TYN30Y-800T

SCR

Rev.01 - 09 September 2019 Product data sheet

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a IITO220 plastic package intended for use in applications requiring very high inrush current capability, high thermal cycling performance and high junction temperature capability ($T_{j(max)}$ = 150 °C).

2. Features and benefits

- AC power control
- High blocking voltage capability
- High thermal cycling performance
- Planar passivated for voltage ruggedness and reliability
- High immunity to false turn-on by dV/dt
- Internally insulated package
- Internally isolated mounting base
- High junction operating temperature capability ($T_{j(max)}$ = 150 °C)
- Package meets UL94V0 flammability requirement
- Package is RoHS compliant
- IEC 61000-4-4 fast transient

3. Applications

- Capacitive Discharge Ignition (CDI)
- Crowbar protection
- Inrush protection
- Motor control
- Voltage regulation

4. Quick reference data

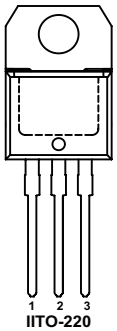
Table 1. Quick reference data

Symbol	Parameter	Conditions	Values	Unit
V_{DRM}	repetitive peak off-state voltage		800	V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 114$ °C; Fig. 1; Fig. 2; Fig. 3	30	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	350	A
		half sine wave; $T_{j(init)}$ = 25 °C; t_p = 8.3 ms	385	A
T_j	junction temperature		150	°C

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 7		6	-	15	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 9		-	-	60	mA
V_T	on-state voltage	I_T = 60 A; T_j = 25 °C; Fig. 10		-	1.3	1.5	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 402 V; T_j = 150 °C; exponential waveform; gate open circuit		1000	-	-	V/µs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 IITO-220	 *sym037*
2	A	anode		
3	G	gate		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
TYN30Y-800T	IITO220	TYN30Y-800TQ	Tube	50	IITO220E	15-Dec-2017

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7. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Values	Unit
V_{DRM}	repetitive peak off-state voltage		800	V
V_{RRM}	repetitive peak reverse voltage		800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 114$ °C;	19	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 114$ °C; Fig. 1; Fig. 2; Fig. 3	30	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	350	A
		half sine wave; $T_{j(init)} = 25$ °C; $t_p = 8.3$ ms	385	A
I^2t	I^2t for fusing	$t_p = 10$ ms; sine-wave pulse	612.5	A^2s
dI_T/dt	rate of rise of on-state current	$I_G = 30$ mA	100	A/µs
I_{GM}	peak gate current		5	A
V_{GM}	peak gate voltage		5	V
P_{GM}	peak gate power		20	W
$P_{G(AV)}$	average gate power	over any 20 ms period	0.5	W
T_{stg}	storage temperature		-40 to 150	°C
T_j	junction temperature		150	°C

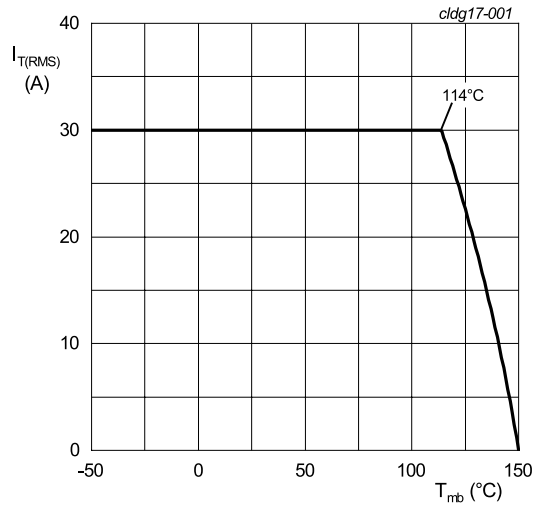
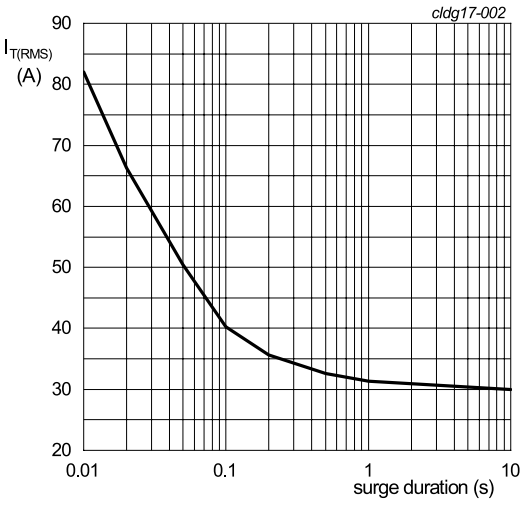


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz; T_{mb} = 114 °C

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

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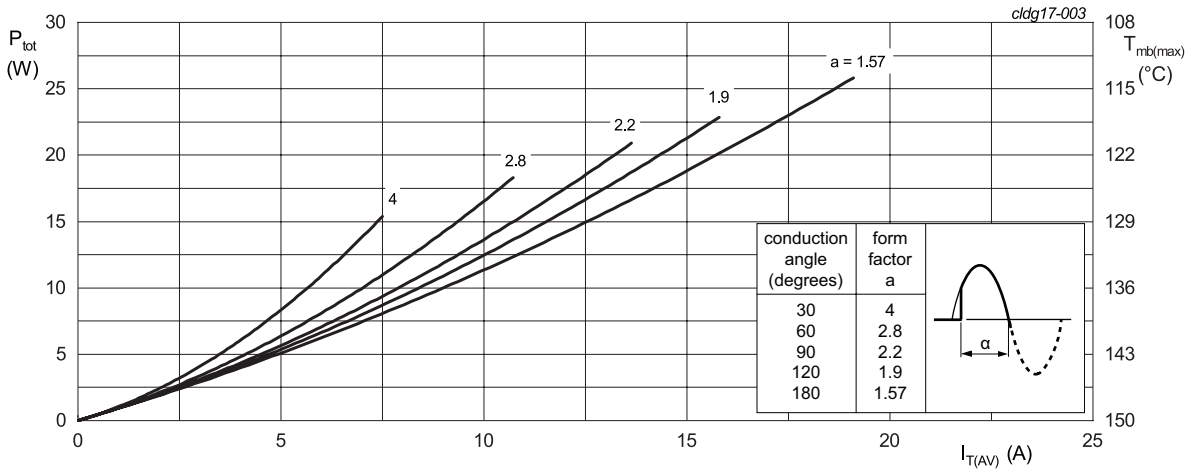
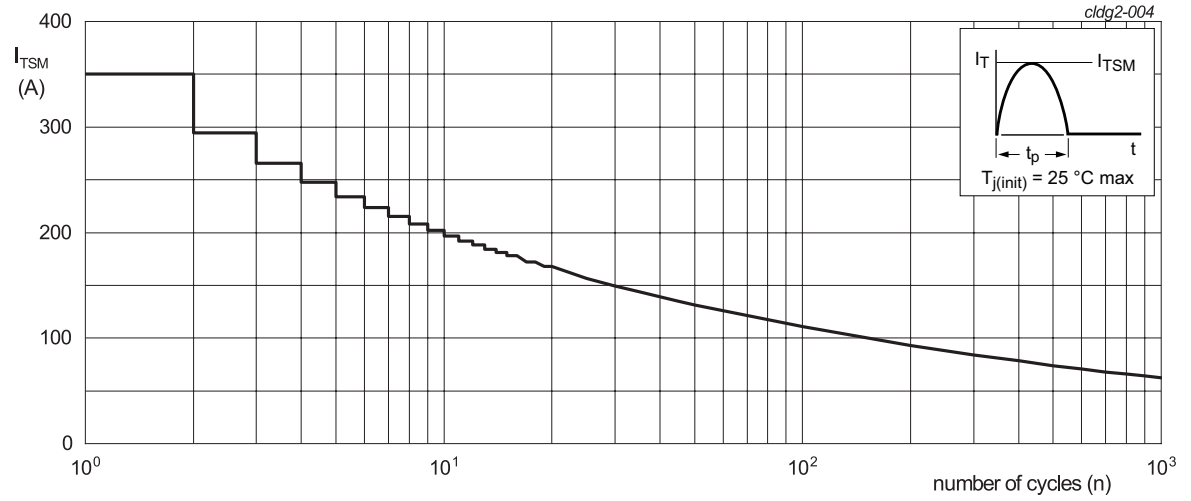


α = conduction angle

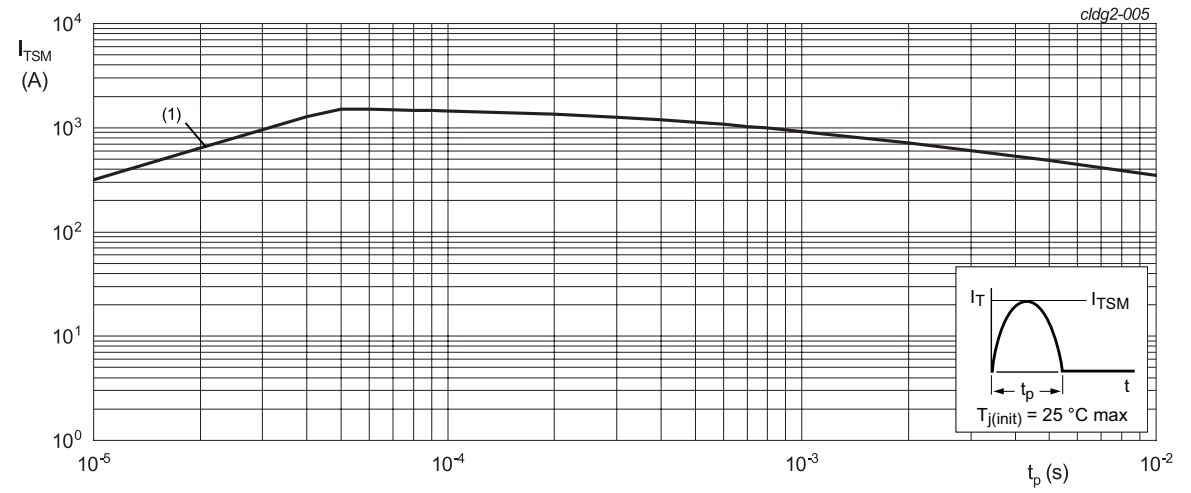
a = form factor = $I_{T(RMS)}$ / $I_{T(AV)}$

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 ≤ 10 ms

(1) dI_T/dt limit

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

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8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig 6		-	-	1.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

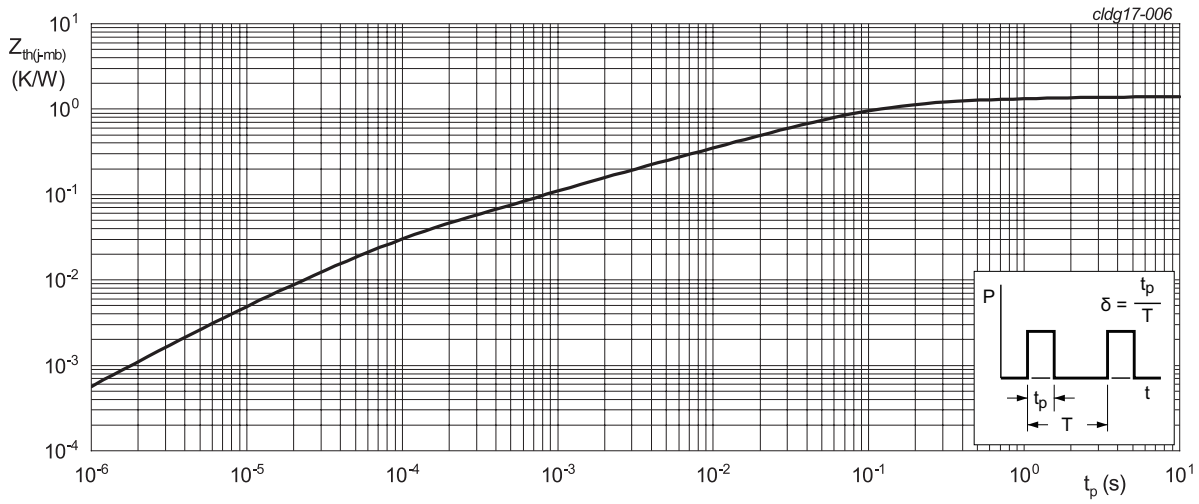

Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

9. Isolation characteristics

Table 6. Isolation characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz ≤ f ≤ 60 Hz; RH ≤ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free		-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink		-	10	-	pF

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10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 7		6	-	15	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T_j = 25 °C; Fig. 8		-	-	80	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 9		-	-	60	mA
V_T	on-state voltage	I_T = 60 A; T_j = 25 °C; Fig. 10		-	1.3	1.5	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A;T_j = 25 °C; Fig. 11		-	0.6	1	V
		V_D = 400 V; I_T = 0.1 A;T_j = 125 °C		0.25	0.4	-	V
I_D	off-state current	V_D = 800 V; T_j = 150 °C		-	-	1	mA
I_R	reverse current	V_R = 800 V; T_j = 150 °C		-	-	1	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 402 V; T_j = 150 °C; exponential waveform; gate open circuit		1000	-	-	V/µs
		V_{DM} = 536 V; T_j = 150 °C; (V_{DM} = 67% of V_{DRM}); exponential waveform; gate open circuit		500	-	-	V/µs
t_{gt}	gate-controlled turn-on time	I_{TM} = 30 A; V_D = 800 V; I_G = 100 mA; dI_G/dt = 5 A/µs; T_j = 25 °C		-	2	-	µs
t_q	commutated turn-off time	V_{DM} = 536 V; T_j = 150 °C; I_{TM} = 30 A; V_R = 25 V; dI_T/dt = 30 A/µs; dV_D/dt = 50 V/µs		-	70	-	µs

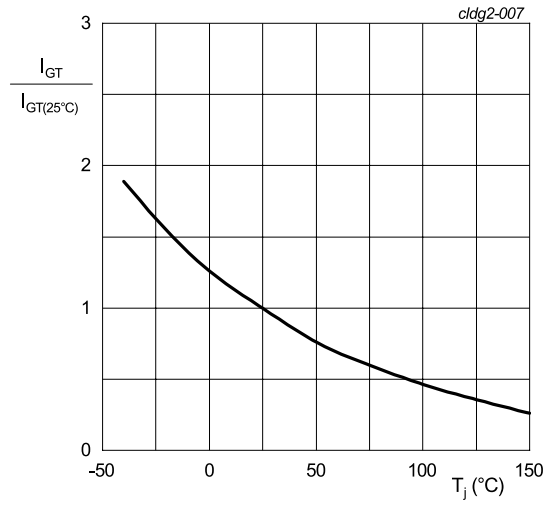

Fig. 7. Normalized gate trigger current as a function of junction temperature

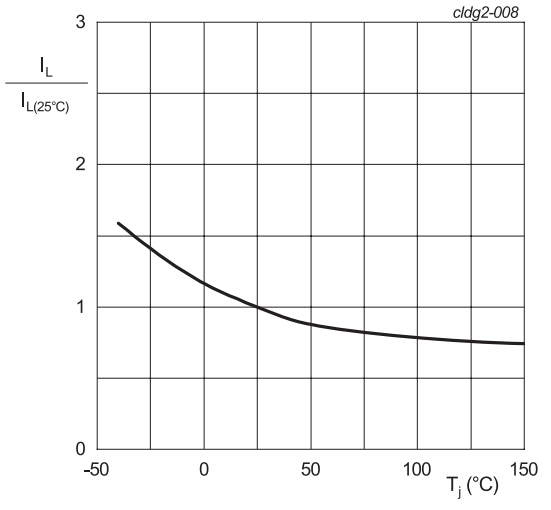

Fig. 8. Normalized latching current as a function of junction temperature

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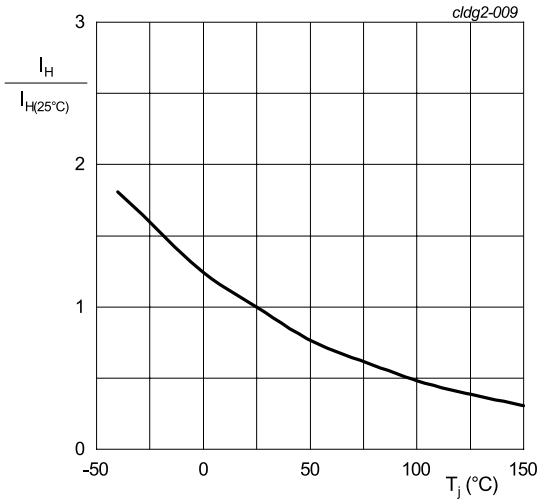
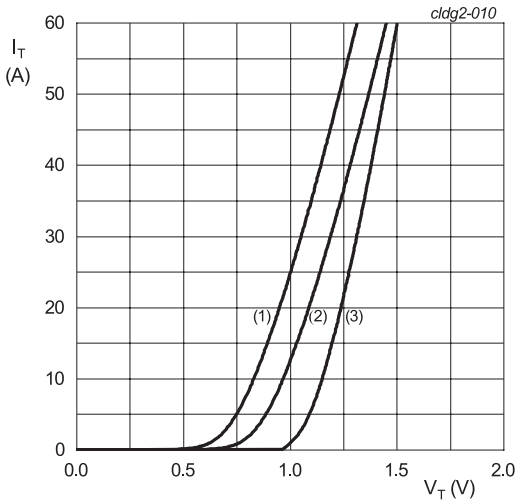


Fig. 9. Normalized holding current as a function of junction temperature



V_o = 0.899 V; R_s = 0.0096 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

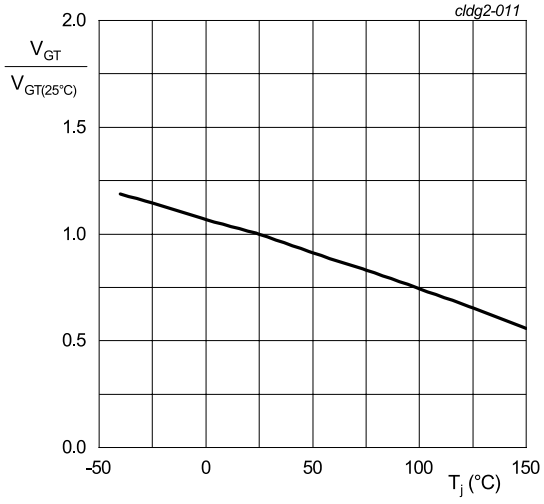


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

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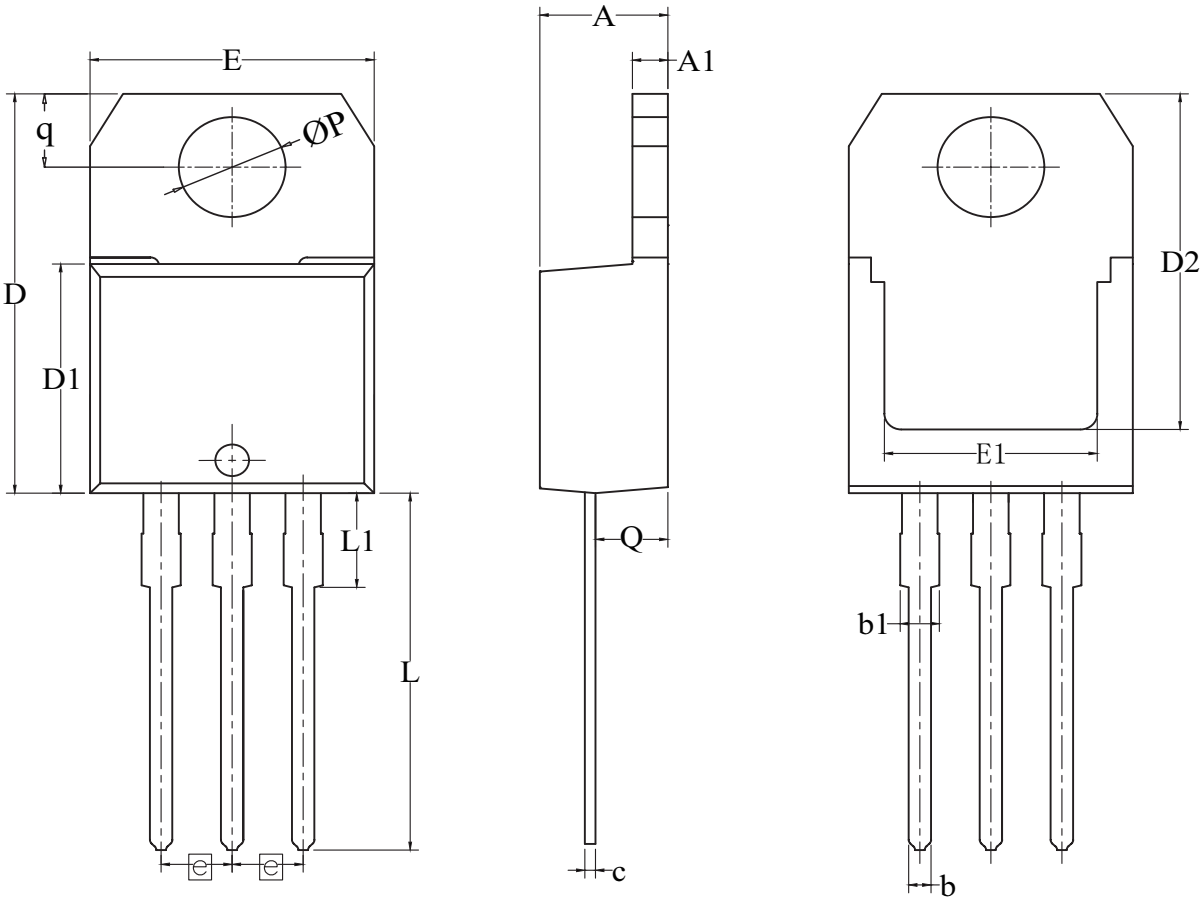
11. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3 leads TO-220 IITO220



Unit		A	A1	b	b1	c	D	D1	D2	E	E1	e	L	L1	P	Q	q
MM	min	4.30	1.25	0.69	1.20	0.40	15.20	8.50	12.20	10.00	6.86	2.54 (BSC)	12.80	2.70	3.70	2.40	2.70
	max	4.70	1.40	0.90	1.72	0.60	16.00	9.02	12.88	10.40	8.89		14.00	3.30	3.95	2.80	3.00

Fig. 12. Package outline IITO220

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