WCR03-10L

SCR

Rev.02 - 14 July 2025 Product data sheet

1. General description

Planar passivated SCR with sensitive gate in a TO92 plastic package. This SCR is designed to be interfaced directly to microcontrollers, logic integrated circuits or other low power gate trigger circuits

Lead-Free Halogen-Free RoHS Green

2. Features and benefits

- On-state RMS current, 1.25 A
- Repetitive peak off-state voltage, 1000 V
- High surge current capability
- Direct triggering from low power drivers and logic ICs
- Planar passivated for voltage ruggedness or reliability

3. Applications

- GFCI (Ground Fault Circuit Interrupter)
- AFCI (Arc Fault Circuit Interrupter)
- RCD (Residual Current Device)
- RCBO (Residual Current circuit Breaker with Overload protection)
- AFDD (Arc Fault Detection Device)

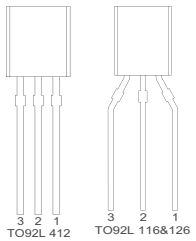
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{DRM}	repetitive peak off-state voltage			1000			V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_C \leq 66$ °C; Fig. 1; Fig. 2; Fig. 3		1.25			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		23			A
		half sine wave; $T_{j(init)} = 25$ °C; $t_p = 8.3$ ms		25			A
T_j	junction temperature			-40 to 125			°C
Symbol	**Parameter**	**Conditions**	**Notes**	**Min**	**Typ**	**Max**	**Unit**
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12$ V; $R_L = 100$ Ω; $T_j = 25$ °C; Fig. 7		20	-	50	µA
I_H	holding current	$V_D = 12$ V; $R_{GK} = 1$ kΩ; $T_j = 25$ °C; Fig. 9		-	-	3	mA
V_T	on-state voltage	$I_T = 2.5$ A; $T_j = 25$ °C; Fig. 10		-	-	1.45	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 670$ V; $T_j = 125$ °C; $R_{GK} = 1$ kΩ; (V_{DM} = 67% of V_{DRM}); exponential waveform		100	-	-	V/µs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	G	gate		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
WCR03-10L	TO92	WCR03-10LEP	Bulk	1000	TO92L	10-May-2021
		WCR03-10LQP	Reel	2000		

7. Marking

Table 4. Marking codes

Type number	Marking codes
WCR03-10L	WCR03L

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DRM}	repetitive peak off-state voltage			1000	V
V_{RRM}	repetitive peak reverse voltage			1000	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_C \leq 66$ °C;		0.8	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_C \leq 66$ °C; Fig. 1; Fig. 2; Fig. 3		1.25	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		23	A
		half sine wave; $T_{j(init)} = 25$ °C; $t_p = 8.3$ ms		25	A
I^2t	I^2t for fusing	$t_p = 10$ ms; sine-wave pulse		2.645	A^2s
dI_T/dt	rate of rise of on-state current	$I_G = 0.1$ mA		100	A/µs
I_{GM}	peak gate current			1.2	A
P_{GM}	peak gate power			2	W
$P_{G(AV)}$	average gate power	over any 20 ms period		0.2	W
T_{stg}	storage temperature			-40 to 150	°C
T_j	junction temperature			-40 to 125	°C

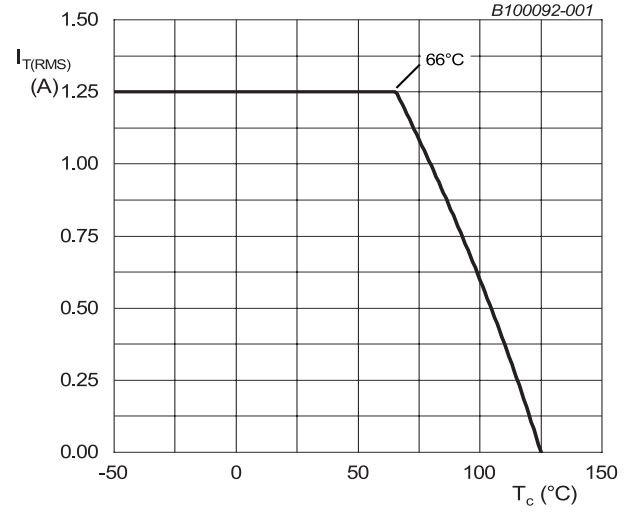
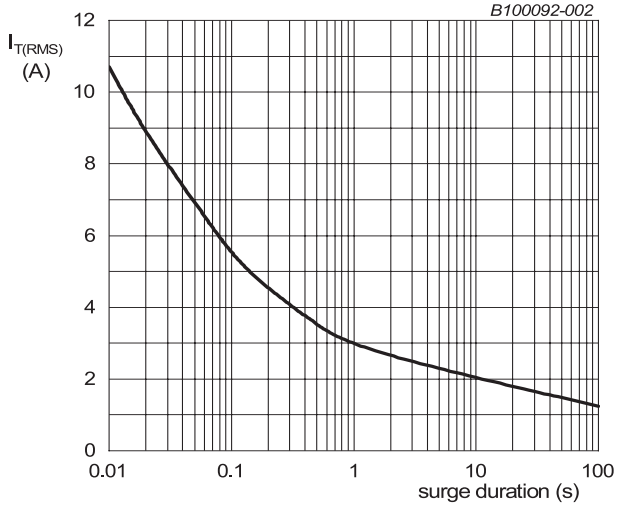
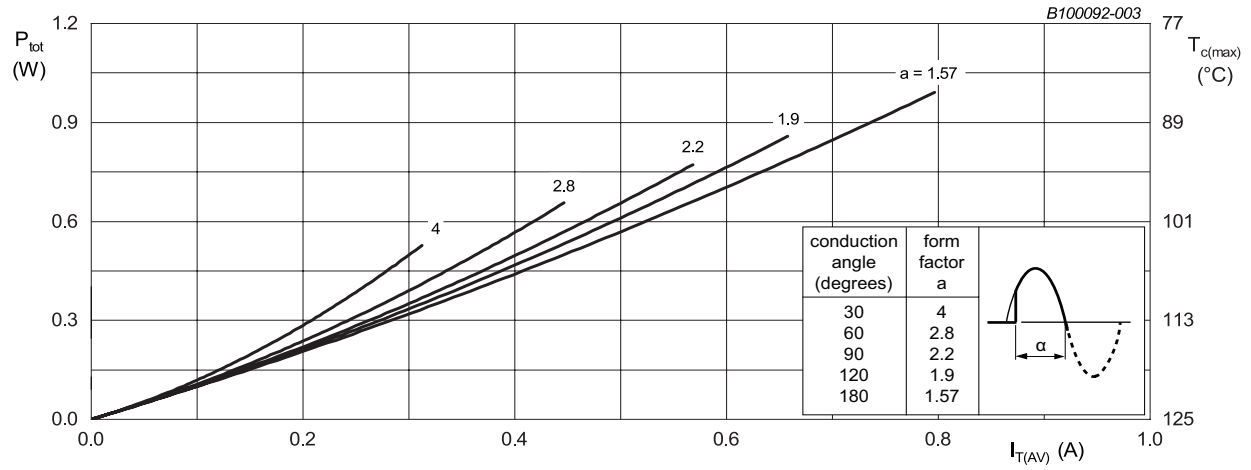


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz; T_C = 66 °C

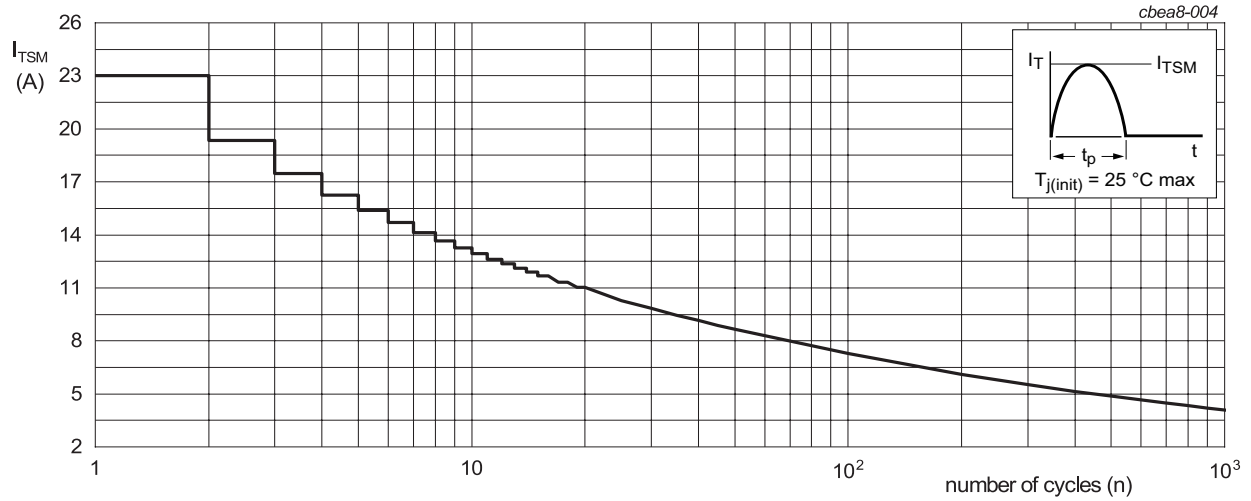
Fig. 2. RMS on-state current as a function of surge duration; maximum values



α = conduction angle

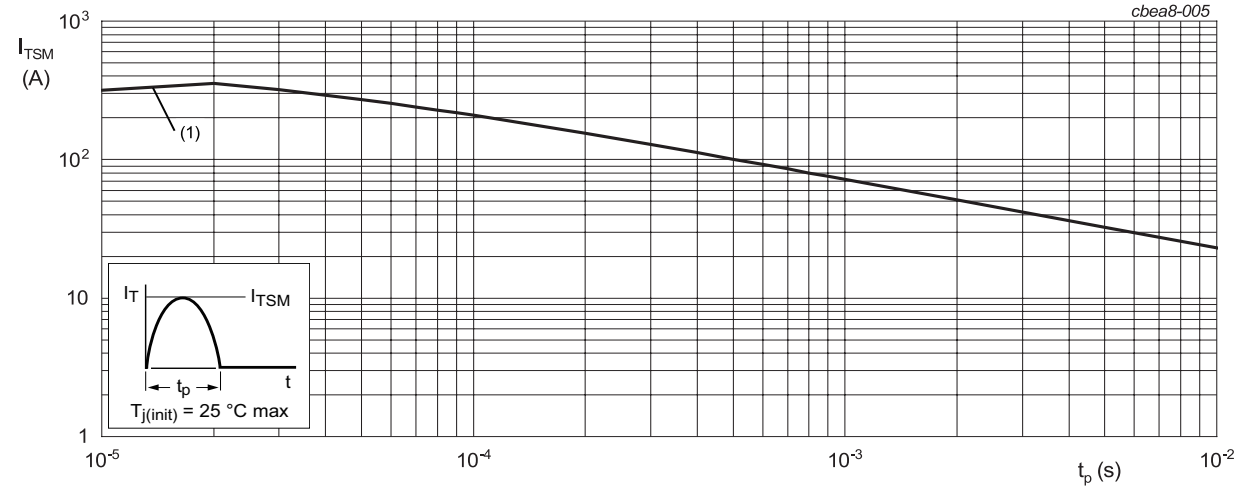
a = form factor = $I_{T(RMS)}$ / $I_{T(AV)}$

Fig. 3. Total power dissipation as a function of RMS on-state current; 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



$t_p \leq 10$ ms

(1) dI_T/dt limit

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

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	Fig. 6		-	-	60	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	150	-	K/W

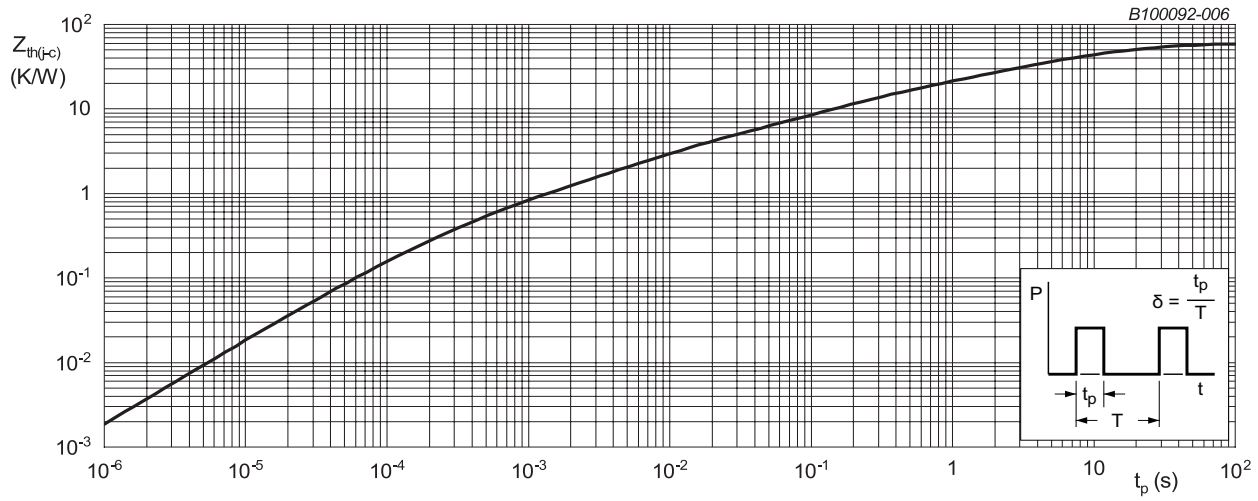


Fig. 6. Transient thermal impedance from junction to case as a function of pulse duration; maximum values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; R_L = 100 Ω; T_j = 25 °C; Fig. 7		20	-	50	µA
I_L	latching current	V_D = 12 V; R_{GK} = 1 kΩ; T_j = 25 °C; Fig. 8		-	-	5	mA
I_H	holding current	V_D = 12 V; R_{GK} = 1 kΩ; T_j = 25 °C; Fig. 9		-	-	3	mA
V_T	on-state voltage	I_T = 2.5 A; T_j = 25 °C; Fig. 10		-	-	1.45	V
V_{GT}	gate trigger voltage	V_D = 12 V; R_L = 100 Ω; T_j = 25 °C; Fig. 11		-	0.6	0.8	V
		V_D = 800 V; I_T = 0.1 A; T_j = 125 °C		0.25	0.4	-	V
V_{RG}	gate reverse voltage	I_{RG} = 2 mA		10	-	-	V
I_{DRM}	off-state current	V_D = V_{DRM}; T_j = 25 °C		-	-	1	µA
		V_D = V_{DRM}; T_j = 125 °C		-	-	100	µA
I_{RRM}	reverse current	V_D = V_{RRM}; T_j = 25 °C		-	-	1	µA
		V_D = V_{RRM}; T_j = 125 °C		-	-	100	µA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 670 V; T_j = 125 °C; R_{GK} = 1 kΩ; (V_{DM} = 67% of V_{DRM}); exponential waveform		100	-	-	V/µs

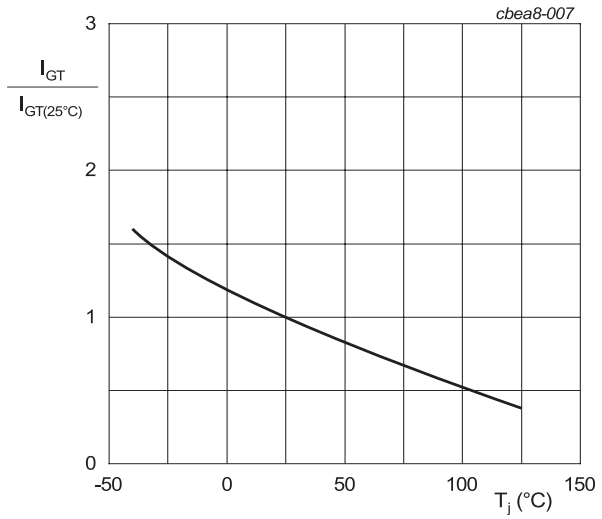


Fig. 7. Normalized gate trigger current as a function of junction temperature

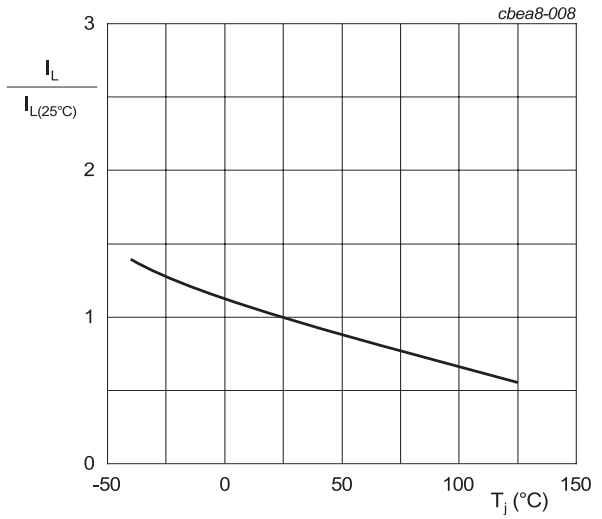


Fig. 8. Normalized latching current as a function of junction temperature

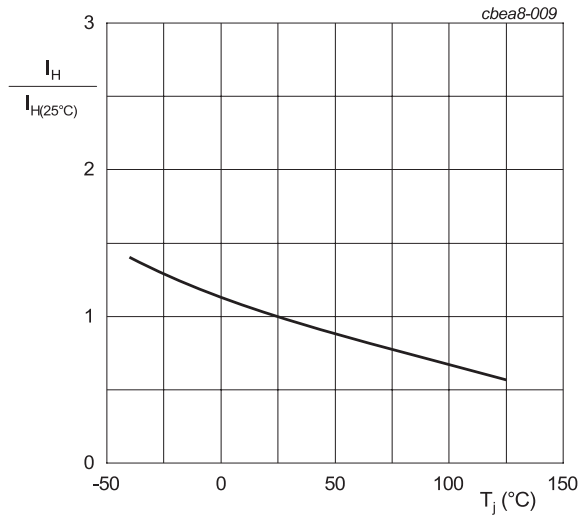
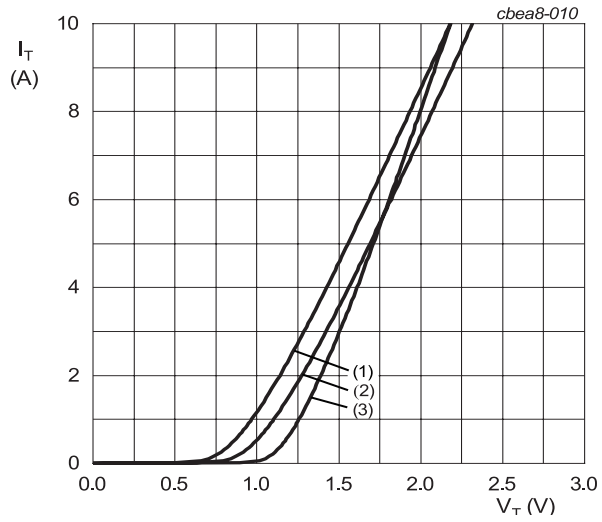


Fig. 9. Normalized holding current as a function of junction temperature



V_o = 0.957 V; R_s = 0.1464 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

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

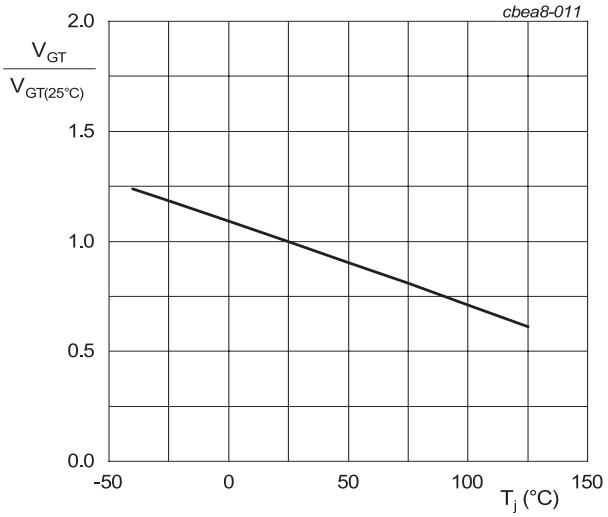
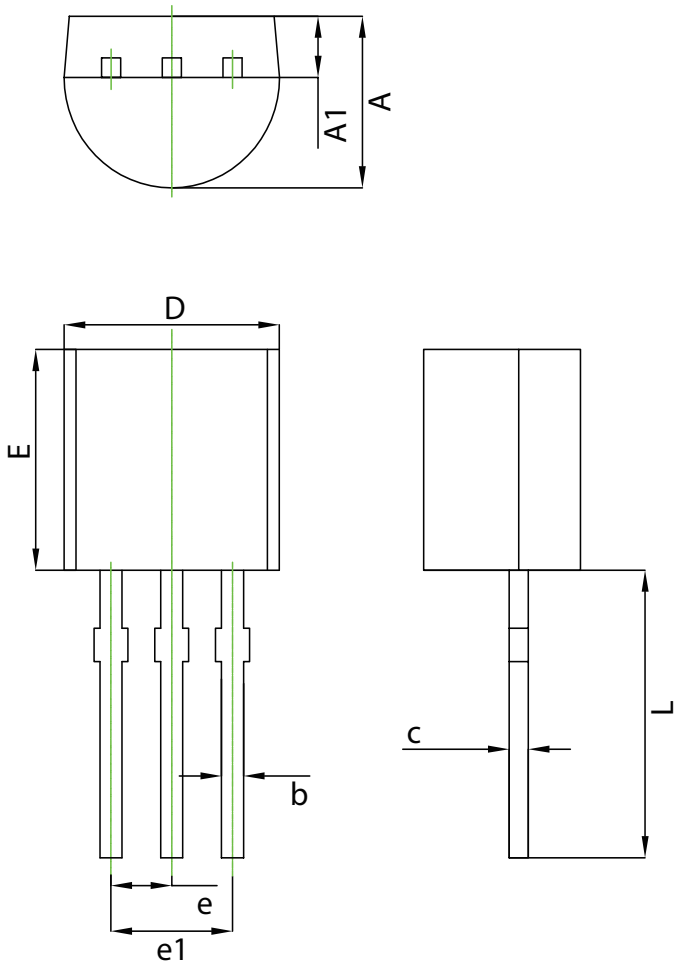


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

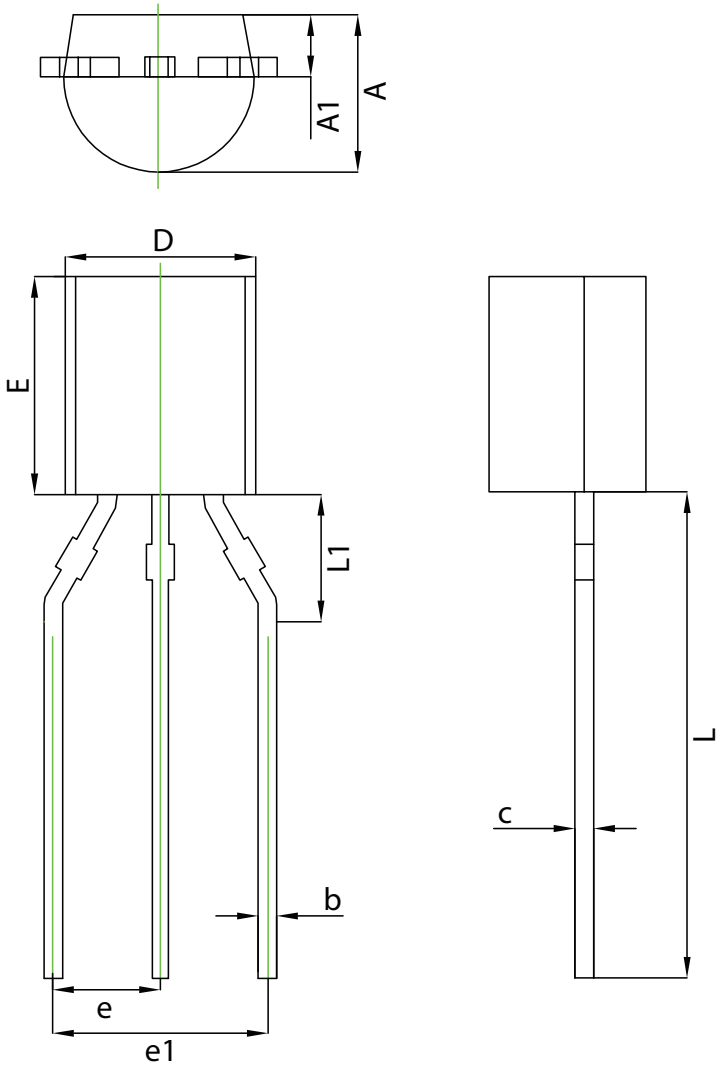
11. Package outline

TO92L 412



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571

TO92L 116&126



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
E	4.300	4.700	0.169	0.185
e	2.500BSC.		0.098BSC.	
e1	5.000BSC.		0.197BSC.	
L	13.300	13.700	0.524	0.539
L1	3.00TYP.		0.118TYP.	

12. Legal information

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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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13. Contents

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