

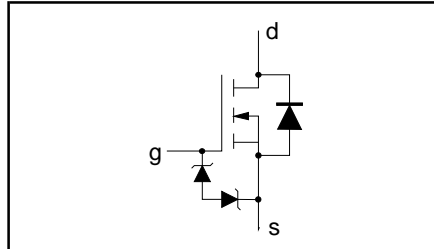
TrenchMOS™ transistor Logic level FET

PHP125N06LT, PHB125N06LT

FEATURES

- 'Trench' technology
- Very low on-state resistance
- Fast switching
- Stable off-state characteristics
- High thermal cycling performance
- Low thermal resistance

SYMBOL QUICK REFERENCE DATA



$V_{DSS} = 55 \text{ V}$
$I_D = 75 \text{ A}$
$R_{DS(ON)} \leq 8 \text{ m}\Omega (V_{GS} = 5 \text{ V})$
$R_{DS(ON)} \leq 7 \text{ m}\Omega (V_{GS} = 10 \text{ V})$

GENERAL DESCRIPTION

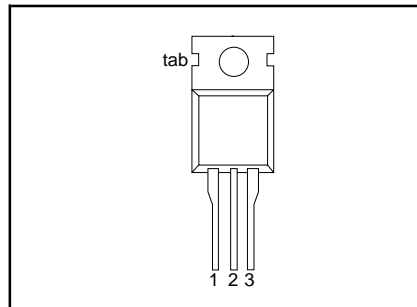
N-channel enhancement mode, logic level, field-effect power transistor in a plastic envelope using 'trench' technology. The device has very low on-state resistance. It is intended for use in dc to dc converters and general purpose switching applications.

The PHP125N06LT is supplied in the SOT78 (TO220AB) conventional leaded package.
The PHB125N06LT is supplied in the SOT404 surface mounting package.

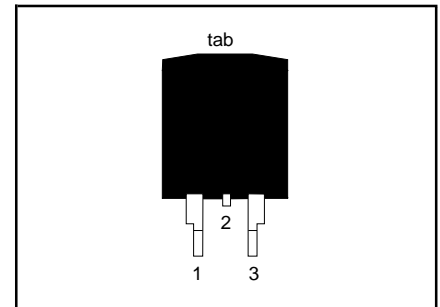
PINNING

PIN	DESCRIPTION
1	gate
2	drain ¹
3	source
tab	drain

SOT78 (TO220AB)



SOT404



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DSS}	Drain-source voltage	$T_j = 25 \text{ }^\circ\text{C}$ to $175 \text{ }^\circ\text{C}$	-	55	V
V_{DGR}	Drain-gate voltage	$T_j = 25 \text{ }^\circ\text{C}$ to $175 \text{ }^\circ\text{C}$; $R_{GS} = 20 \text{ k}\Omega$	-	55	V
V_{GS}	Gate-source voltage		-	± 13	V
I_D	Continuous drain current	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	75	A
		$T_{mb} = 100 \text{ }^\circ\text{C}$	-	75	A
I_{DM}	Pulsed drain current	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	240	A
P_D	Total power dissipation	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	250	W
T_j, T_{stg}	Operating junction and storage temperature		- 55	175	$^\circ\text{C}$

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THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th(jc)}$	Thermal resistance junction to mounting base	-	0.6	-	K/W
$R_{th(j-a)}$	Thermal resistance junction to ambient	SOT78 package, in free air SOT404 package, pcb mounted, minimum footprint	60 50	- -	K/W K/W

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage, all pins	Human body model (100 pF, 1.5 k Ω)	-	2	kV

ELECTRICAL CHARACTERISTICS

$T_j = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA};$ $T_j = -55^\circ\text{C}$	55 50	- -	- -	V V
$V_{(BR)GSS}$	Gate-source breakdown voltage	$I_G = \pm 1\text{ mA};$	10	-	-	V
$V_{GS(TO)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 1\text{ mA}$ $T_j = 175^\circ\text{C}$ $T_j = -55^\circ\text{C}$	1.0 0.5 -	1.5 -	2.0 - 2.3	V V V
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = 5\text{ V}; I_D = 25\text{ A}$ $V_{GS} = 10\text{ V}; I_D = 25\text{ A}$ $T_j = 175^\circ\text{C}$	- -	6.5 4.9	8 7 17	m Ω m Ω m Ω
g_{fs}	Forward transconductance	$V_{DS} = 25\text{ V}; I_D = 25\text{ A}$	10	45	-	S
I_{GSS}	Gate source leakage current	$V_{GS} = \pm 5\text{ V}; V_{DS} = 0\text{ V}$ $T_j = 175^\circ\text{C}$	-	0.02	1	μA μA
I_{DSS}	Zero gate voltage drain current	$V_{DS} = 55\text{ V}; V_{GS} = 0\text{ V};$ $T_j = 175^\circ\text{C}$	-	0.05	10	μA μA
$Q_{g(tot)}$	Total gate charge	$I_D = 50\text{ A}; V_{DD} = 44\text{ V}; V_{GS} = 5\text{ V}$	-	84	-	nC
Q_{gs}	Gate-source charge		-	18	-	nC
Q_{gd}	Gate-drain (Miller) charge		-	39	-	nC
t_{don}	Turn-on delay time	$V_{DD} = 30\text{ V}; I_D = 25\text{ A};$	-	45	60	ns
t_r	Turn-on rise time	$V_{GS} = 5\text{ V}; R_G = 10\ \Omega$	-	120	170	ns
t_{doff}	Turn-off delay time	Resistive load	-	225	300	ns
t_f	Turn-off fall time		-	100	135	ns
L_d	Internal drain inductance	Measured from tab to centre of die	-	3.5	-	nH
L_d	Internal drain inductance	Measured from drain lead to centre of die (SOT78 package only)	-	4.5	-	nH
L_s	Internal source inductance	Measured from source lead to source bond pad	-	7.5	-	nH
C_{iss}	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	5200	6900	pF
C_{oss}	Output capacitance		-	840	1000	pF
C_{rss}	Feedback capacitance		-	350	480	pF

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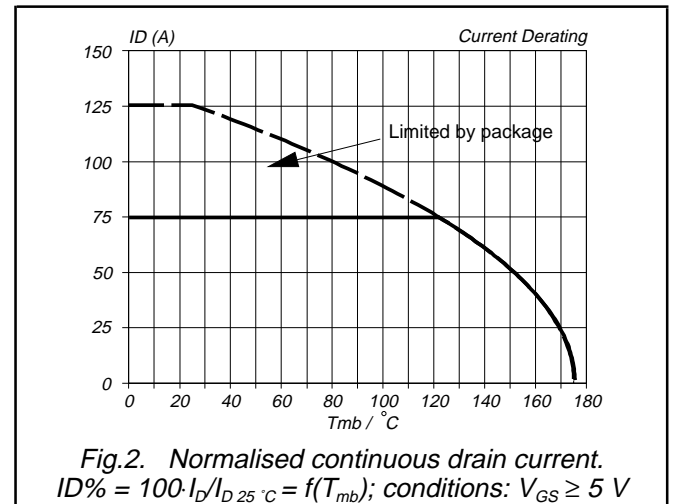
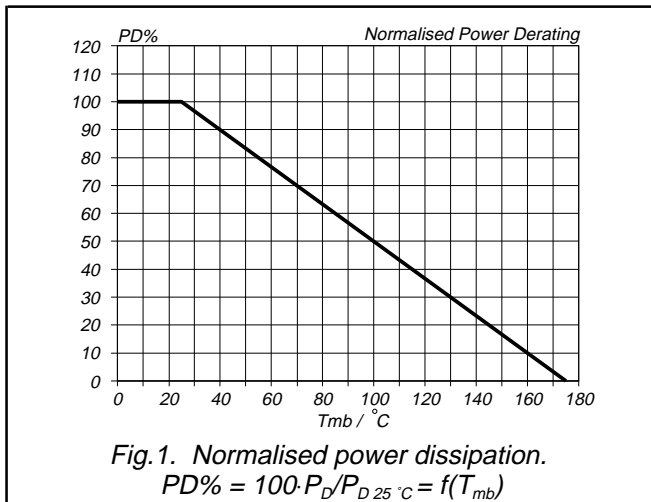
REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS

$T_j = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{SM}	Continuous source current (body diode)	- - 75	A			
I_{SM}	Pulsed source current (body diode)		-	-	240	A
V_{SD}	Diode forward voltage	$I_F = 25\text{ A}; V_{GS} = 0\text{ V}$	-	0.85	1.2	V
		$I_F = 75\text{ A}; V_{GS} = 0\text{ V}$	-	1.0	-	V
t_{rr}	Reverse recovery time	$I_F = 75\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s};$ $V_{GS} = -10\text{ V}; V_R = 30\text{ V}$	-	65	-	ns
Q_{rr}	Reverse recovery charge		-	0.18	-	μC

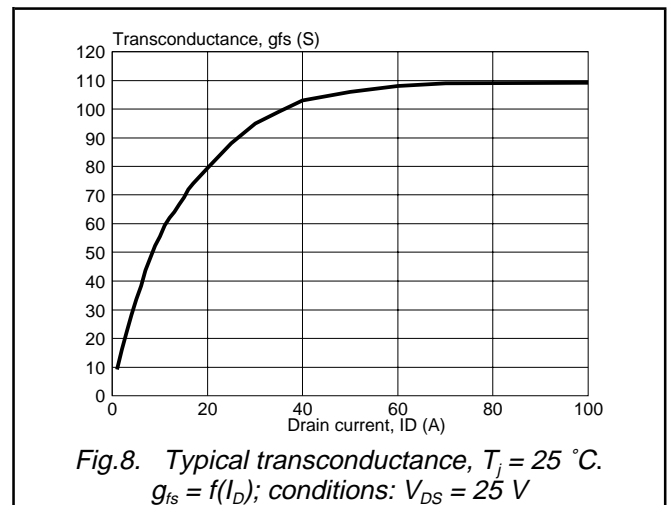
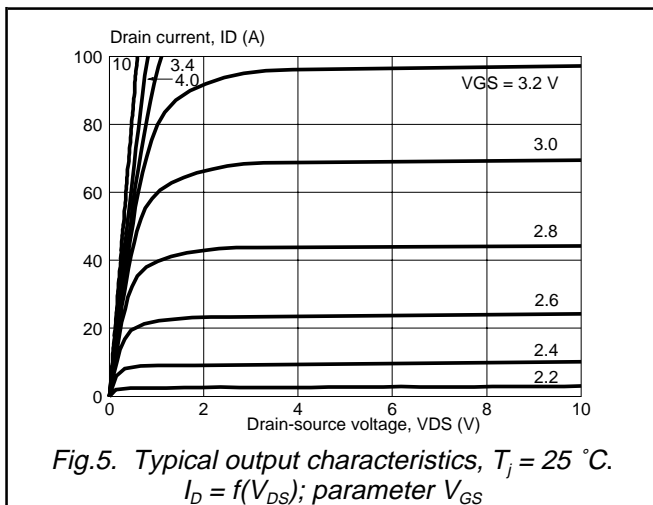
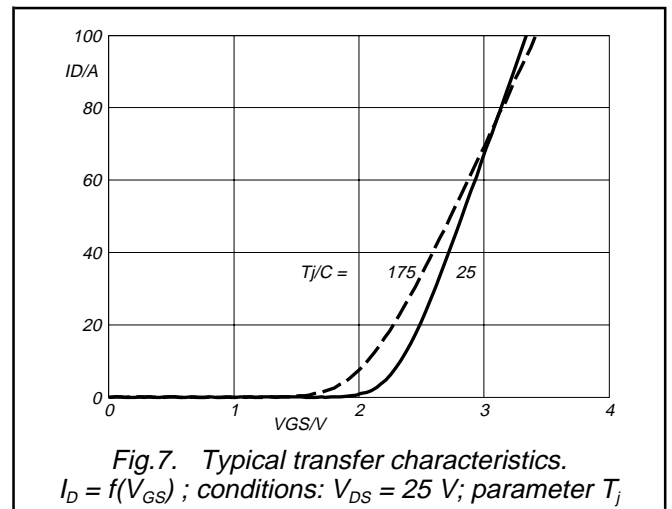
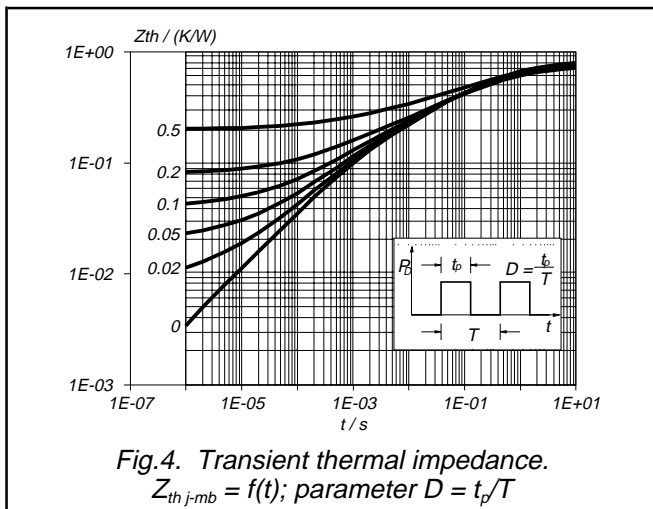
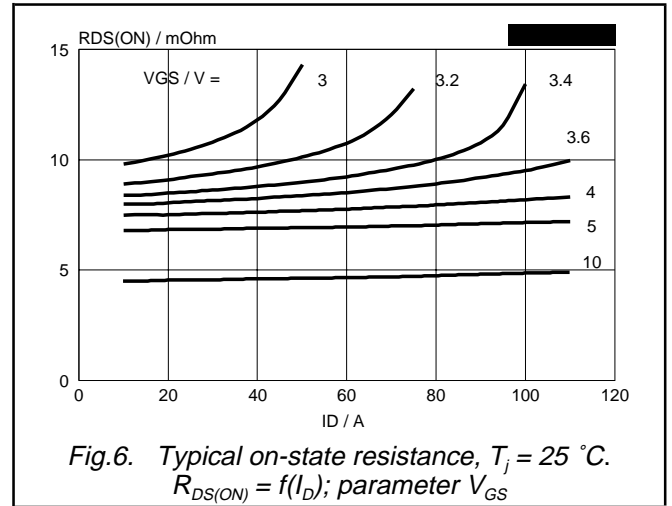
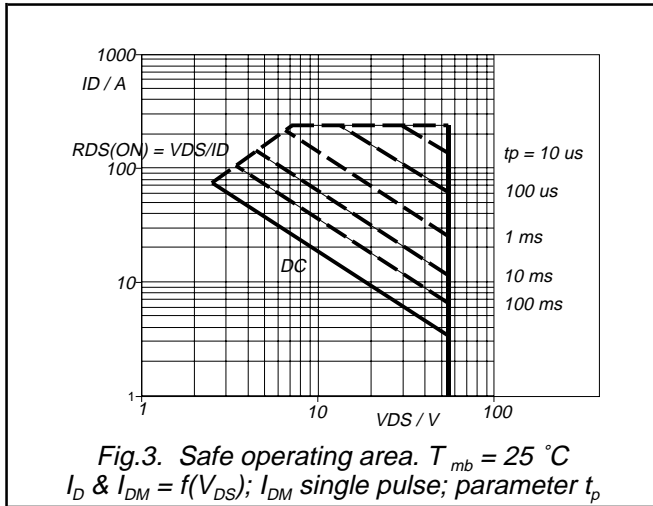
AVALANCHE LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
W_{DSS}	Drain-source non-repetitive unclamped inductive turn-off energy	$I_D = 75\text{ A}; V_{DD} \leq 25\text{ V}; V_{GS} = 5\text{ V};$ $R_{GS} = 50\ \Omega; T_{mb} = 25^\circ\text{C}$	-	500	mJ



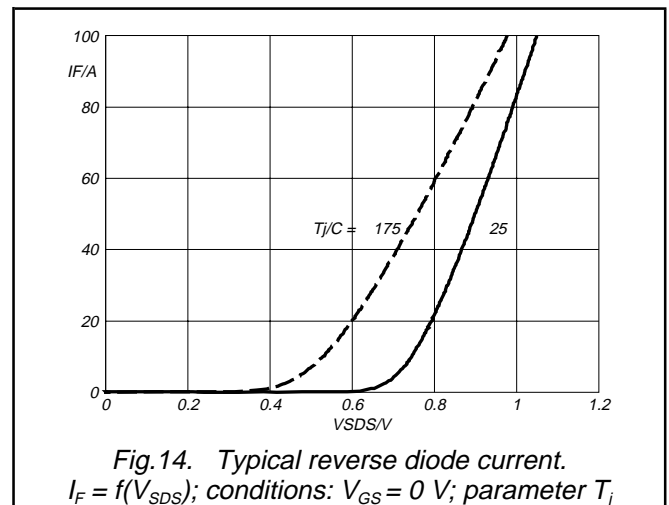
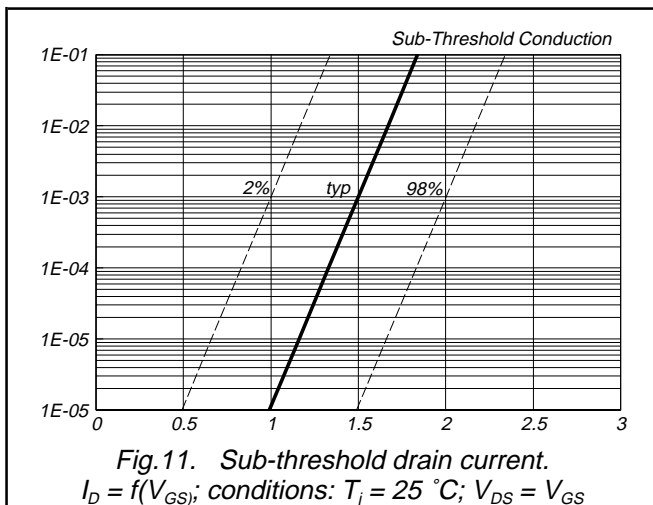
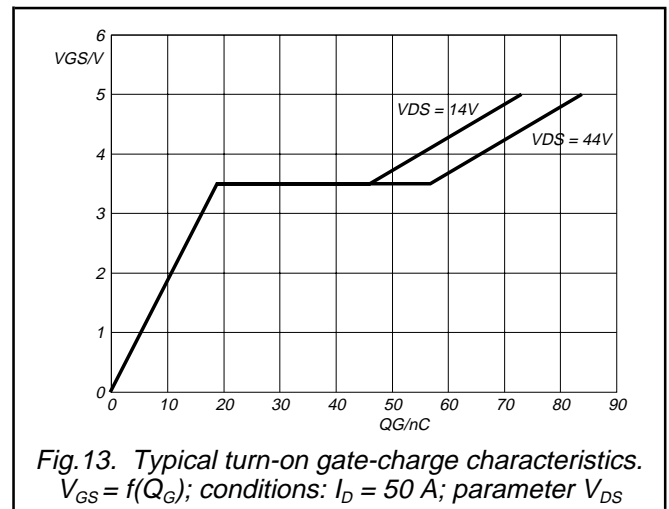
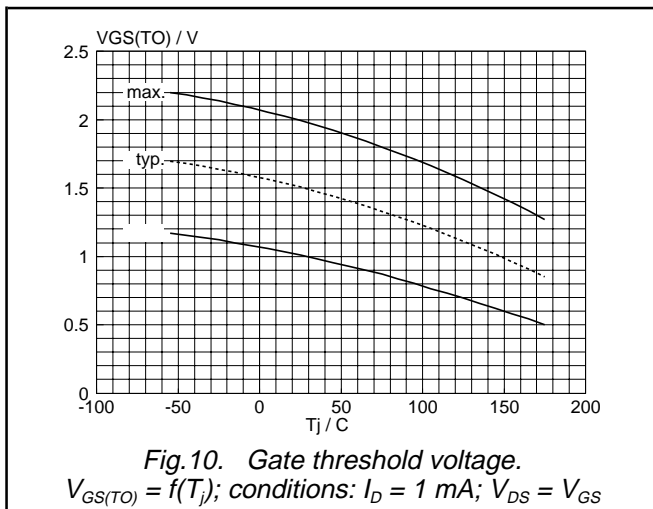
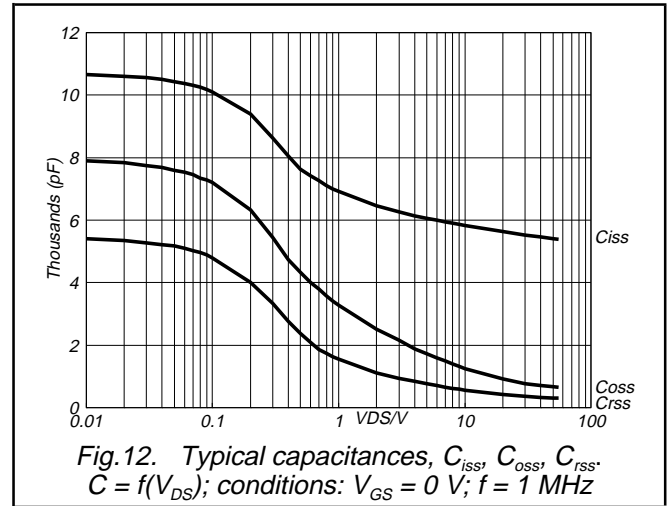
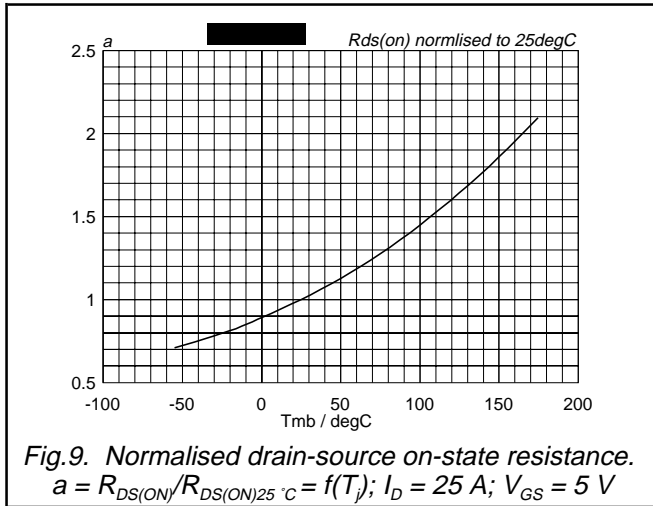
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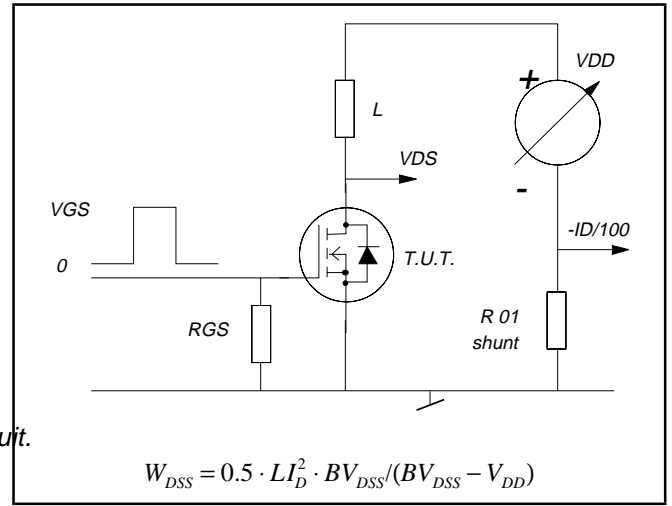
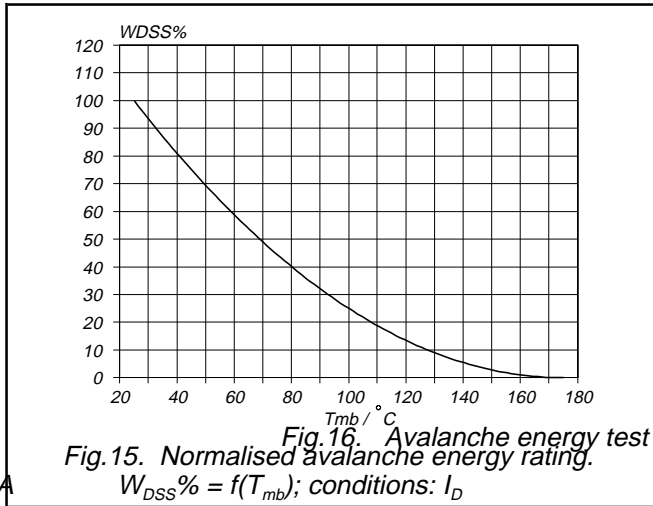
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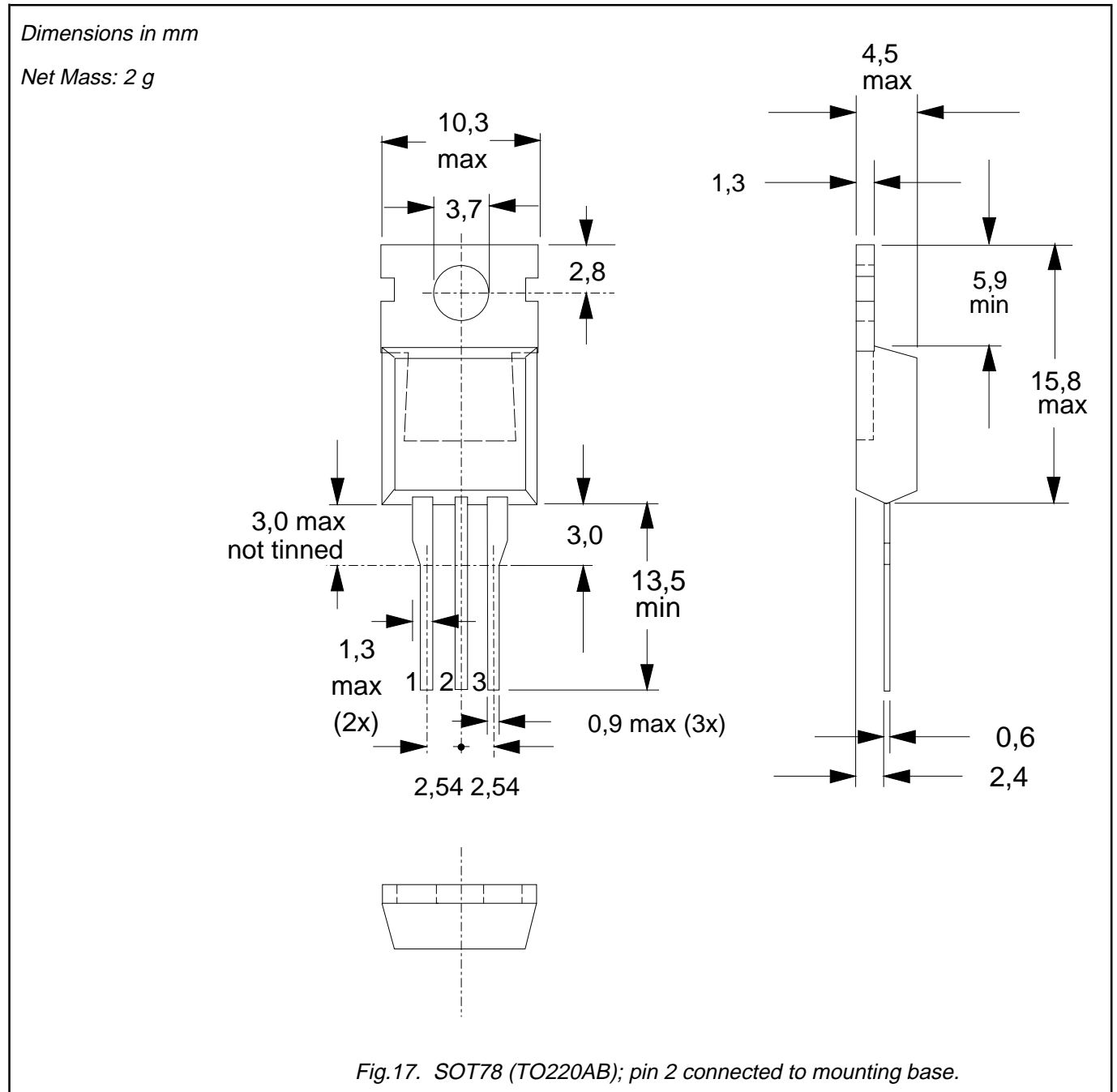
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MECHANICAL DATA



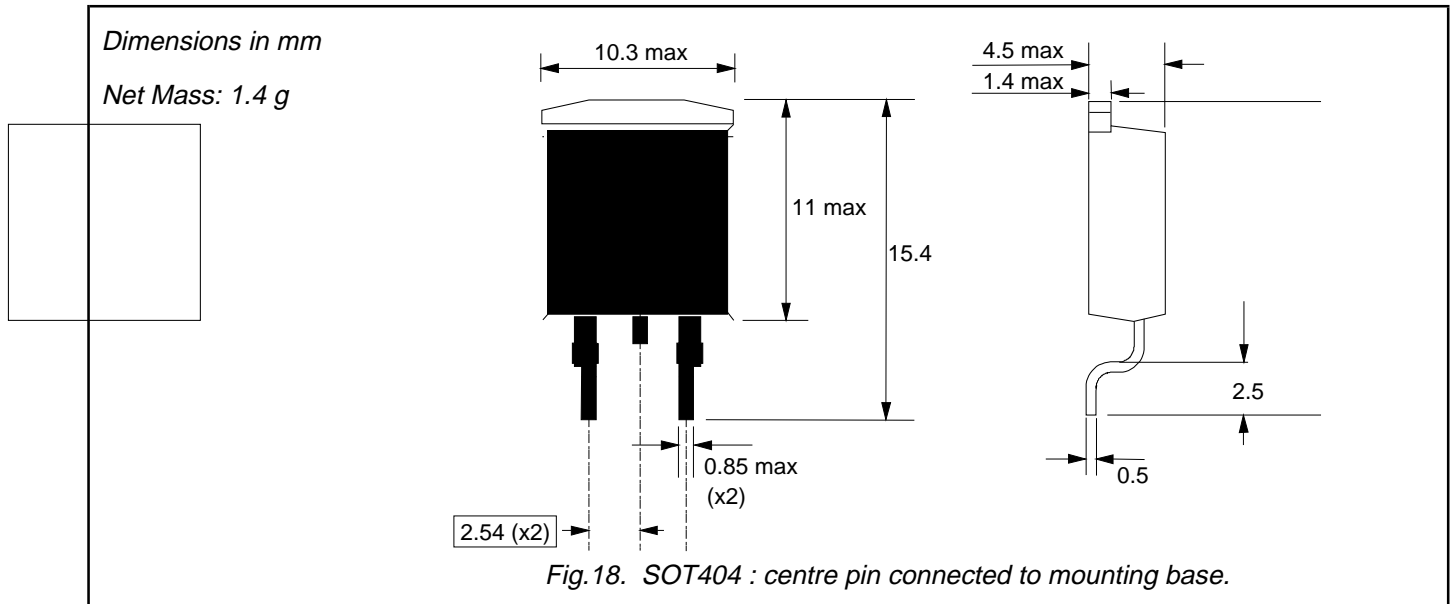
Notes

1. Observe the general handling precautions for electrostatic-discharge sensitive devices (ESDs) to prevent damage to MOS gate oxide.
2. Refer to mounting instructions for SOT78 (TO220) envelopes.
3. Epoxy meets UL94 V0 at 1/8".

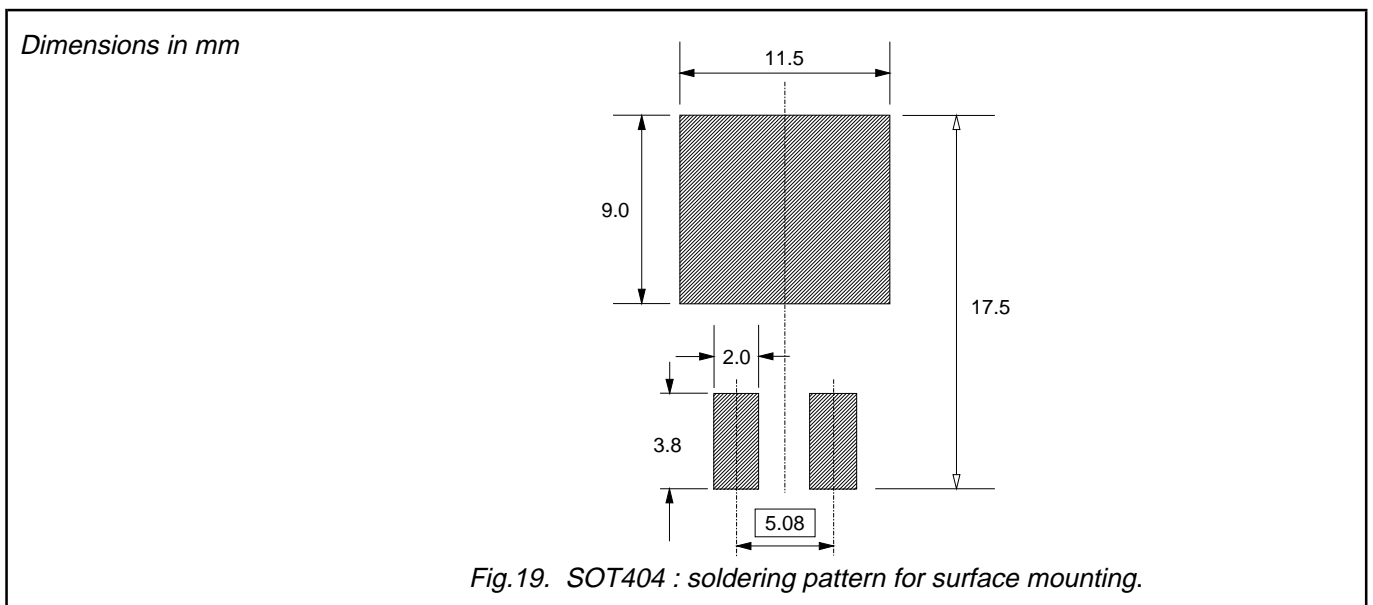
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MECHANICAL DATA



MOUNTING INSTRUCTIONS



Notes

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DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
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