IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

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Thank you for your cooperation and understanding,

WeEn Semiconductors

EC103D1

SCR

18 October 2016 Product data sheet

1. General description

Planar passivated ultra sensitive gate Silicon Controlled Rectifier in a SOT54 (T0-92) plastic package.

2. Features and benefits

- Planar passivated for voltage ruggedness and reliability
- Ultra sensitive gate

3. Applications

- Electronic ballasts
- Safety shut down and protection circuits
- Sensing circuits
- Smoke detectors
- Switched Mode Power Supplies

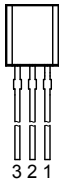
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	400	V
V_{RRM}	repetitive peak reverse voltage			-	-	400	V
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)}$ = 25 °C; t_p = 10 ms; Fig. 4; Fig. 5		-	-	8	A
$I_{T(AV)}$	average on-state current	half sine wave; $T_{lead} \leq 92$ °C; Fig. 1		-	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{lead} \leq 92$ °C; Fig. 2; Fig. 3		-	-	0.8	A
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 10 mA; T_j = 25 °C; Fig. 7		-	3	12	µA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 TO-92 (SOT54)	
2	G	gate		
3	A	anode		

6. Ordering information

Table 3. Ordering information

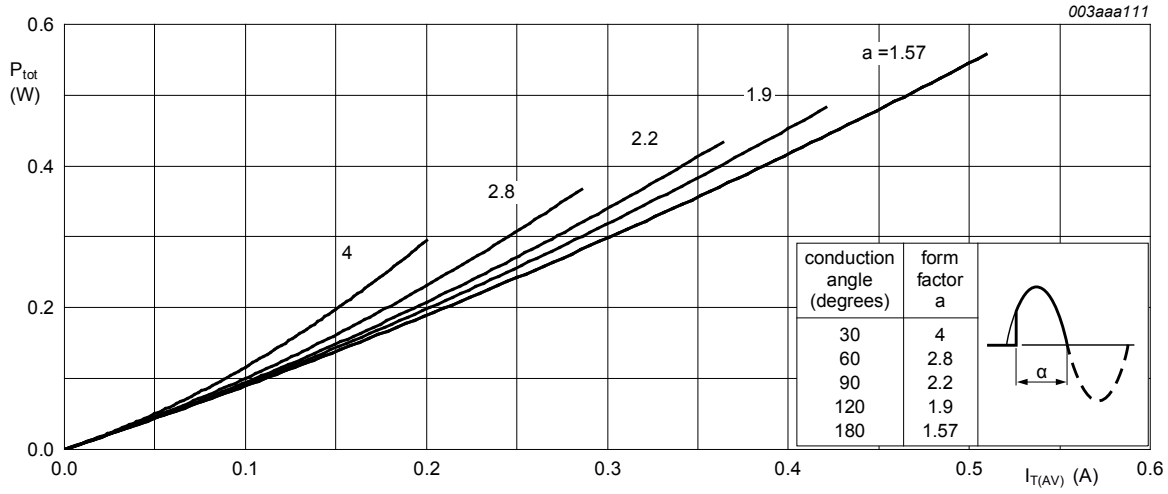
Type number	Package		
	Name	Description	Version
EC103D1	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	400	V
V_{RRM}	repetitive peak reverse voltage			-	400	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{lead} \leq 92$ °C; Fig. 1		-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{lead} \leq 92$ °C; Fig. 2; Fig. 3		-	0.8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25$ °C; $t_p = 10$ ms; Fig. 4; Fig. 5		-	8	A
		half sine wave; $T_{j(init)} = 25$ °C; $t_p = 8.3$ ms		-	9	A
I^2t	I^2t for fusing	$t_p = 10$ ms; SIN		-	0.32	A^2s
dI_T/dt	rate of rise of on-state current	$I_T = 2$ A; $I_G = 10$ mA; $dI_G/dt = 100$ mA/µs		-	50	A/µs
I_{GM}	peak gate current			-	1	A
V_{RGM}	peak reverse gate voltage			-	5	V
P_{GM}	peak gate power			-	2	W
$P_{G(AV)}$	average gate power	over any 20 ms period		-	0.1	W
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature			-	125	°C



α = conduction angle

a = form factor = $I_{T(RMS)} / I_{T(AV)}$

Fig. 1. Total power dissipation as a function of average on-state current; maximum values

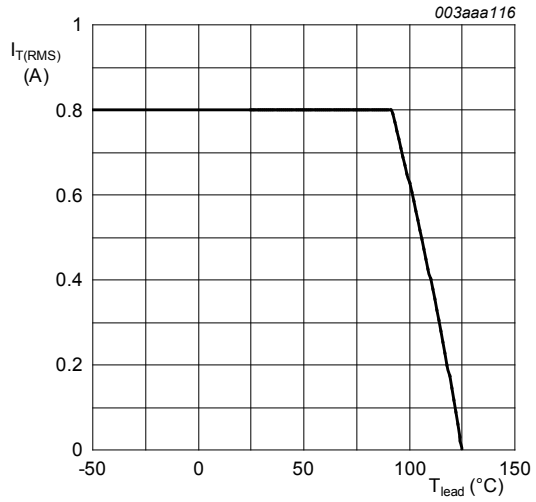
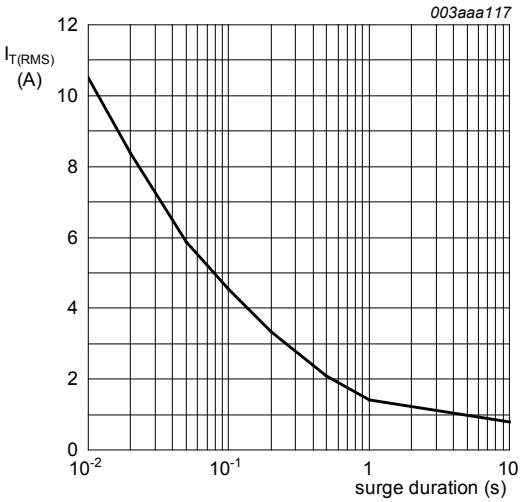
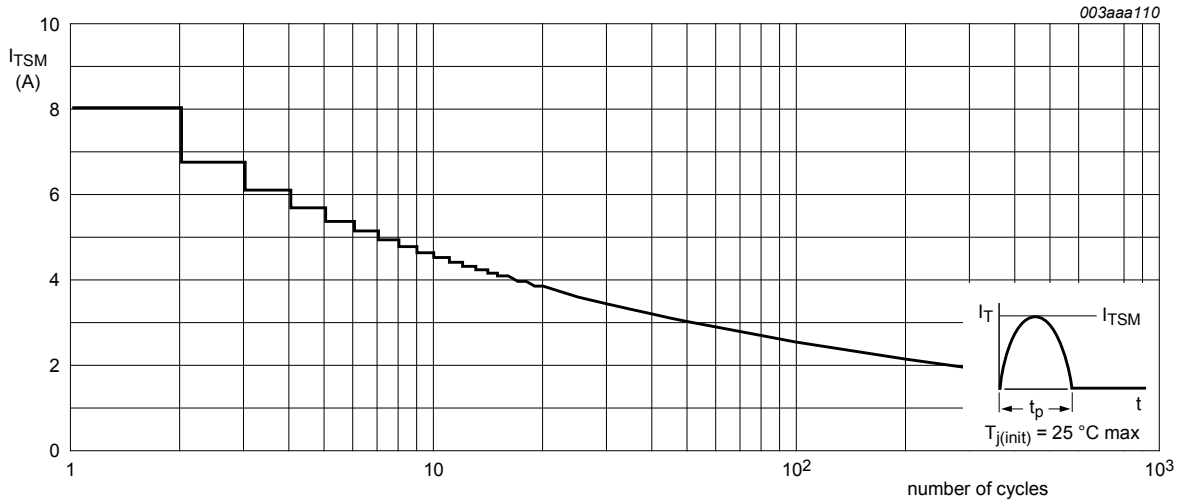


Fig. 2. RMS on-state current as a function of lead temperature; maximum values



f = 50 Hz; T_{lead} = 92 °C

Fig. 3. RMS on-state current as a function of surge duration; maximum values



f = 50 Hz

Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

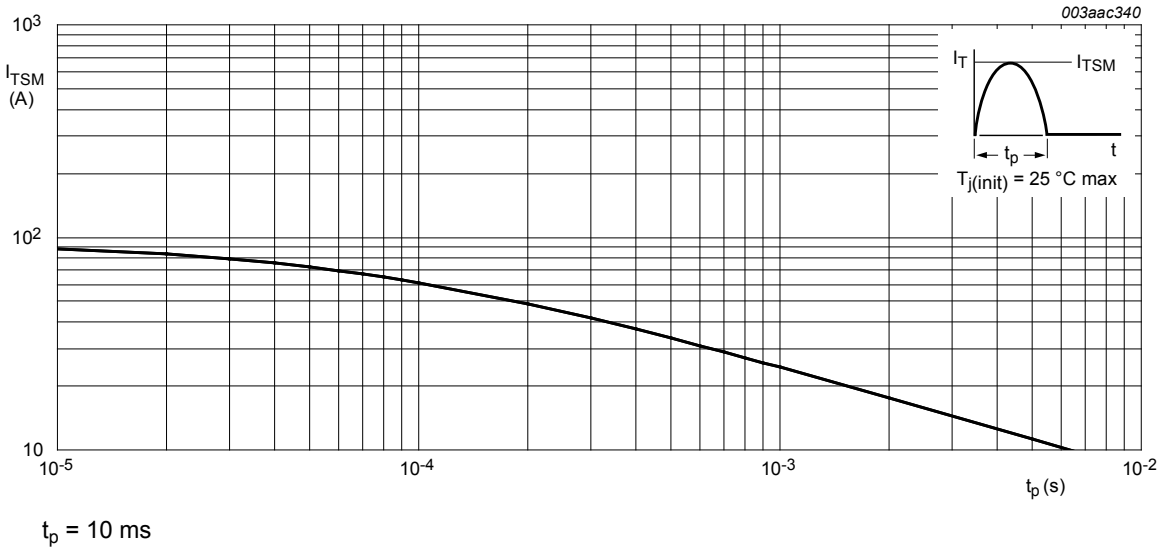


Fig. 5. Non-repetitive peak on-state current as a function of pulse duration; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j\text{-}lead)}$	thermal resistance from junction to lead	Fig. 6		-	-	60	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient	printed circuit board mounted: lead length = 4 mm		-	150	-	K/W

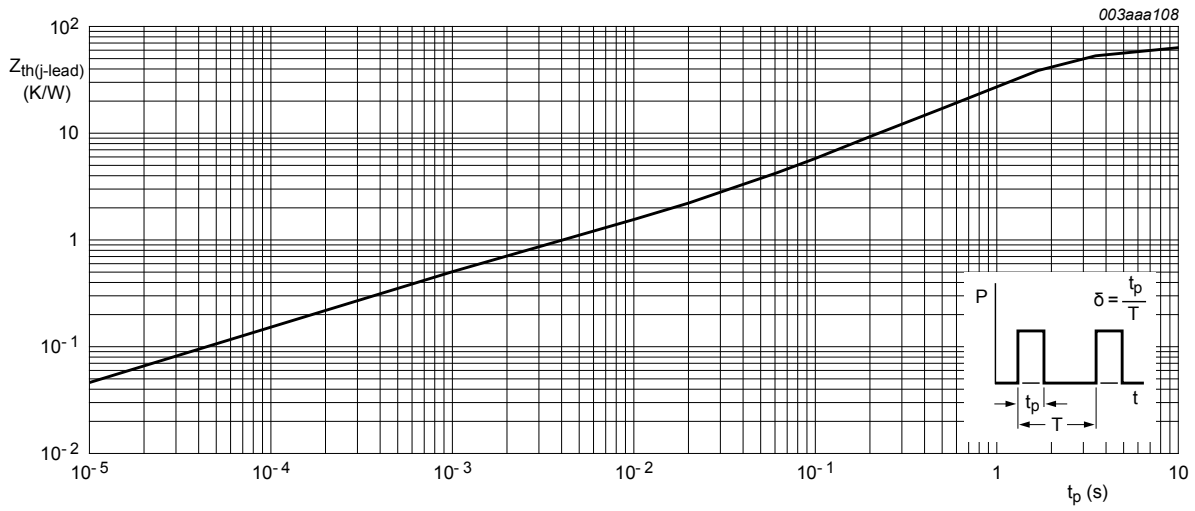


Fig. 6. Transient thermal impedance from junction to lead as a function of pulse duration

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 10 mA; T_j = 25 °C; Fig. 7		-	3	12	µA
I_L	latching current	V_D = 12 V; I_G = 0.5 mA; R_{GK} = 1 kΩ; T_j = 25 °C; Fig. 8		-	2	6	mA
I_H	holding current	V_D = 12 V; R_{GK} = 1 kΩ; T_j = 25 °C; Fig. 9		-	2	5	mA
V_T	on-state voltage	I_T = 1 A; T_j = 25 °C; Fig. 10		-	1.2	1.35	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 10 mA; T_j = 25 °C; Fig. 11		-	0.5	0.8	V
		V_D = 400 V; I_T = 10 mA; T_j = 125 °C; Fig. 11		0.2	0.3	-	V
I_D	off-state current	V_D = 400 V; T_j = 125 °C; R_{GK} = 1 kΩ		-	0.05	0.1	mA
I_R	reverse current	V_R = 400 V; T_j = 125 °C; R_{GK} = 1 kΩ		-	0.05	0.1	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 268 V; T_j = 125 °C; R_{GK} = 1 kΩ; (V_{DM} = 67% of V_{DRM}); exponential waveform; Fig. 12		-	150	-	V/µs
t_{gt}	gate-controlled turn-on time	I_{TM} = 2 A; V_D = 400 V; I_G = 10 mA; dI_G/dt = 0.1 A/µs; T_j = 25 °C		-	2	-	µs
t_q	commutated turn-off time	V_{DM} = 268 V; T_j = 125 °C; I_{TM} = 1.6 A; V_R = 35 V; $(dI_T/dt)_M$ = 30 A/µs; dV_D/dt = 2 V/µs; R_{GK} = 1 kΩ; (V_{DM} = 67% of V_{DRM})		-	100	-	µs

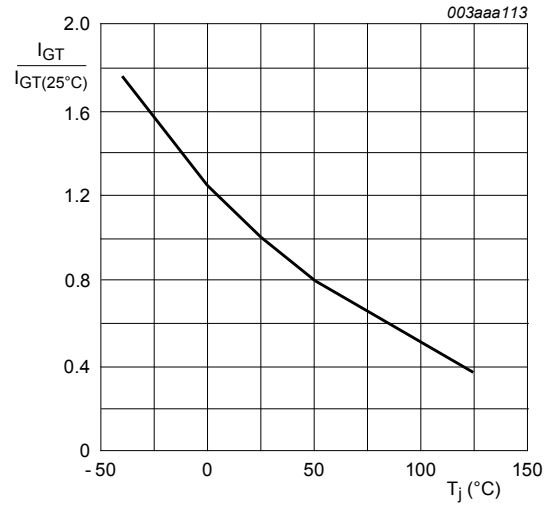
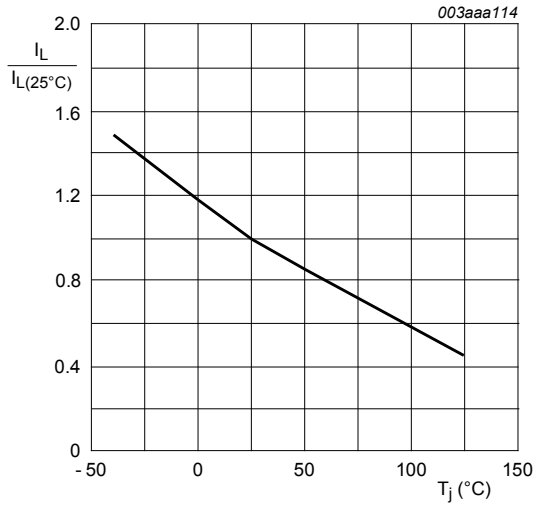
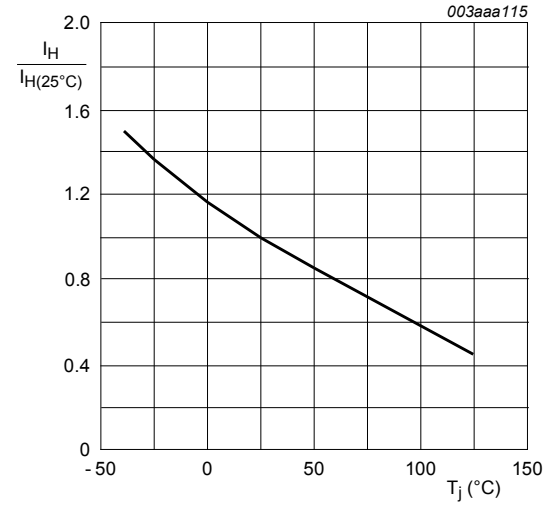


Fig. 7. Normalized gate trigger current as a function of junction temperature



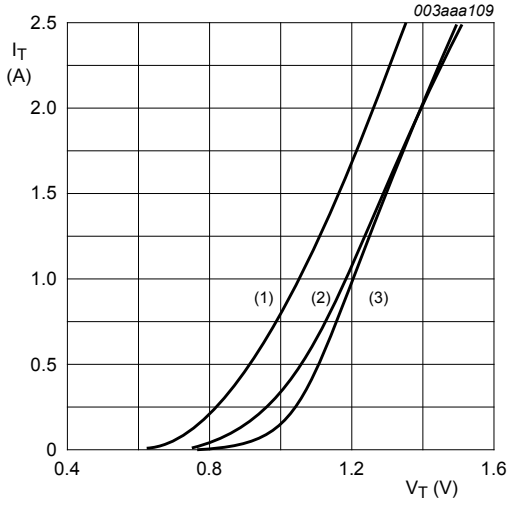
R_{GK} = 1 kΩ

Fig. 8. Normalized latching current as a function of junction temperature



R_{GK} = 1 kΩ

Fig. 9. Normalized holding current as a function of junction temperature



V_o = 0.895 V; R_s = 0.195 Ω

(1) T_j = 125 °C; typical values

(2) T_j = 125 °C; maximum values

(3) T_j = 25 °C; maximum values

Fig. 10. On-state current as a function of on-state voltage

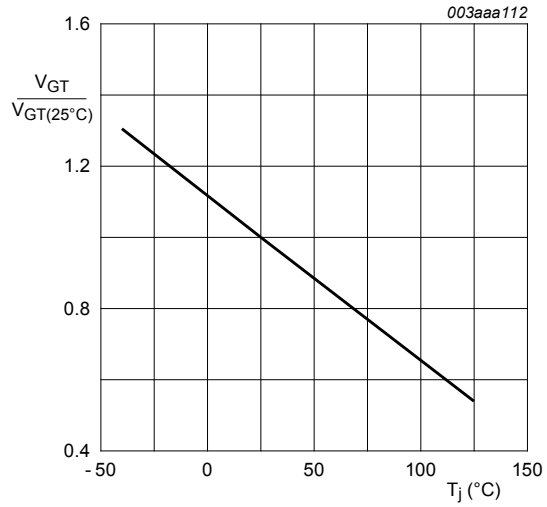
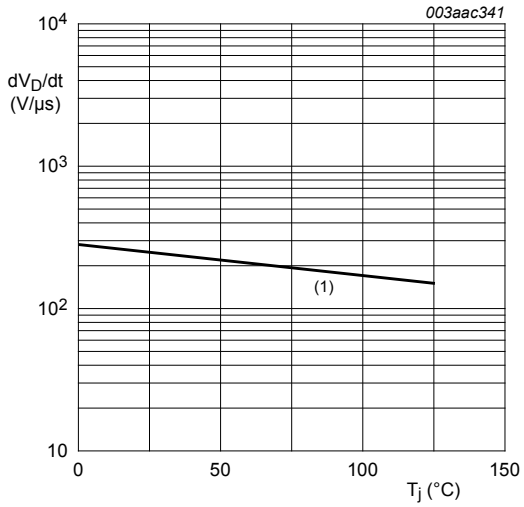


Fig. 11. Normalized gate trigger voltage as a function of junction temperature



R_{GK} = 1 kΩ

Fig. 12. Critical rate of rise of off-state voltage as a function of junction temperature; typical values

10. Package outline

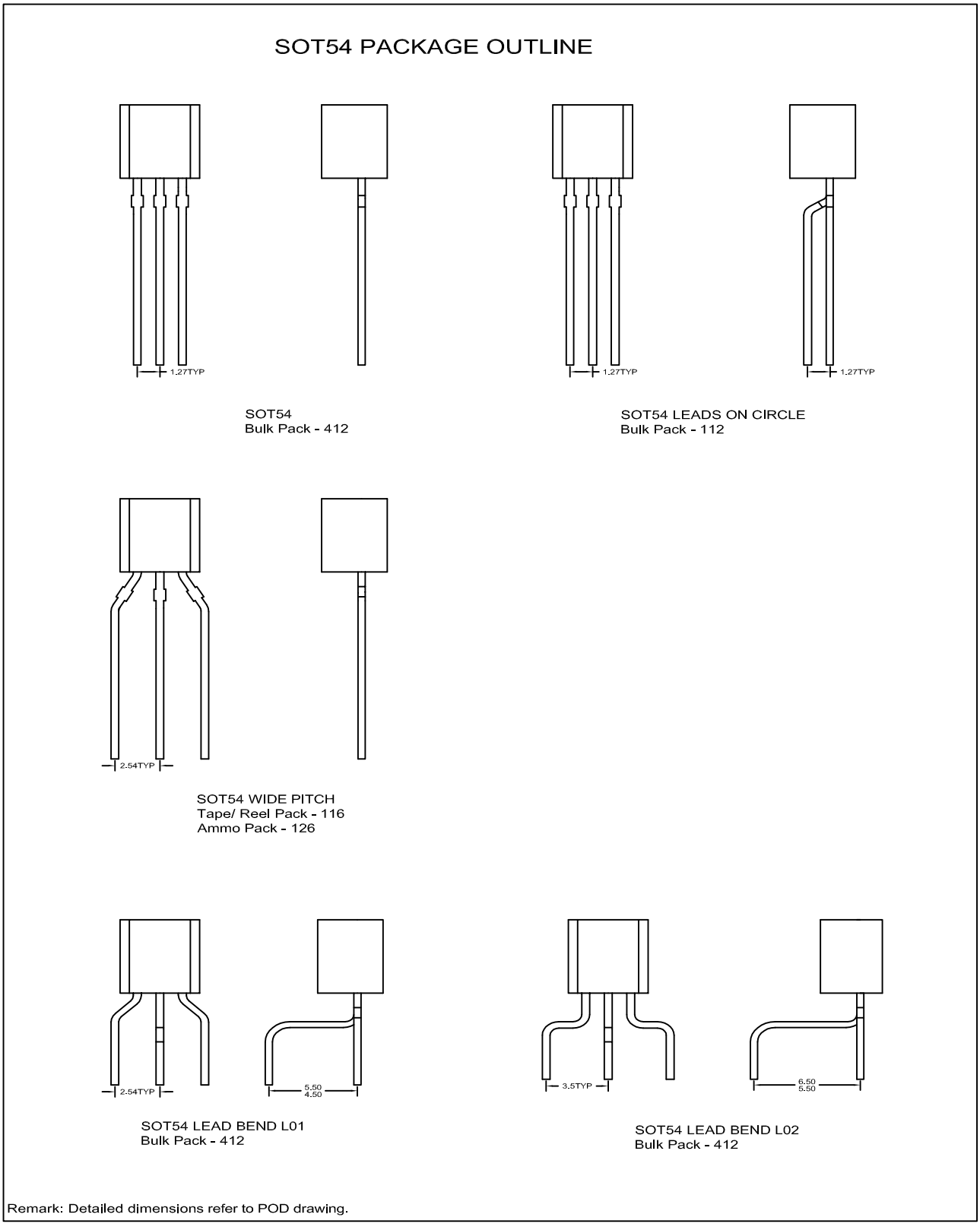


Fig. 13. Package outline TO-92 (SOT54)

11. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".
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