

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a ITO220 plastic package intended for use in applications requiring very high inrush current capability, high thermal cycling performance and high junction temperature capability ($T_{j(max)} = 150\text{ °C}$).

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 ($T_{j(max)} = 150\text{ °C}$)
- 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

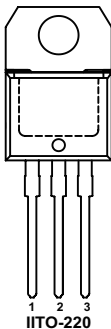

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values	Unit
V_{DRM}	repetitive peak off-state voltage		800	V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 114\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	30	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig 4 ; Fig 5	350	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$	385	A
T_j	junction temperature		150	°C

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>IITO-220</p>	 <p>sym037</p>
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

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; $T_{mb} \leq 114\text{ }^{\circ}\text{C}$;	19	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 114\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	30	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig 4 ; Fig 5	350	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$	385	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse	612.5	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 30\text{ mA}$	100	$\text{A}/\mu\text{s}$
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	$^{\circ}\text{C}$
T_j	junction temperature		150	$^{\circ}\text{C}$

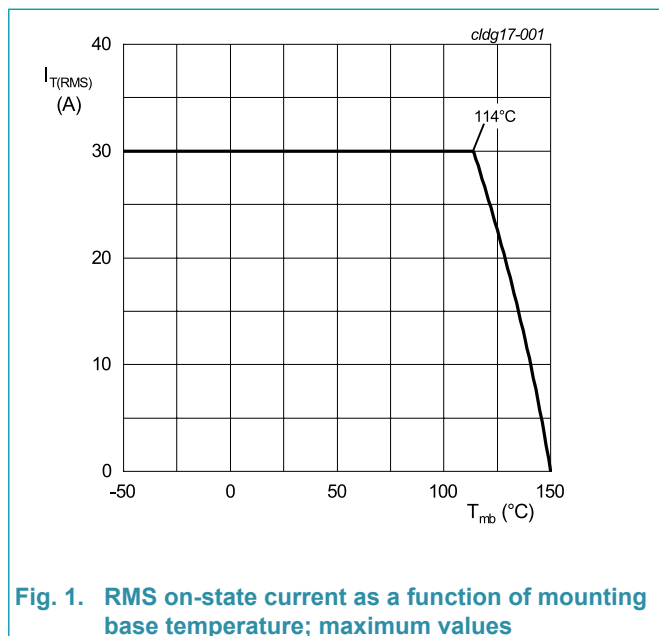


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

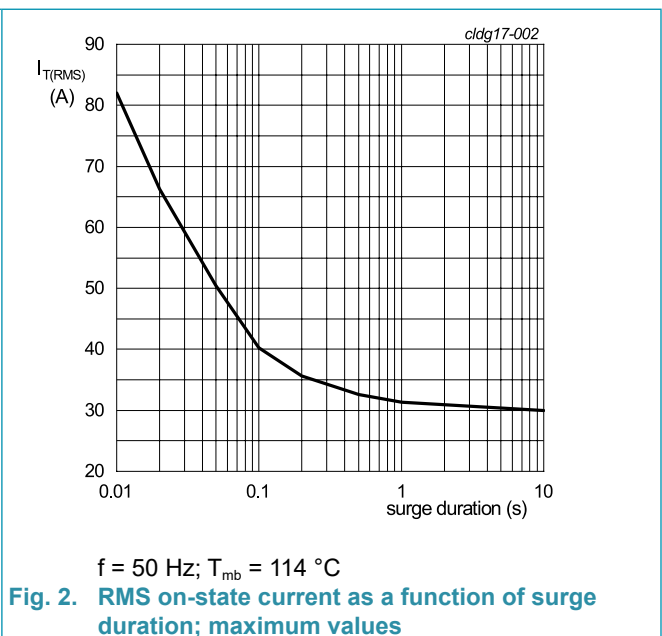
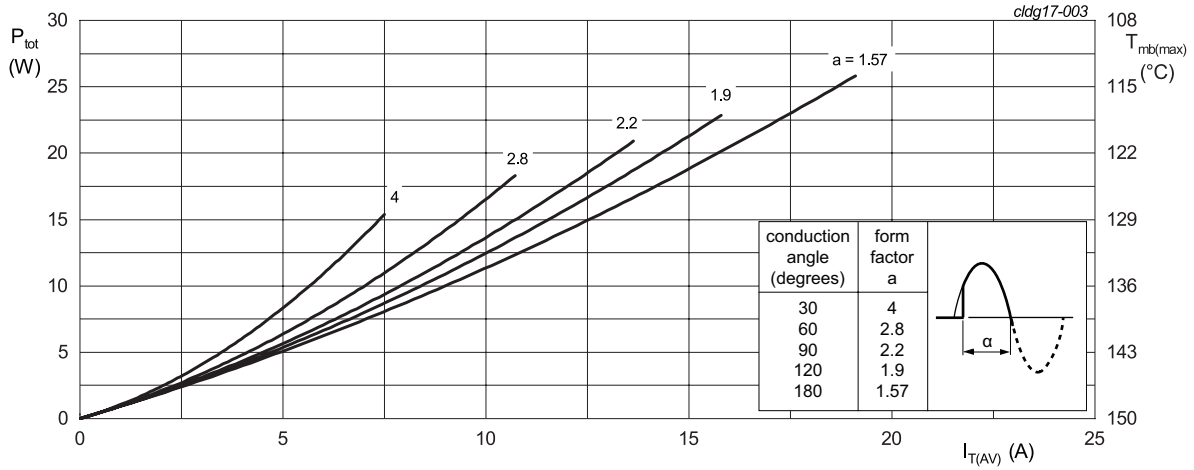
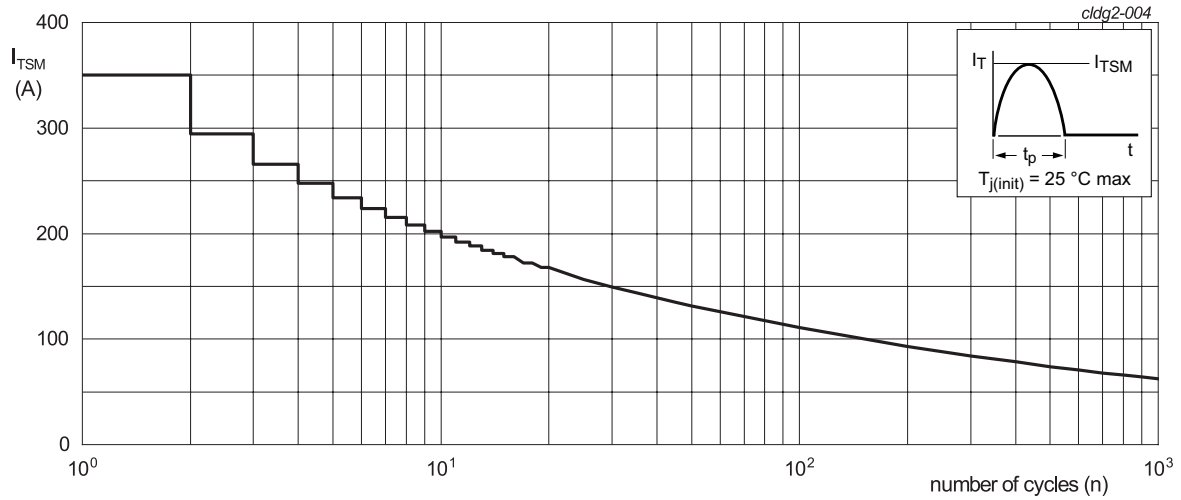


Fig. 2. RMS on-state current as a function of surge duration; maximum values
 $f = 50\text{ Hz}$; $T_{mb} = 114\text{ }^{\circ}\text{C}$



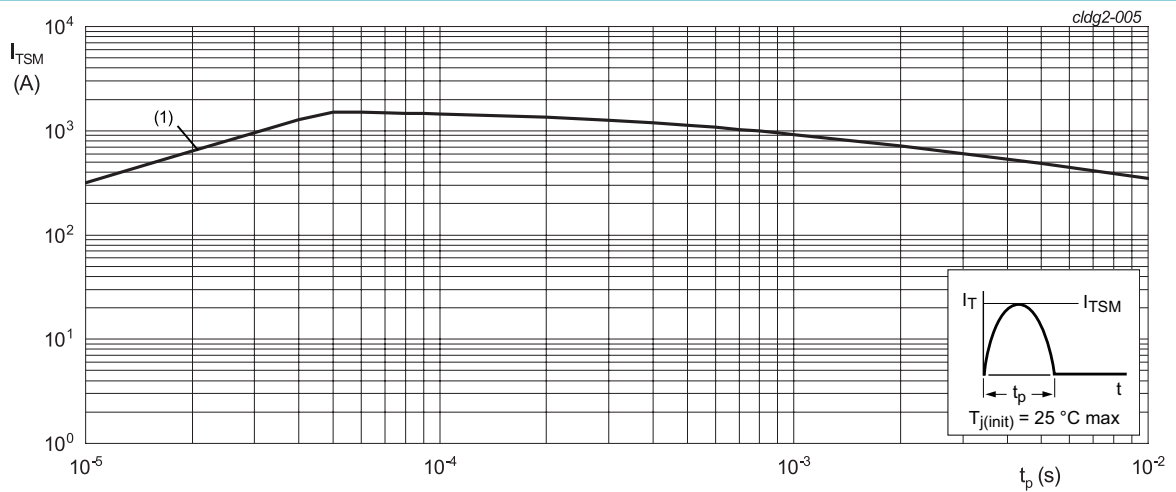
α = conduction angle
 a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



$f = 50\text{ Hz}$

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



$t_p \leq 10\text{ ms}$
 (1) di_T/dt limit

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
$R_{th(j-mb)}$	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

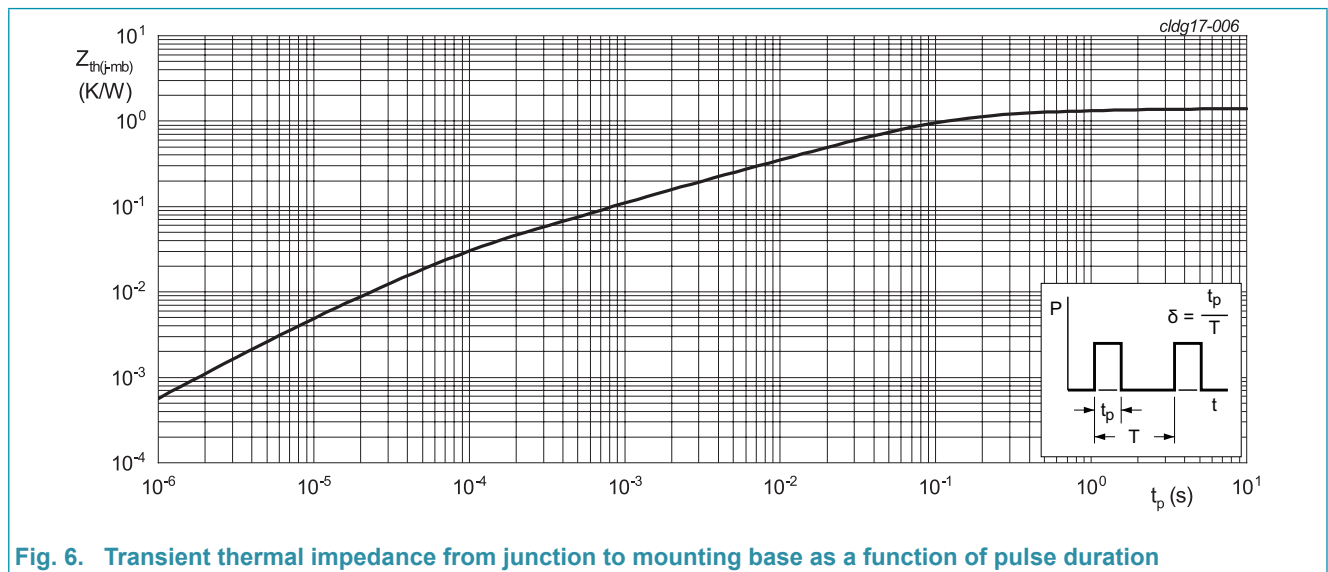


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

9. Isolation characteristics

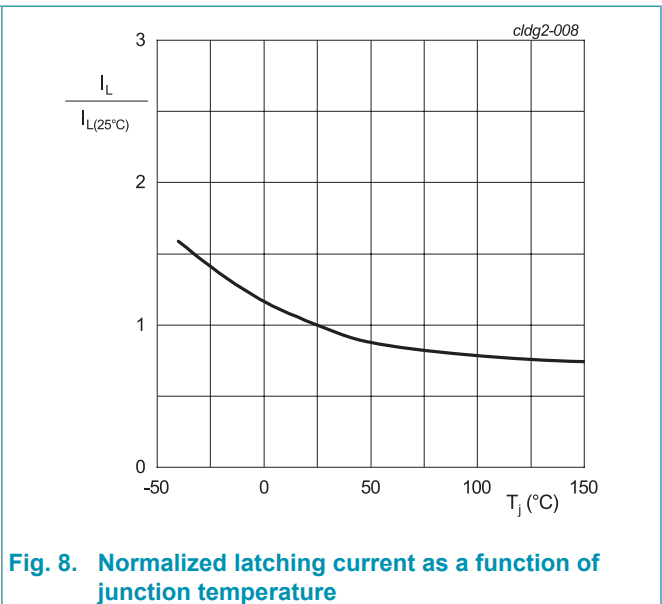
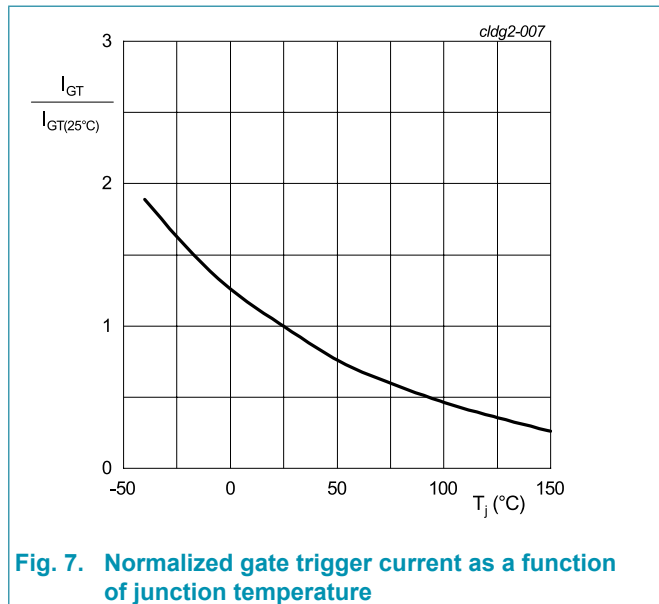
Table 6. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	$50 \text{ Hz} \leq f \leq 60 \text{ Hz}$; $RH \leq 65 \%$; 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

10. Characteristics

Table 7. Characteristics

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



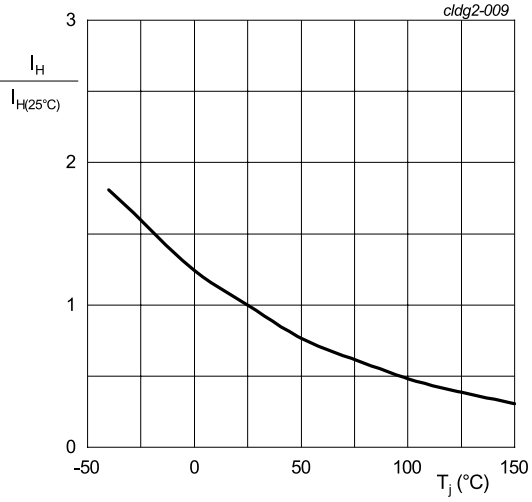
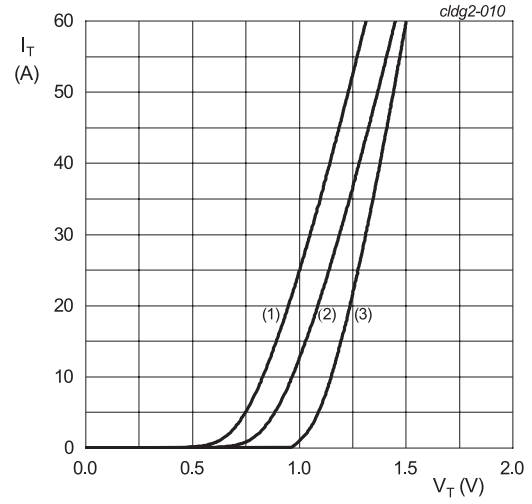


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 0.899 \text{ V}; R_s = 0.0096 \Omega$
 (1) $T_j = 150^\circ\text{C}$; typical values
 (2) $T_j = 150^\circ\text{C}$; maximum values
 (3) $T_j = 25^\circ\text{C}$; maximum values

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

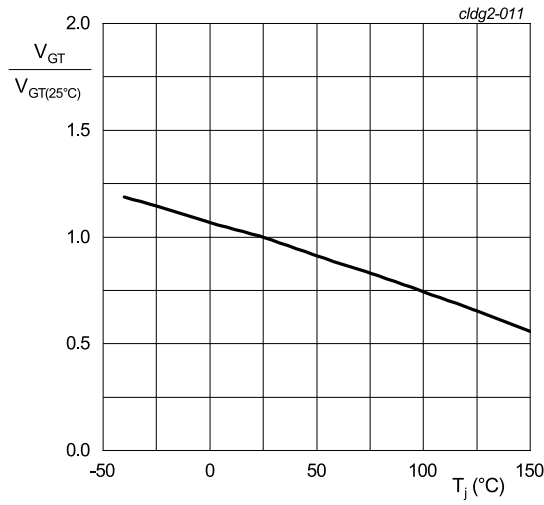


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

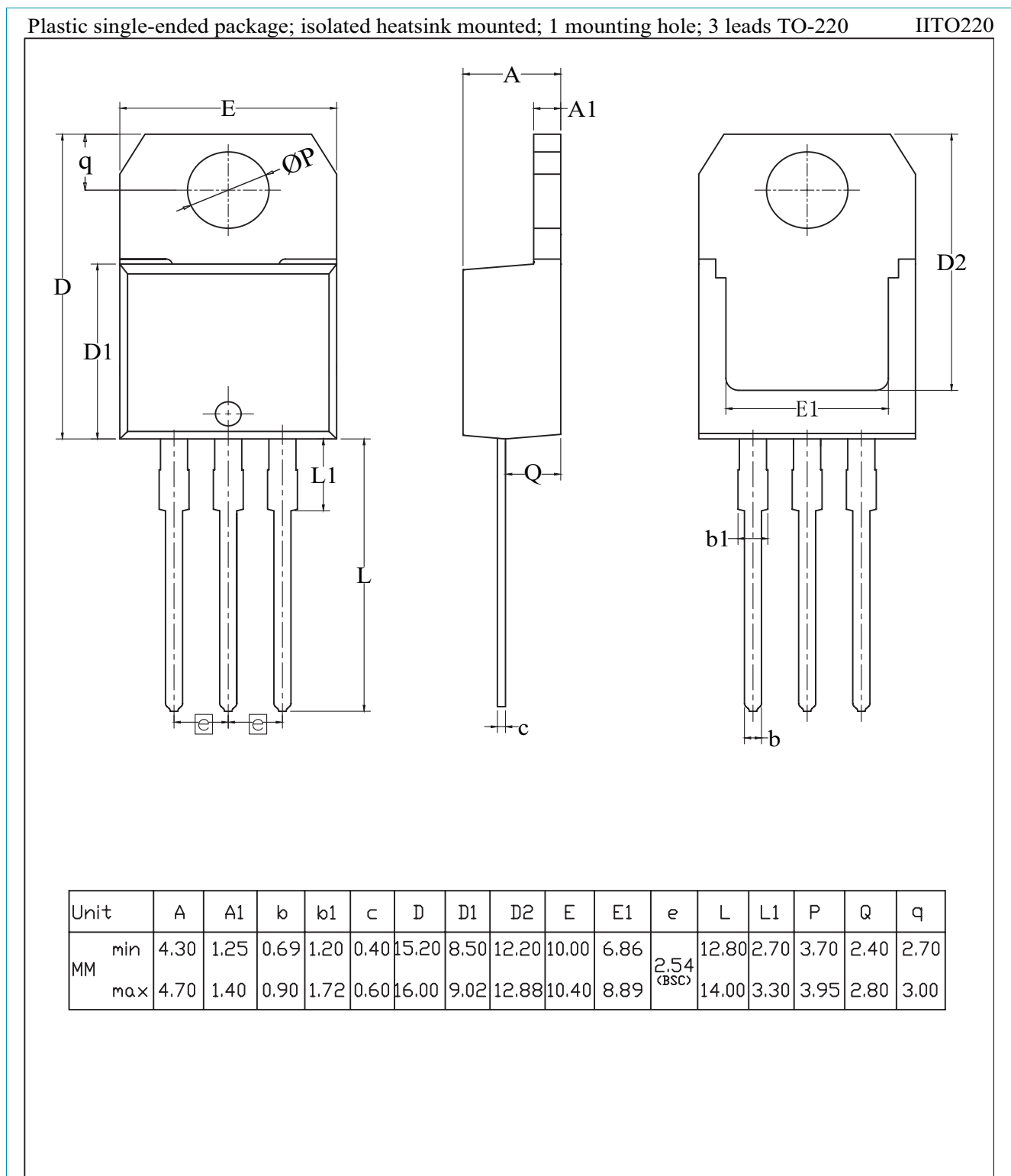


Fig. 12. Package outline IITO220

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.
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