

PRODUCT CHARACTERISTICS

BVCBO	700V
BVCEO	400V
HFE@5V2A	8-40
IC	12A

APPLICATIONS

- Fluorescent lamp
- Electronic ballast
- Electronic transformer
- Switch mode power supply

FEATURES

- * $V_{CEQ(SUS)}$ 400V
- * 700V Blocking Capability

Symbol



ORDER INFORMATION

Order codes		Package	Packing
Halogen-Free	Halogen		
N/A	MOT13009DQ	TO-3PB	30 pieces/Tube

ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter Voltage		V_{CEO}	400	V
Collector-Emitter Voltage ($V_{BE}=-1.5V$)		V_{CEV}	700	V
Emitter Base Voltage		V_{EBO}	9	V
Collector Current	Continuous	I_C	12	A
	Peak	I_{CM}	24	A
Base Current	Continuous	I_B	6	A
	Peak	I_{BM}	12	A
Emitter Current	Continuous	I_E	18	A
	Peak	I_{EM}	36	A
Power Dissipation		P_D	80	W
Derate above 25°C			640	mW/°C
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-40 ~ +150	°C

THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	21	°C/W
Junction to Case	θ_{JC}	1.55	°C/W

■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS (Note)						
Collector- Emitter Sustaining Voltage	V _{CEO}	I _C = 10mA, I _B = 0	400	-	-	V
Collector Cutoff Current	I _{CEV}	V _{BE(OFF)} = 1.5V _{DC}	-	-	1	mA
V _{CBO} =Rated Value		V _{BE(OFF)} = 1.5V _{DC} , T _C = 100°C	-	-	5	
Emitter Cutoff Current	I _{EBO}	V _{EB} = 9V _{DC} , I _C = 0	-	-	1	mA
ON CHARACTERISTICS (Note)						
DC Current Gain	h _{FE1}	I _C = 5A, V _{CE} = 5V	-	-	40	
	h _{FE 2}	I _C = 8A, V _{CE} = 5V	-	-	30	
Current-Emitter Saturation Voltage	V _{CE(SAT)}	I _C = 5A, I _B = 1A	-	-	1	V
		I _C = 8A, I _B = 1.6A	-	-	1.5	V
		I _C = 12A, I _B = 3A	-	-	3	V
		I _C = 8A, I _B = 1.6A, T _C = 100°C	-	-	2	V
Base-Emitter Saturation Voltage	V _{BE(SAT)}	I _C = 5A, I _B = 1A	-	-	1.2	V
		I _C = 8A, I _B = 1.6A	-	-	1.6	V
		I _C = 8A, I _B = 1.6A, T _C = 100°C	-	-	1.5	V
DYNAMIC CHARACTERISTICS						
Transition frequency	f _T	I _C = 500mA, V _{CE} = 10V, f = 1MHz	4	-	-	MHz
Output Capacitance	C _{OB}	V _{CB} = 10V, I _E = 0, f = 0.1MHz	-	180	-	pF
SWITCHING CHARACTERISTICS (Resistive Load, Table 1)						
Delay Time	t _{DLY}	V _{CC} = 125Vdc, I _C = 8A I _{B1} = I _{B2} = 1.6A, t _P = 25µs Duty Cycle ≤1%	-	0.06	0.1	µs
Rise Time	t _R		-	0.45	1	µs
Storage Time	t _S		-	1.3	3	µs
Fall Time	t _F		-	0.2	0.7	µs
Inductive Load, Clamped (Table 1, Fig. 13)						
Voltage Storage Time	t _S	I _C =8A, V _{CLAMP} =300V, I _{B1} =1.6A	-	0.92	2.3	µs
Crossover Time	t _C	V _{BE(OFF)} = 5V, T _C = 100°C	-	0.12	0.7	µs

Note: Pulse Test: Pulse Width = 300 μs , Duty Cycle = 2%

■ TYPICAL CHARACTERISTICS

Fig. 1 Forward Bias Safe Operating Area

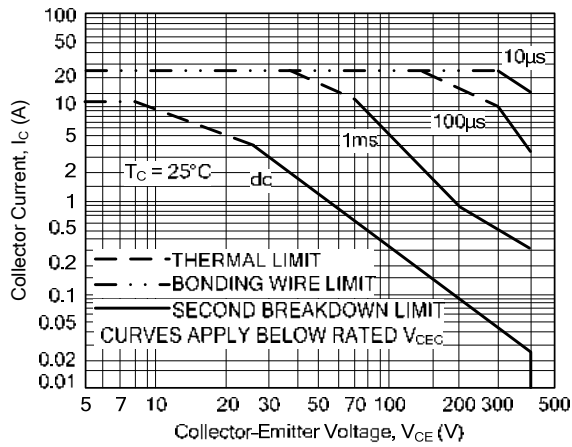


Fig. 2 Reverse Bias Switching Safe Operating Area

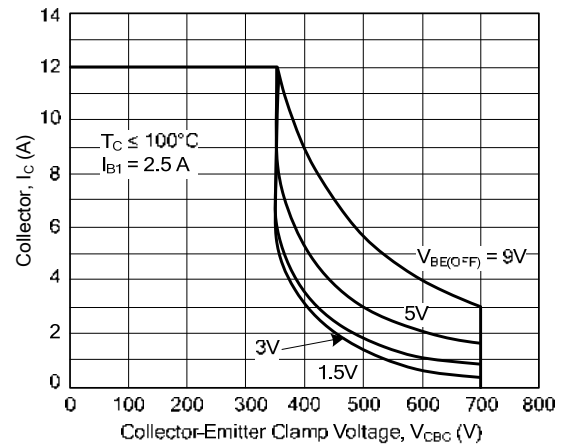


Fig. 3 Forward Bias Power Derating

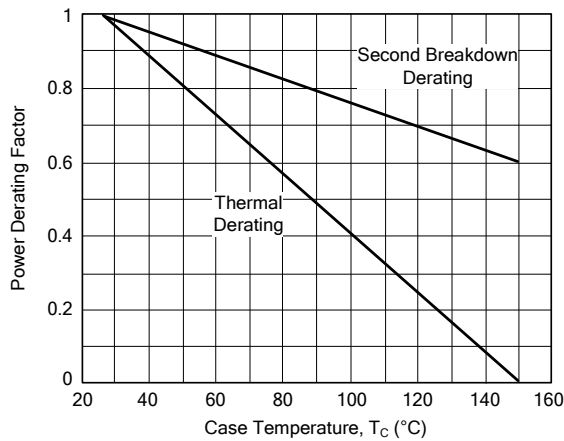
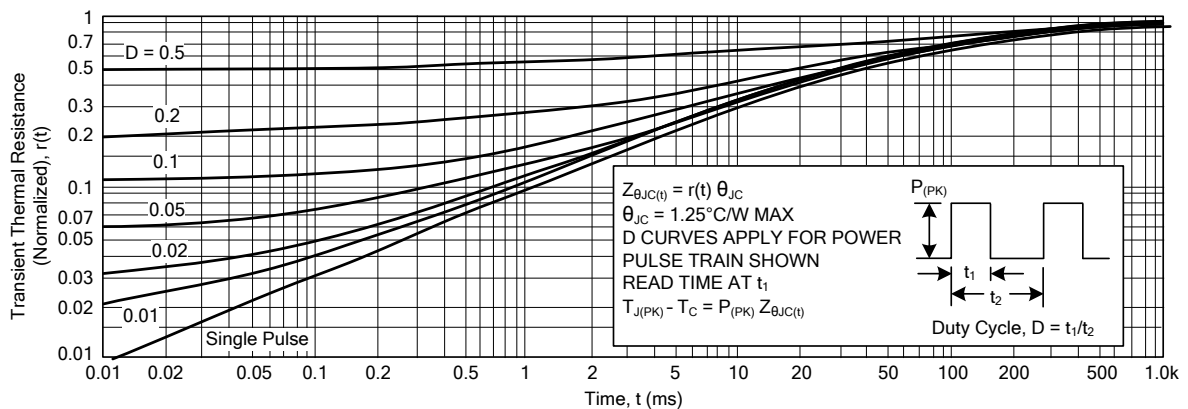


Fig. 4 Typical Thermal Response [$Z_{\theta JC}(t)$]



■ TYPICAL CHARACTERISTICS(Cont.)

Fig. 5 DC Current Gain

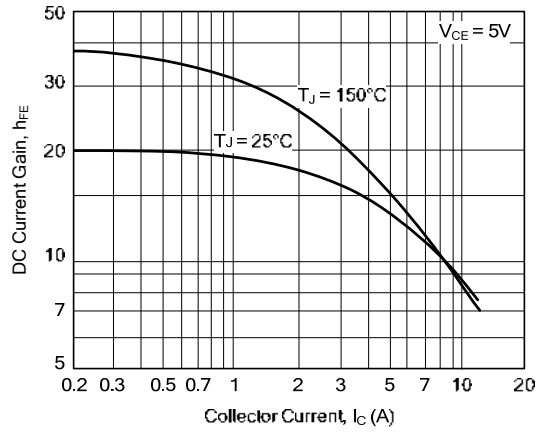


Fig. 6 Collector Saturation Region

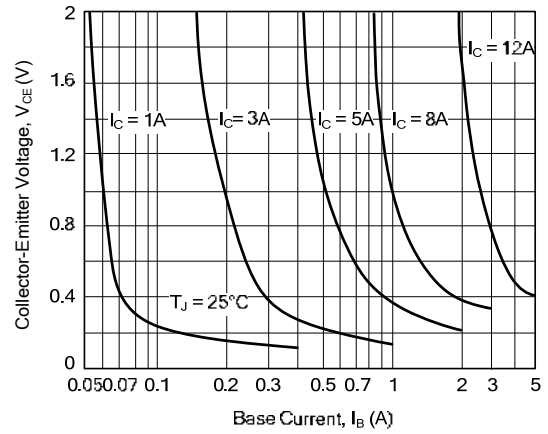


Fig. 7 Base-Emitter Saturation Voltage

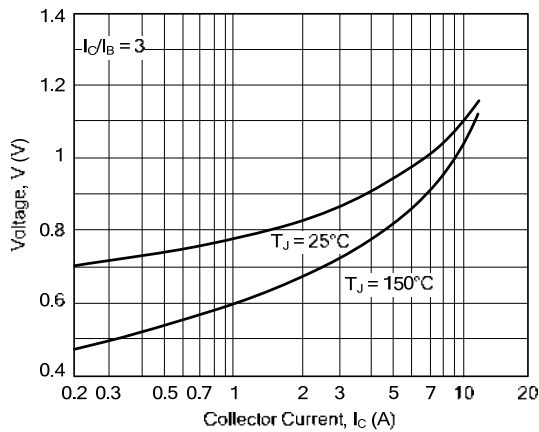


Fig. 8 Collector-Emitter Saturation Voltage

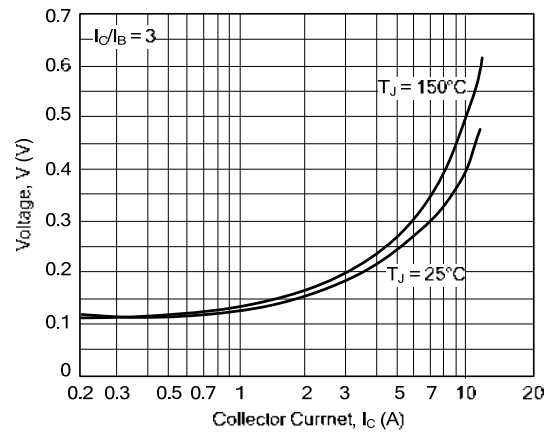


Fig. 9 Collector Cutoff Region

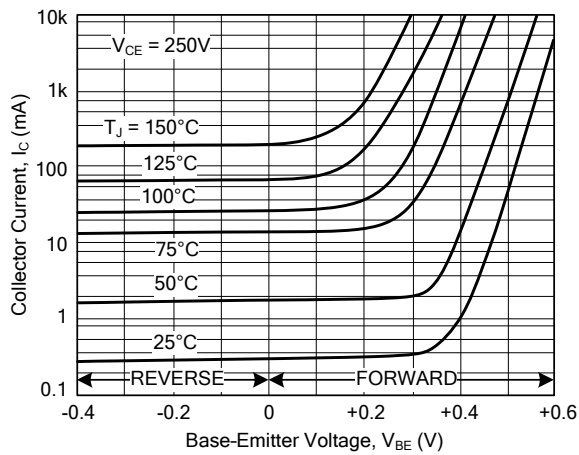
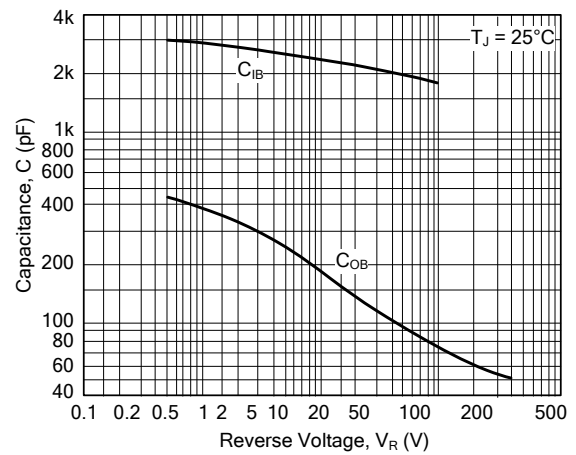


Fig. 10 Capacitance



■ RESISTIVE SWITCHING PERFORMANCE

Fig. 11. Turn-On Time

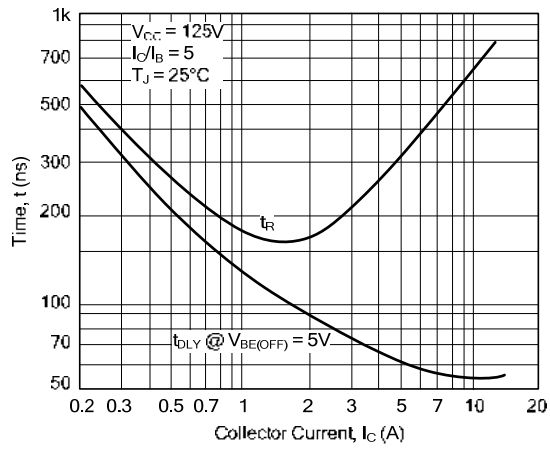


Fig. 12 Turn-Off Time

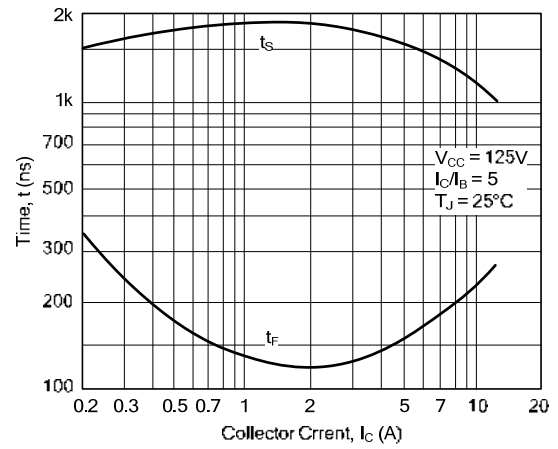
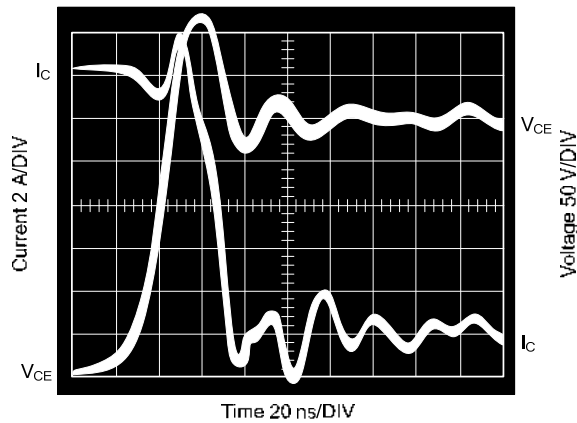


Fig. 13 Typical Inductive Switching Waveforms
(at 300V and 12A with $I_{B1} = 2.4A$ and $V_{BE(off)} = 5V$)



■ TO-3PB PACKAGE OUTLINE DIMENSIONS

