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NTE239 Silicon Controlled Switch (SCS)

Description:

The NTE239 is a silicon controlled switch in a TO72 type package designed for use as a driver for a numerical indicator tube and switching applications.

Features:

- Selective Breakover Voltage
- Low ON Voltage

Absolute Maximum Ratings: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Collector-Base Voltage (Open Emitter), V_{CBO}		
NPN	.....	70V
PNP	.....	-70V
Collector-Emitter Voltage (NPN Only, $R_{BE} = 10k\Omega$), V_{CER}		70V
Collector-Emitter Voltage (PNP Only, Open Base), V_{CEO}		-70V
Emitter-Base Voltage (Open Collector), V_{EBO}		
NPN	.....	5V
PNP	.....	-70V
DC Collector Current (NPN Only), I_C		
Continuous (Note 1)	.....	175mA
Peak (Note 2)	.....	175mA
Emitter Current, I_E		
NPN	.....	-175mA
PNP	.....	175mA
Peak Emitter Current ($t_p \leq 10\mu\text{s}$, $\delta = 0.01$), I_{EM}		
NPN	.....	-2.5A
PNP	.....	2.5A
Total Power Dissipation ($T_A \leq +25^\circ\text{C}$), P_D		275mW
Operating Junction Temperature, T_J		+150°C
Ambient Operating Temperature Range, T_A		-65° to +150°C
Storage Temperature Range, T_{stg}		-65° to +200°C
Thermal Resistance, Junction-to-Ambient, R_{thJA}		450K/W

Note 1. Provided the I_E rating is not exceeded.

Note 2. During switching on, the device can withstand the discharge of a capacitor o a maximum value of 500pF. This capacitor is charged when the transistor is in cut-off condition, with a collector supply voltage of 160V an a serise resistance of 100kΩ.

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Individual NPN Transistor						
Collector Cutoff Current	I_{CER}	$V_{CE} = 70V, R_{BE} = 10k\Omega$	-	-	100	nA
		$V_{CE} = 70V, R_{BE} = 10k\Omega, T_J = +150^\circ\text{C}$	-	-	10	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 5V, I_C = 0, T_J = +150^\circ\text{C}$	-	-	10	μA

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Individual NPN Transistor (Cont'd)						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	-	500	mV
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	-	900	mV
DC Current Gain	h_{FE}	$V_{CE} = 2\text{V}, I_C = 10\text{mA}$	50	-	-	
Transition Frequency	f_T	$V_{CE} = 2\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$	100	-	-	MHz
Collector Capacitance	C_c	$V_{CB} = 20\text{V}, I_E = I_c = 0$	-	-	5	pF
Emitter Capacitance	C_e	$V_{EB} = 1\text{V}, I_C = I_c = 0$	-	-	25	pF
Individual PNP Transistor						
Collector Cutoff Current	I_{CEO}	$-V_{CE} = 70\text{V}, I_B = 0, T_J = +150^\circ\text{C}$	-	-	-10	μA
Emitter Cutoff Current	$-I_{EBO}$	$-V_{EB} = 70\text{V}, I_C = 0, T_J = +150^\circ\text{C}$	-	-	-10	μA
DC Current Gain	h_{FE}	$-V_{CB} = 5\text{V}, I_E = 1\text{mA}$	3	-	15	
Combined Device						
Forward On-State Voltage	V_{AK}	$I_A = 50\text{mA}, I_{AG} = 0, R_{KG-K} = 10\text{k}\Omega$	-	-	1.4	V
		$I_A = 50\text{mA}, I_{AG} = 0, R_{KG-K} = 10\text{k}\Omega, T_J = -55^\circ\text{C}$	-	-	1.9	V
		$I_A = 1\text{mA}, I_{AG} = 10\text{mA}, R_{KG-K} = 10\text{k}\Omega$	-	-	1.2	V
Holding Current	I_H	$V_{BB} = -2\text{V}, I_{AG} = 0, R_{KG-K} = 10\text{k}\Omega$	-	-	1.0	mA
Switching Times						
Turn-On Time	t_{on}	$V_{KG-K} = -0.5 \text{ to } 4.5\text{V}, R_{KG-K} = 1\text{k}\Omega$	-	-	0.25	μs
		$V_{KG-K} = -0.5 \text{ to } 0.5\text{V}, R_{KG-K} = 10\text{k}\Omega$	-	-	1.5	μs
Turn-Off Time	t_{off}	$R_{KG-K} = 10\text{k}\Omega$	-	-	15	μs

