

# KSC5305DF

## NPN Silicon Transistor

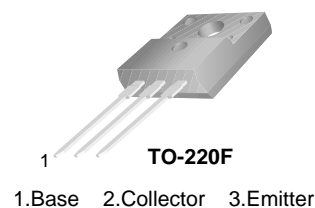
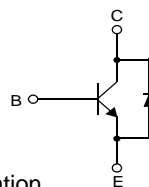
### Features

- 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

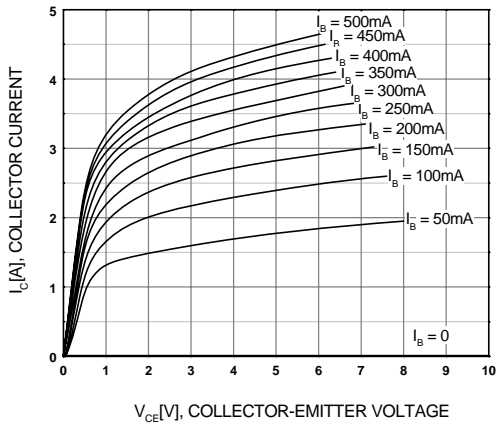


Figure 1. Static Characteristic

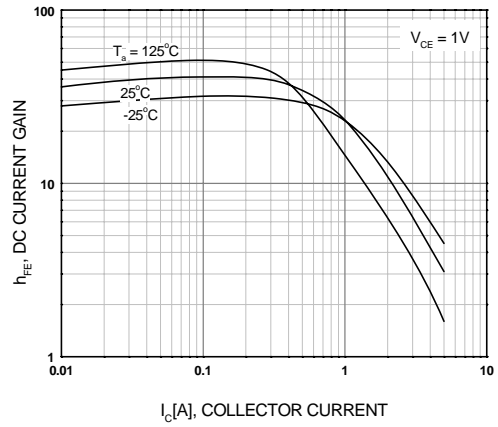


Figure 2. DC current Gain

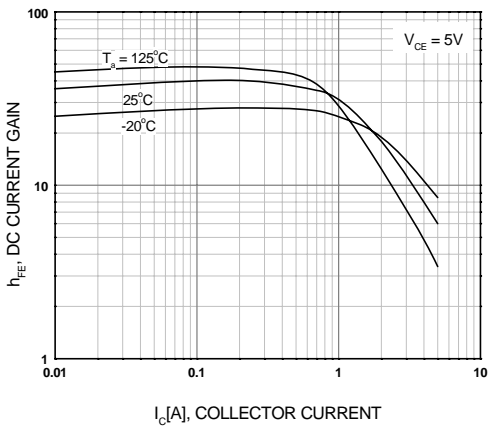


Figure 3. DC current Gain

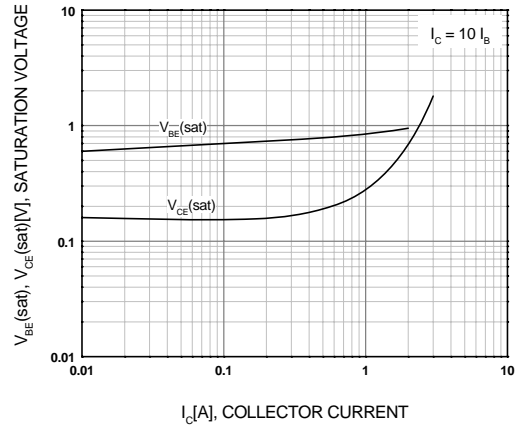


Figure 4. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

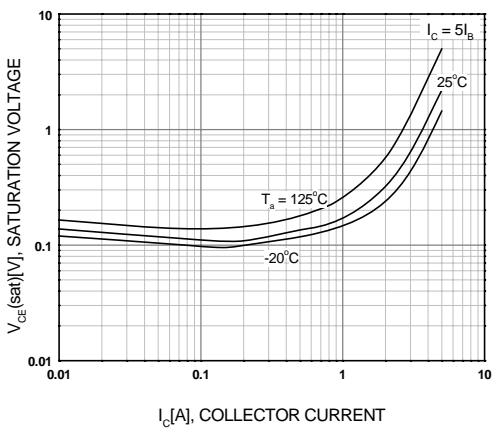


Figure 5. Collector-Emitter Saturation Voltage

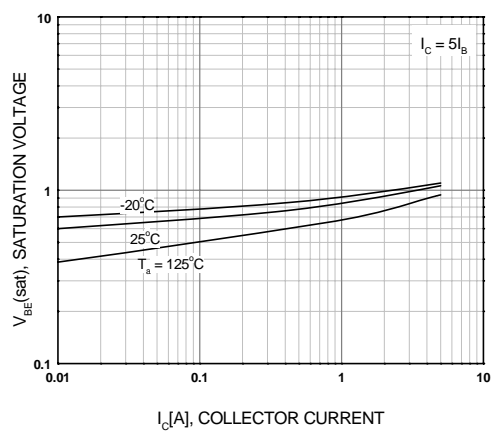
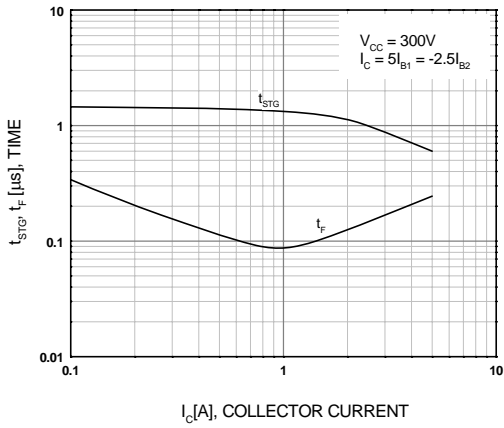
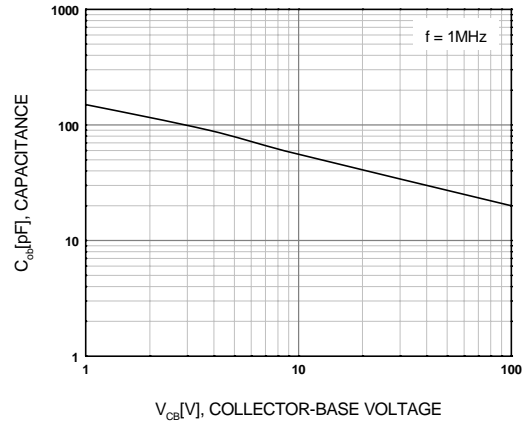


Figure 6. Base-Emitter Saturation Voltage

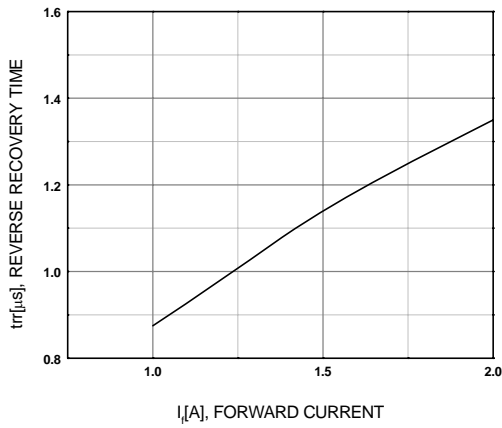
## Typical Performance Characteristics



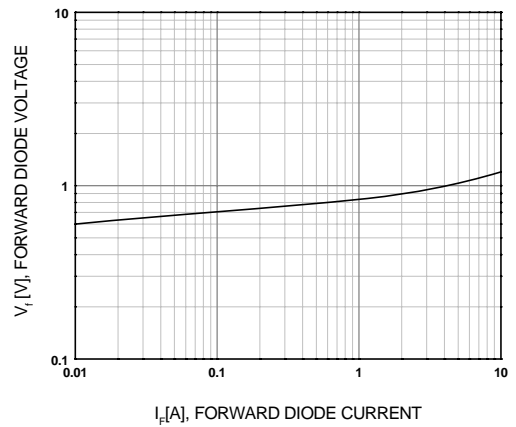
**Figure 7. Switching Time**



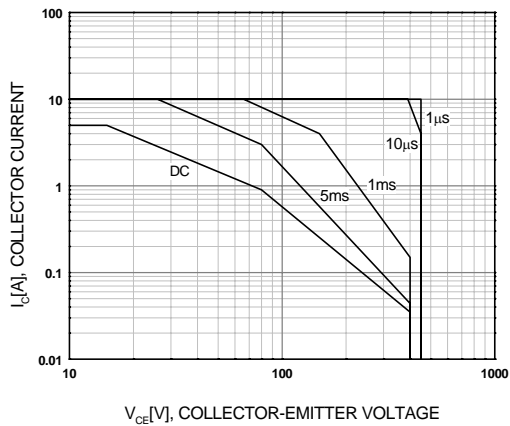
**Figure 8. Collector Output Capacitance**



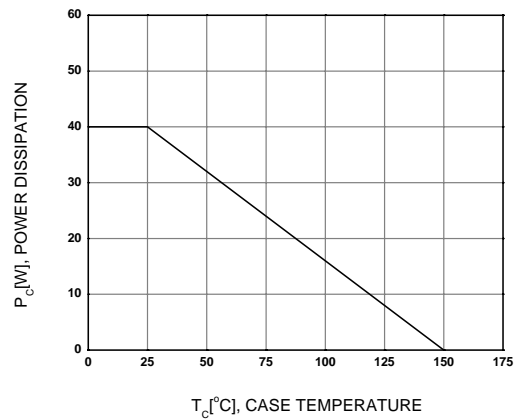
**Figure 9. Reverse Recovery Time**



**Figure 10. Forward Diode Voltage**



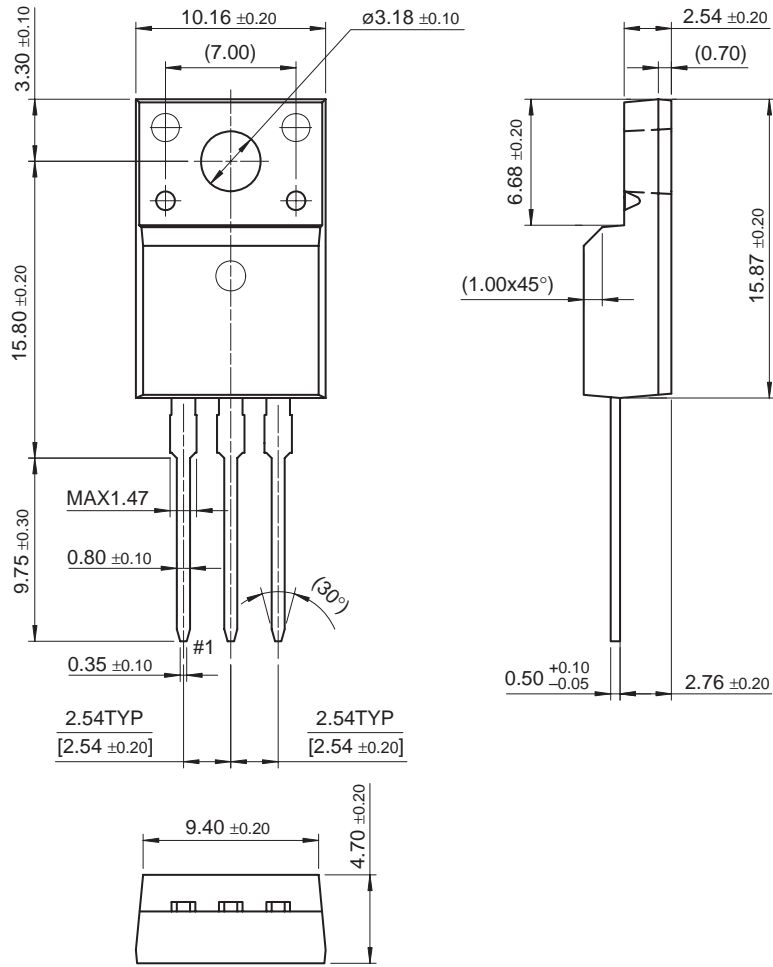
**Figure 11. Safe Operating Area**



**Figure 12. Power Derating**

Physical Dimension

TO-220F









Dimensions in Millimeters



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