

MD2009DFP

High voltage NPN power transistor for CRT TV

Features

- State-of-the-art technology:
 - diffused collector "enhanced generation"
- Stable performance versus operating temperature variation
- Low base drive requirement
- Tight h_{FE} range at operating collector current
- Fully isolated power package UL compliant
- Integrated free wheeling diode

Application

Horizontal deflection output for CRT TV

Description

The MD2009DFP is manufactured using diffused collector in planar technology adopting new and enhanced high voltage structure. The new MD product series show improved silicon efficiency bringing updated performance to the horizontal deflection stage.

Table 1. Device summary

Order code	Marking	Package	Packaging
MD2009DFP	MD2009DFP	TO-220FP	Tube



Figure 1. Internal schematic diagram



1 Electrical ratings

-		
Table 2.	Absolute maximum rating	IS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V _{BE} = 0)	1500	V
V_{CEO}	Collector-emitter voltage (I _B = 0)	700	V
V_{EBO}	Base-emitter voltage (I _C = 0)	7	V
Ι _C	Collector current	10	А
I _{CM}	Collector peak current (t _P < 5ms) 16		А
Ι _Β	Base current 6		А
P _{TOT}	Total dissipation at $T_c = 25^{\circ}C$	40	W
V _{ISO}	Isolation withstand voltage (RMS) from all three 2500		v
T _{stg}	Storage temperature	-65 to 150 150	
Τ _J	Max. operating junction temperature		

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R _{thj-case}	Thermal resistance junction-case max	3.12	°C/W

2 Electrical characteristics

(T_{case} =25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CES}	Collector cut-off current (V _{BE} = 0)	$V_{CE} = 1500V$ $V_{CE} = 1500V$, $T_{c} = 125^{\circ}C$			0.2 2	mA mA
I _{EBO}	Emitter cut-off current $(I_{C} = 0)$	V _{EB} = 5V	40		120	mA
V _{(BR)EBO}	Emitter-base breakdown voltage $(I_{C} = 0)$	l _E = 700mA	10			V
V _{CE(sat)} ⁽¹⁾	Collector-emitter saturation voltage	$I_{\rm C} = 5.5 {\rm A}$, $I_{\rm B} = 1.4 {\rm A}$			2.8	v
V _{BE(sat)} ⁽¹⁾	Base-emitter saturation voltage	$I_{\rm C} = 5.5 {\rm A}$, $I_{\rm B} = 1.4 {\rm A}$			1.3	v
h _{FE} ⁽¹⁾	DC current gain	$ \begin{array}{ll} I_{C} = 1 A, & V_{CE} = 5 V \\ I_{C} = 5.5 A, & V_{CE} = 1 V \\ I_{C} = 5.5 A , & V_{CE} = 5 V \end{array} $	5	18 4.7	7	
V _F ⁽¹⁾	Diode forward voltage	I _F = 5.5 A			1.6	V
t _s	Inductive load Storage time	$I_{C} = 5A, f_{h} = 16KHz$ $I_{B(on)} = 1.5A, V_{BE(off)} = -2.7V$		4.5	6	μs
s t _f	Fall time	$L_{\text{BB}(\text{off})} = 6.2 \mu \text{H}$		4.3 0.3	0.6	μs μs

Table 4. Electrical characteristics

1. Pulse test: pulse duration \leq 300 µs, duty cycle \leq 2%.



DG11570

Is∕₿

100 125 T_{case}(°C)

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area







Figure 3.

P_{tot} (%)

100

80

60

40

20

0

Figure 5.

25 50 75

Reverse biased SOA

Derating curve









MD2009DFP

Figure 8. Collector-emitter saturation voltage Figure 9. Base-emitter saturation voltage



Figure 10. Power losses

Figure 11. Inductive load switching time





3 Test circuits



Figure 12. Power losses and inductive load switching test circuit







4 Package mechanical data

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Dim.		mm			
	Min.	Тур.	Max.		
А	4.4		4.6		
В	2.5		2.7		
D	2.5		2.75		
E	0.45		0.7		
F	0.75		1		
F1	1.15		1.70		
F2	1.15		1.5		
G	4.95		5.2		
G1	2.4		2.7		
Н	10		10.4		
L2		16			
L3	28.6		30.6		
L4	9.8		10.6		
L5	2.9		3.6		
L6	15.9		16.4		
L7	9		9.3		
Dia	3		3.2		



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5 Revision history

Table 5.Document revision history

Date	Revision	Changes
11-Aug-2009	1	First release



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