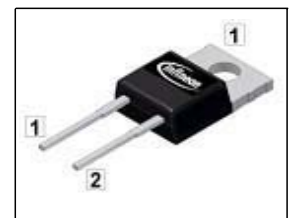


**Fast Switching Diode  
Features**

- 600 V diode technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21
- Qualified according to JEDEC for target applications

**Product Summary**

$V_{RRM}$	600	V
$I_F$	9	A
$V_F$	1.5	V
$T_{jmax}$	175	°C

**PG-TO220-2**


Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDP09E60	PG-TO220-2	-	D09E60	C	A	-

**Maximum Ratings, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	$V_{RRM}$	600	V
Continuous forward current	$I_F$	19.3 13	A
$T_C=25\text{ °C}$			
$T_C=90\text{ °C}$			
Surge non repetitive forward current	$I_{FSM}$	40	
$T_C=25\text{ °C}$ , $t_p=10\text{ ms}$ , sine halfwave			
Maximum repetitive forward current	$I_{FRM}$	29.5	
$T_C=25\text{ °C}$ , $t_p$ limited by $T_{jmax}$ , $D=0.5$			
Power dissipation	$P_{tot}$	57.7 32.7	W
$T_C=25\text{ °C}$			
$T_C=90\text{ °C}$			
Operating and storage temperature	$T_j, T_{stg}$	-55...+175	°C
Soldering temperature	$T_S$	260	°C
wavesoldering, 1.6mm (0.063 in.) from case for 10s			

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$	-	-	2.6	K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$	-	-	62	
SMD version, device on PCB: @ min. footprint @ 6 cm <sup>2</sup> cooling area <sup>1)</sup>	$R_{thJA}$	-	-	62	
		-	35	-	

**Electrical Characteristics, at  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Reverse leakage current $V_R=600\text{V}$ , $T_j=25\text{ }^\circ\text{C}$ $V_R=600\text{V}$ , $T_j=150\text{ }^\circ\text{C}$	$I_R$	-	-	50 750	$\mu\text{A}$
Forward voltage drop $I_F=9\text{A}$ , $T_j=25\text{ }^\circ\text{C}$ $I_F=9\text{A}$ , $T_j=150\text{ }^\circ\text{C}$	$V_F$	-	1.5 1.5	2 -	V

<sup>0</sup>J-STD20 and JESD22

<sup>1</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

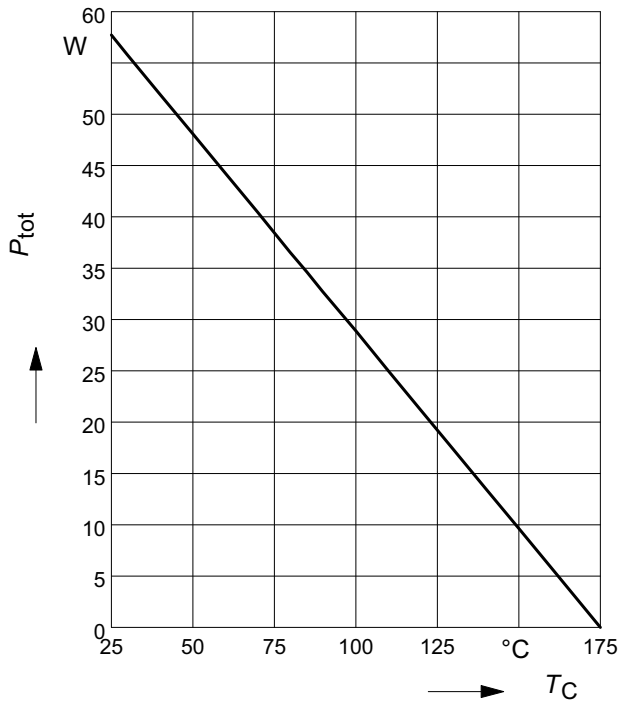
**Electrical Characteristics, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Reverse recovery time $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$t_{rr}$	-	75 110 112	-	ns
Peak reverse current $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$I_{rrm}$	-	10.2 11.8 12.3	-	A
Reverse recovery charge $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	$Q_{rr}$	-	343 585 612	-	nC
Reverse recovery softness factor $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=25\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=125\text{°C}$ $V_R=400\text{V}$ , $I_F=9\text{A}$ , $di_F/dt=800\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$	S	-	4 5.5 5.7	-	

**1 Power dissipation**

$$P_{\text{tot}} = f(T_C)$$

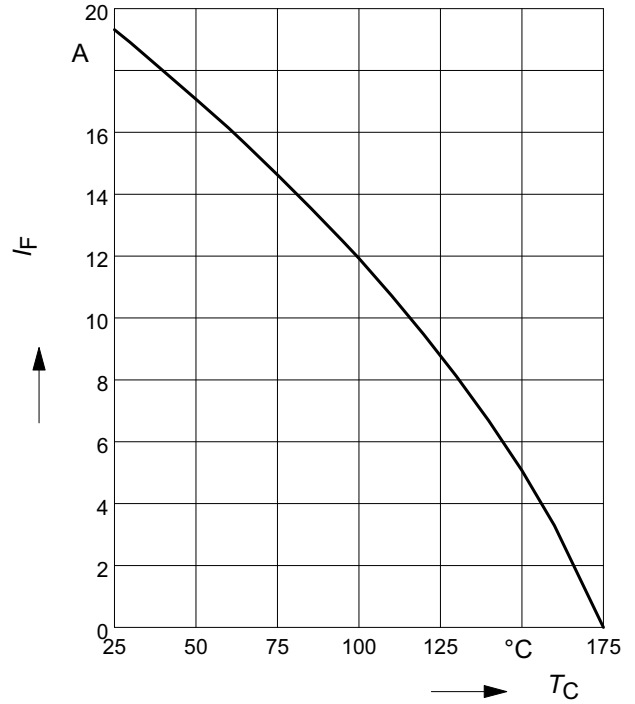
parameter:  $T_j \leq 175^\circ\text{C}$



**2 Diode forward current**

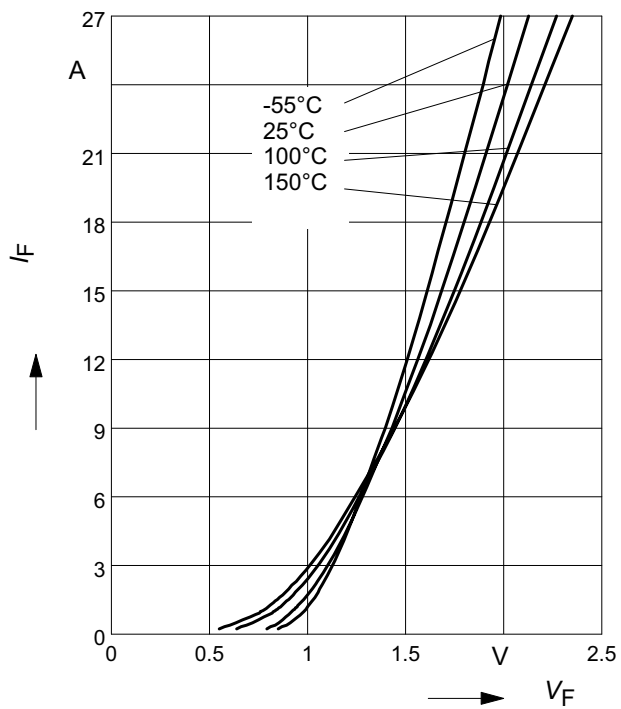
$$I_F = f(T_C)$$

parameter:  $T_j \leq 175^\circ\text{C}$



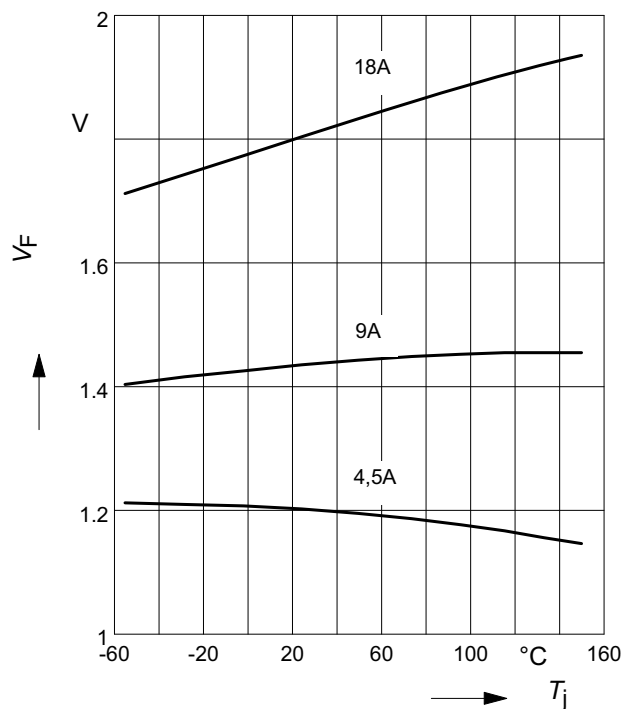
**3 Typ. diode forward current**

$$I_F = f(V_F)$$



**4 Typ. diode forward voltage**

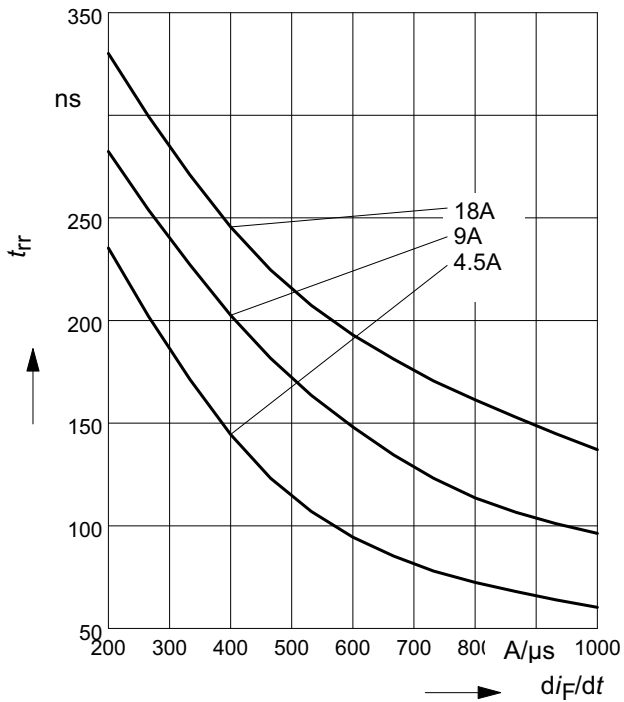
$$V_F = f(T_j)$$



**5 Typ. reverse recovery time**

$$t_{rr} = f(dI_F/dt)$$

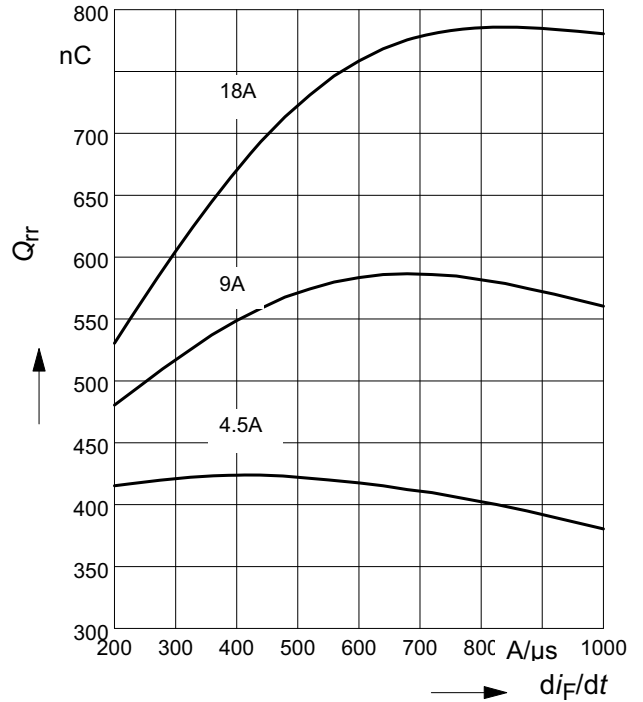
parameter:  $V_R = 400V, T_j = 125^\circ C$



**6 Typ. reverse recovery charge**

$$Q_{rr} = f(dI_F/dt)$$

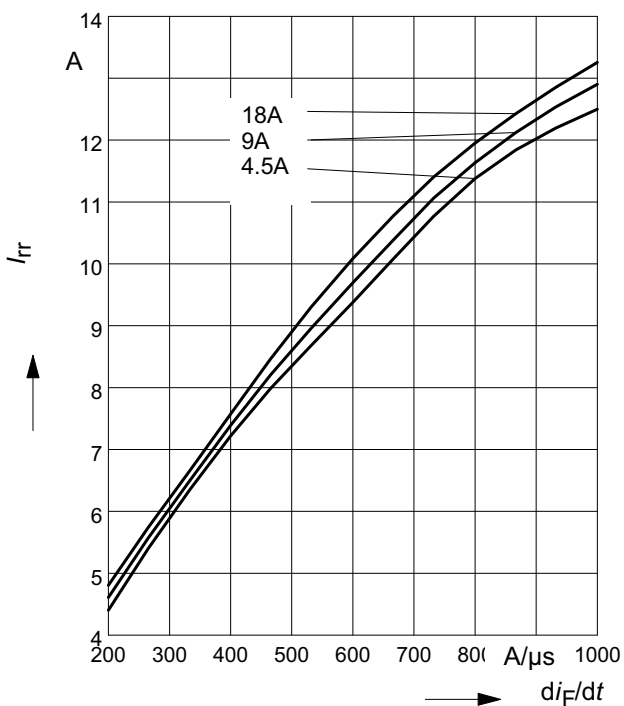
parameter:  $V_R = 400V, T_j = 125^\circ C$



**7 Typ. reverse recovery current**

$$I_{rr} = f(dI_F/dt)$$

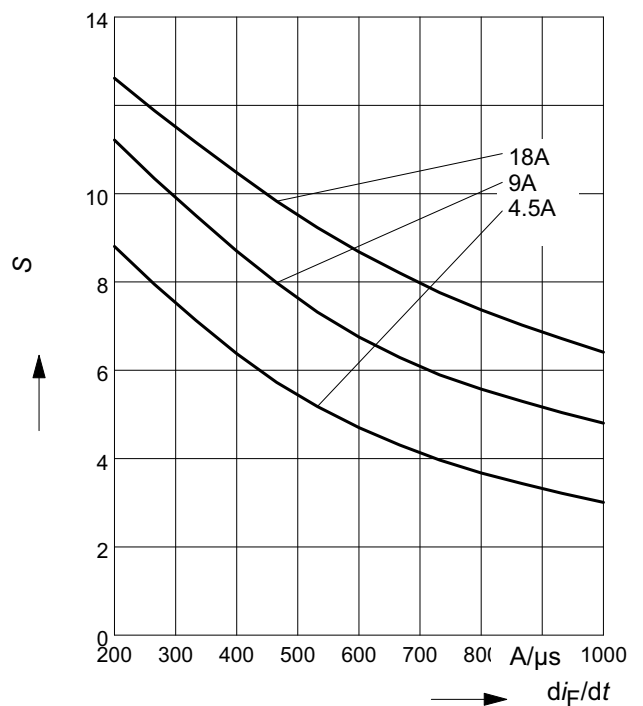
parameter:  $V_R = 400V, T_j = 125^\circ C$



**8 Typ. reverse recovery softness factor**

$$S = f(dI_F/dt)$$

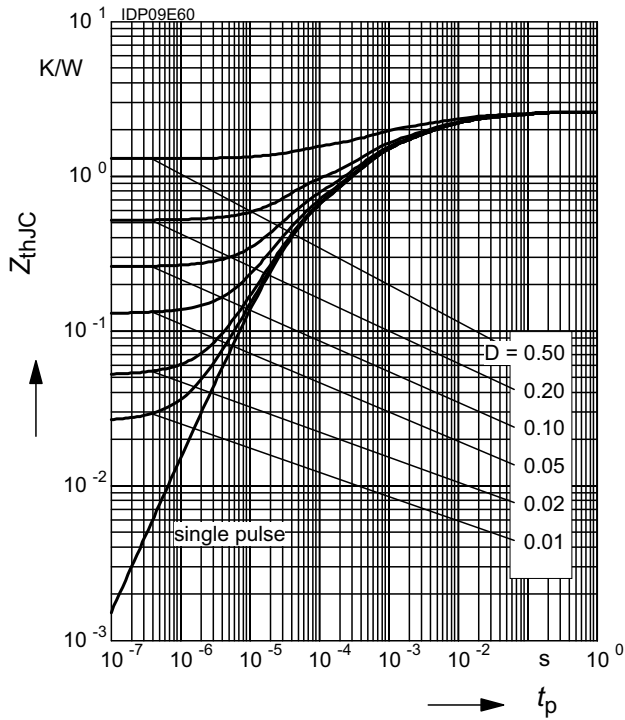
parameter:  $V_R = 400V, T_j = 125^\circ C$



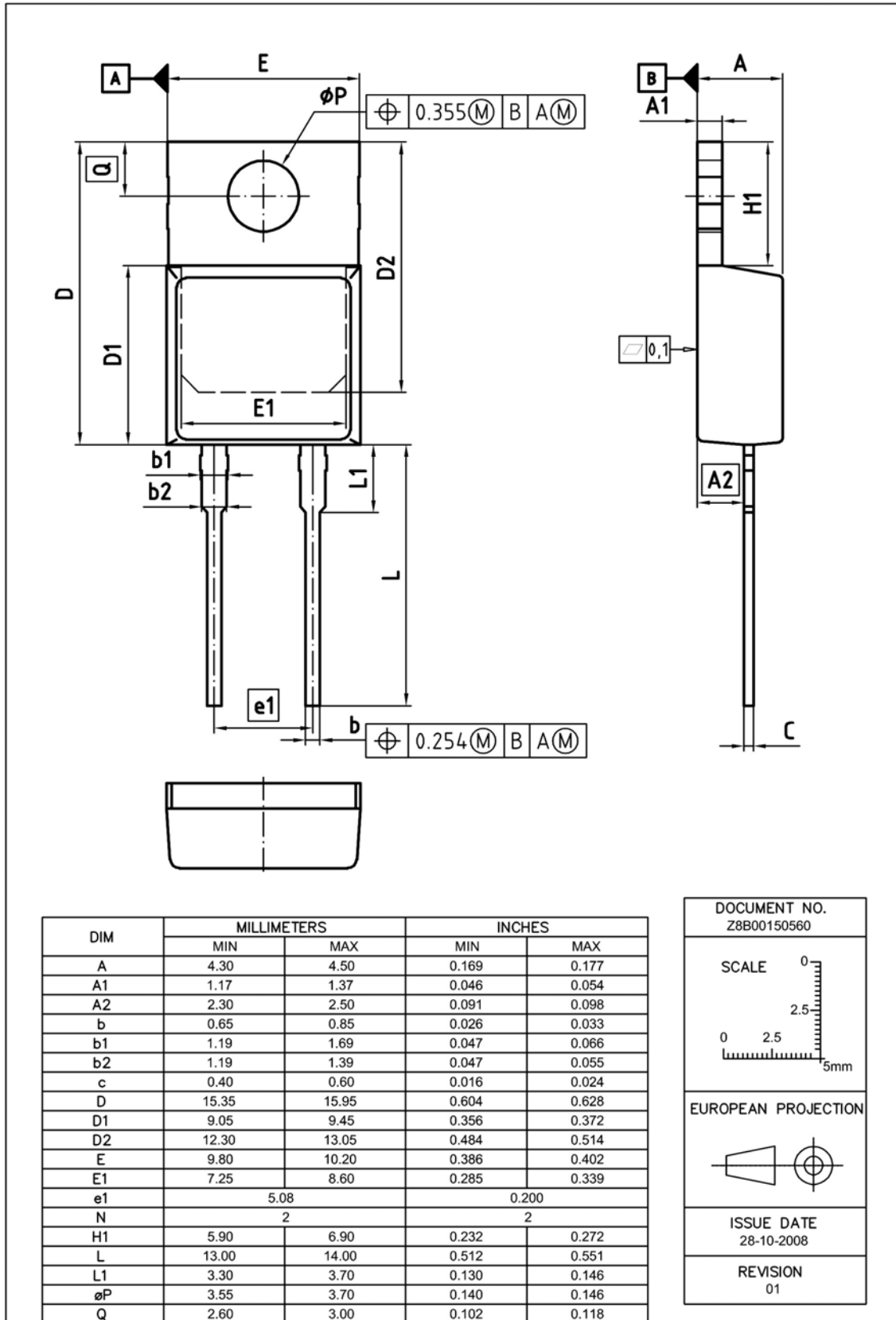
**9 Max. transient thermal impedance**

$$Z_{thJC} = f(t_p)$$

parameter :  $D = t_p/T$



Pacakge outline: TO220-2-1



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