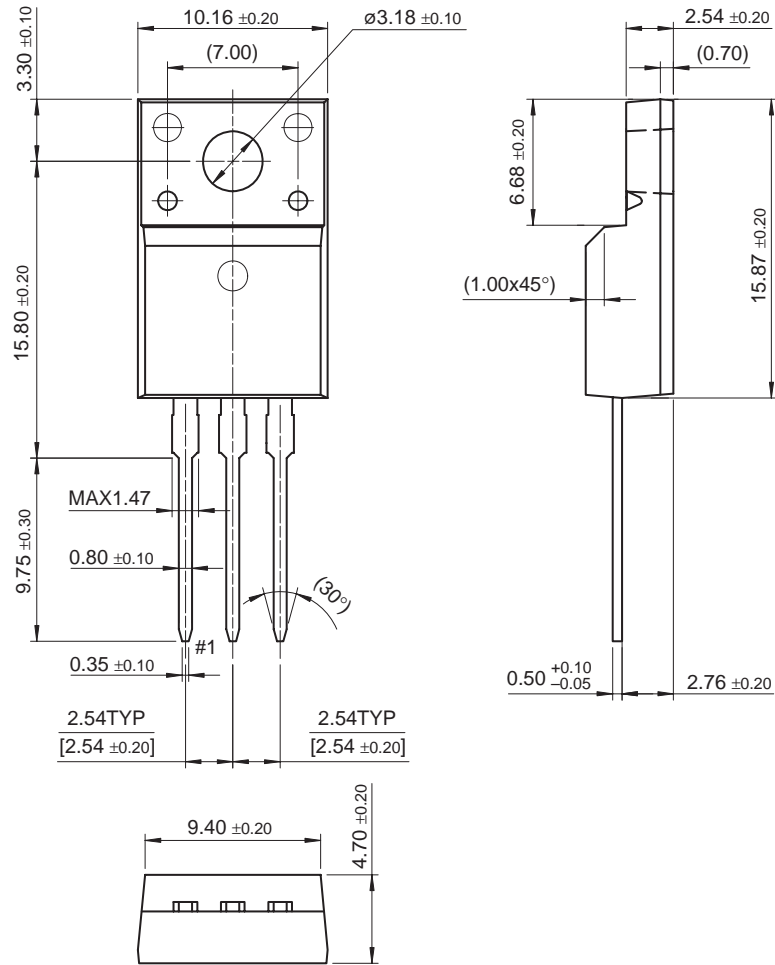


Figure 12. Power Derating

Physical Dimension

TO-220F









Dimensions in Millimeters



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