MD7021,F
MQ7021

MD7021
CASE 654-07, STYLE 5

MD7021F
CASE 610A-04, STYLE 1

MQ7021
CASE 607-04, STYLE 1

COMPLEMENTARY GENERAL PURPOSE TRANSISTOR

NPN/PNP SILICON

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MAXIMUM RATINGS

Rating	Symbol	Value		Unit
Collector-Emitter Voltage	V_{CEO}	40		Vdc
Collector-Base Voltage	V_{CBO}	50		Vdc
Emitter-Base Voltage	V_{EBO}	5.0		Vdc
Collector Current — Continuous	I_C	50		mAdc
		One Die	All Die Equal Power	
Total Device Dissipation @ T_A = 25°C	P_D			mW
MD7021		550	600	
MD7021F		350	400	
MQ7021		400	600	
Derate above 25°C				mW/°C
MD7021		3.14	3.42	
MD7021F		2.0	2.28	
MQ7021		2.28	3.42	
Total Device Dissipation @ T_C = 25°C	P_D			Watts
MD7021		1.4	2.0	
MD7021F		0.7	1.4	
MQ7021		0.7	2.8	
Derate above 25°C				mW/°C
MD7021		8.0	11.4	
MD7021F		4.0	8.0	
MQ7021		4.0	16	
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	One Die	All Die Equal Power	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$			°C/W
MD7021		125	87.5	
MD7021F		250	125	
MQ7021		250	62.6	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$(1)			°C/W
MD7021		319	292	
MD7021F		500	438	
MQ7021		438	292	
		Junction to Ambient	Junction to Case	
Coupling Factor				%
MD7021		83	40	
MD7021F		75	0	
MQ7021 (Q1-Q2)		57	0	
(Q1-Q3 or Q1-Q4)		55	0	

(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage(2) (I_C = 10 mAdc, I_B = 0)	$V_{(BR)CEO}$	40	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	50	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	$V_{(BR)EBO}$	5.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	—	—	100	nAdc
ON CHARACTERISTICS					
DC Current Gain	h_{FE}				—
(I_C = 100 μAdc, V_{CE} = 10 Vdc)		40	65	—	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)		50	70	—	

ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)(2)	$V_{CE(sat)}$	—	—	0.35	Vdc
Base-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)	$V_{BE(sat)}$	—	—	1.0	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 5.0 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	f_T	200	320	—	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)	C_{obo}	—	—	6.0	pF
Input Capacitance (V_{BE} = 2.0 Vdc, I_C = 0, f = 100 kHz)	C_{ibo}	—	—	8.0	pF
SWITCHING CHARACTERISTICS					
Turn-On Time (V_{CC} = 30 Vdc, $V_{BE(off)}$ = 0.5 Vdc, I_C = 150 mAdc, I_{B1} = 15 Adc)	t_{on}	—	28	—	ns
Turn-Off Time (V_{CC} = 30 Vdc, I_C = 150 mAdc, I_{B1} = I_{B2} = 15 mAdc)	t_{off}	—	72	—	ns

(2) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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