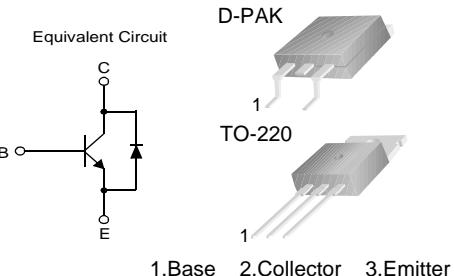




KSC5502D/KSC5502DT

High Voltage Power Switch Switching Application

- Wide Safe Operating Area
- Built-in Free-Wheeling Diode
- Suitable for Electronic Ballast Application
- Small Variance in Storage Time
- Two Package Choices : D-PAK or TO-220



NPN Triple Diffused Planar Silicon Transistor

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

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	1200	V
V_{CEO}	Collector-Emitter Voltage	600	V
V_{EBO}	Emitter-Base Voltage	12	V
I_C	Collector Current (DC)	2	A
I_{CP}	*Collector Current (Pulse)	4	A
I_B	Base Current (DC)	1	A
I_{BP}	*Base Current (Pulse)	2	A
P_C	Collector Dissipation ($T_C=25^\circ\text{C}$)	50	W
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature	- 65 ~ 150	$^\circ\text{C}$
EAS	Avalanche Energy($T_J=25^\circ\text{C}$)	2.5	mJ

* Pulse Test : Pulse Width = 5ms, Duty Cycle $\leq 10\%$

Thermal Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Characteristics		Rating	Unit
$R_{\theta JC}$	Thermal Resistance	Junction to Case	2.5	$^\circ\text{C/W}$
$R_{\theta JA}$		Junction to Ambient	62.5	
T_L	Maximum Lead Temperature for Soldering Purpose : 1/8" from Case for 5 seconds		270	$^\circ\text{C}$

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

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Units
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C=1\text{mA}, I_E=0$		1200	1350		V
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C=5\text{mA}, I_B=0$		600	750		V
BV_{EBO}	Emitter-Base Breakdown Voltage	$I_E=500\mu\text{A}, I_C=0$		12	13.7		V
I_{CES}	Collector Cut-off Current	$V_{CE}=1200\text{V}, V_{BE}=0$	$T_C=25^\circ\text{C}$		100		μA
			$T_C=125^\circ\text{C}$		500		
I_{CEO}	Collector Cut-off Current	$V_{CE}=600\text{V}, I_B=0$	$T_C=25^\circ\text{C}$		100		μA
			$T_C=125^\circ\text{C}$		500		
I_{EBO}	Emitter Cut-off Current	$V_{EB}=12\text{V}, I_C=0$	$T_C=25^\circ\text{C}$		10		μA
h_{FE}	DC Current Gain	$V_{CE}=1\text{V}, I_C=0.2\text{A}$	$T_C=25^\circ\text{C}$	15	28	40	
			$T_C=125^\circ\text{C}$	8	18		
		$V_{CE}=1\text{V}, I_C=1\text{A}$	$T_C=25^\circ\text{C}$	4	6.4		
			$T_C=125^\circ\text{C}$	3	4.7		
		$V_{CE}=2.5\text{V}, I_C=0.5\text{A}$	$T_C=25^\circ\text{C}$	12	20	30	
			$T_C=125^\circ\text{C}$	6	12		
$V_{CE(\text{sat})}$	Collector-Emitter Saturation Voltage	$I_C=0.2\text{A}, I_B=0.02\text{A}$	$T_C=25^\circ\text{C}$		0.31	0.8	V
			$T_C=125^\circ\text{C}$		0.54	1.1	V
		$I_C=0.4\text{A}, I_B=0.08\text{A}$	$T_C=25^\circ\text{C}$		0.15	0.6	V
			$T_C=125^\circ\text{C}$		0.23	1.0	V
		$I_C=1\text{A}, I_B=0.2\text{A}$	$T_C=25^\circ\text{C}$		0.40	1.5	V
			$T_C=125^\circ\text{C}$		1.3	3.0	V
$V_{BE(\text{sat})}$	Base-Emitter Saturation Voltage	$I_C=0.4\text{A}, I_B=0.08\text{A}$	$T_C=25^\circ\text{C}$		0.77	1.0	V
			$T_C=125^\circ\text{C}$		0.60	0.9	V
		$I_C=1\text{A}, I_B=0.2\text{A}$	$T_C=25^\circ\text{C}$		0.83	1.2	V
			$T_C=125^\circ\text{C}$		0.70	1.0	V
C_{ib}	Input Capacitance	$V_{EB}=8\text{V}, I_C=0, f=1\text{MHz}$			385	500	pF
C_{ob}	Output Capacitance	$V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$			60	100	pF
f_T	Current Gain Bandwidth Product	$I_C=0.5\text{A}, V_{CE}=10\text{V}$			11		MHz
V_F	Diode Forward Voltage	$I_F=0.2\text{A}$	$T_C=25^\circ\text{C}$		0.75	1.2	V
			$T_C=125^\circ\text{C}$		0.59		V
		$I_F=0.4\text{A}$	$T_C=25^\circ\text{C}$		0.80	1.3	V
			$T_C=125^\circ\text{C}$		0.64		V
		$I_F=1\text{A}$	$T_C=25^\circ\text{C}$		0.9	1.5	V

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

Symbol	Parameter	Test Condition		Min	Typ.	Max.	Units
t_{fr}	Diode Froward Recovery Time ($\text{di}/\text{dt}=10\text{A}/\mu\text{s}$)	$I_F=0.2\text{A}$ $I_F=0.4\text{A}$ $I_F=1\text{A}$		650 740 785			ns ns ns
$V_{CE}(\text{DSAT})$	Dynamic Saturation Voltage	$I_C=0.4\text{A}$, $I_{B1}=80\text{mA}$ $V_{CC}=300\text{V}$	@ 1 μs		7.2		V
			@ 3 μs		1.8		V
		$I_C=1\text{A}$, $I_{B1}=200\text{mA}$ $V_{CC}=300\text{V}$	@ 1 μs		18		V
			@ 3 μs		6		V
RESISTIVE LOAD SWITCHING (D.C $\leq 10\%$, Pulse Width=20s)							
t_{ON}	Turn On Time	$I_C=0.4\text{A}$, $I_{B1}=80\text{mA}$ $I_{B2}=0.2\text{A}$, $V_{CC}=300\text{V}$ $R_L = 750\Omega$	$T_C=25^\circ\text{C}$		175	350	ns
			$T_C=125^\circ\text{C}$		185		ns
t_{OFF}	Turn Off Time	$I_C=1\text{A}$, $I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA}$, $V_{CC}=300\text{V}$ $R_L = 300\Omega$	$T_C=25^\circ\text{C}$		2.1	3.0	μs
			$T_C=125^\circ\text{C}$		2.6		μs
t_{ON}	Turn On Time	$I_C=1\text{A}$, $I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA}$, $V_{CC}=300\text{V}$ $R_L = 300\Omega$	$T_C=25^\circ\text{C}$		240	450	ns
			$T_C=125^\circ\text{C}$		310		ns
t_{OFF}	Turn Off Time	$I_C=1\text{A}$, $I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA}$, $V_{CC}=300\text{V}$ $R_L = 300\Omega$	$T_C=25^\circ\text{C}$		3.7	5.0	μs
			$T_C=125^\circ\text{C}$		4.5		μs
INDUCTIVE LOAD SWITCHING ($V_{CC}=15\text{V}$)							
t_{STG}	Storage Time	$I_C=0.4\text{A}$, $I_{B1}=80\text{mA}$ $I_{B2}=0.2\text{A}$, $V_Z=300\text{V}$ $L_C=200\text{H}$	$T_C=25^\circ\text{C}$		1.2	2.0	μs
			$T_C=125^\circ\text{C}$		1.5		μs
t_F	Fall Time	$I_C=0.4\text{A}$, $I_{B1}=80\text{mA}$ $I_{B2}=0.2\text{A}$, $V_Z=300\text{V}$ $L_C=200\text{H}$	$T_C=25^\circ\text{C}$		90	200	ns
			$T_C=125^\circ\text{C}$		65		ns
t_C	Cross-over Time	$I_C=0.4\text{A}$, $I_{B1}=80\text{mA}$ $I_{B2}=0.2\text{A}$, $V_Z=300\text{V}$ $L_C=200\text{H}$	$T_C=25^\circ\text{C}$		185	350	ns
			$T_C=125^\circ\text{C}$		145		ns
t_{STG}	Storage Time	$I_C=0.8\text{A}$, $I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA}$, $V_{CC}=300\text{V}$ $L_C=200\text{H}$	$T_C=25^\circ\text{C}$		3.3	4.5	μs
			$T_C=125^\circ\text{C}$		3.75		μs
t_F	Fall Time	$I_C=0.8\text{A}$, $I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA}$, $V_{CC}=300\text{V}$ $L_C=200\text{H}$	$T_C=25^\circ\text{C}$		90	250	ns
			$T_C=125^\circ\text{C}$		160		ns
t_C	Cross-over Time	$I_C=0.8\text{A}$, $I_{B1}=160\text{mA}$ $I_{B2}=160\text{mA}$, $V_{CC}=300\text{V}$ $L_C=200\text{H}$	$T_C=25^\circ\text{C}$		300	600	ns
			$T_C=125^\circ\text{C}$		570		ns