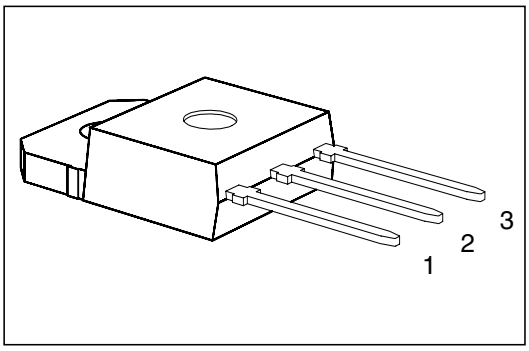
Features

- N channel
- Enhancement mode
- Temperature sensor with thyristor characteristic
- The drain pin is electrically shorted to the tab
- AEC qualified
- Green product (RoHS compliant)



Pin	1	2	3
	G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	
BTS 240A	50 V	58 A	0.018 Ω	PG-TO-218	

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	50	V
Drain-gate voltage, R_{GS} = 20 kΩ	V_{DGR}	50	
Gate-source voltage	V_{GS}	± 20	
Continuous drain current, T_C = 73 °C	I_D	58	A
ISO drain current T_C = 85 °C, V_{GS} = 10 V, V_{DS} = 0.5 V	$I_{D\text{-}ISO}$	21.0	
Pulsed drain current, T_C = 25 °C	$I_{D\ puls}$	232	
Short circuit current, T_j = – 55 ... + 150 °C	I_{SC}	147	
Short circuit dissipation, T_j = – 55 ... + 150 °C	P_{SCmax}	2200	W
Power dissipation	P_{tot}	170	
Operating and storage temperature range	T_j, T_{stg}	– 55 ... + 150	°C
Thermal resistance Chip-case Chip-ambient	 $R_{th\ JC}$ $R_{th\ JA}$	 ≤ 0.74 ≤ 45	K/W

Electrical Characteristics

at T_j = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS} = 0, I_D = 0.25 mA	$V_{(BR)DSS}$	50	–	–	V
Gate threshold voltage V_{GS} = V_{DS}, I_D = 1 mA	$V_{GS(th)}$	2.5	3.0	3.5	
Zero gate voltage drain current V_{GS} = 0 V, V_{DS} = 50 V T_j = 25 °C T_j = 125 °C	I_{DSS}	 – –	 0.1 10	 1.0 100	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 T_j = 25 °C T_j = 150 °C	I_{GSS}	 – –	 10 2.0	 100 4.0	 nA µA
Drain-source on-state resistance V_{GS} = 10 V, I_D =47 A	$R_{DS(on)}$	–	0.012	0.018	Ω
Dynamic Characteristics					
Forward transconductance $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, I_D = 47 A	g_{fs}	20.0	43.0	–	S
Input capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{iss}	–	2.9	4.3	nF
Output capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{oss}	–	1.4	2.1	
Reverse transfer capacitance V_{GS} = 0, V_{DS} = 25 V, f = 1 MHz	C_{rss}	–	0.5	0.8	
Turn-on time t_{on}, (t_{on} = $t_{d(on)}$ + t_r) V_{CC} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_{GS} = 50 Ω	$t_{d(on)}$	–	50	75	ns
	t_r	–	150	230	
Turn-off time t_{off}, (t_{off} = $t_{d(off)}$ + t_f) V_{CC} = 30 V, V_{GS} = 10 V, I_D = 3 A, R_{GS} = 50 Ω	$t_{d(off)}$	–	350	560	
	t_f	–	250	330	

Electrical Characteristics (cont'd)
at T_j = 25 °C, unless otherwise specified.

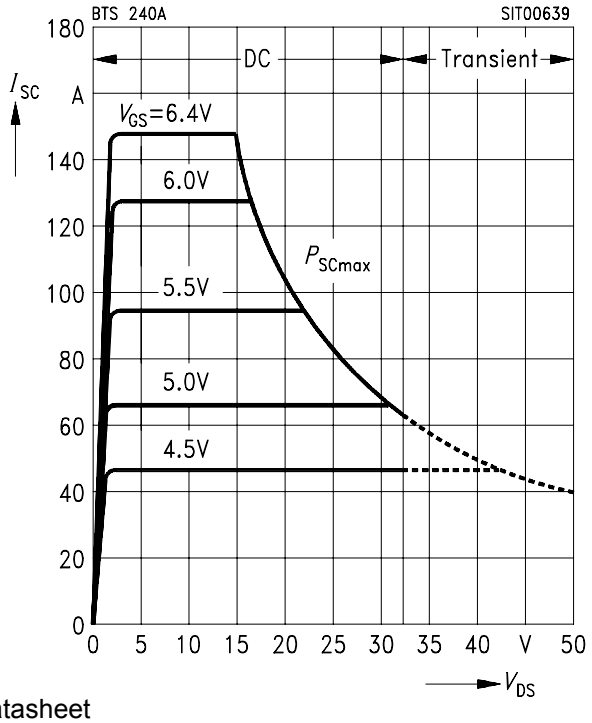
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Continuous source current	I_S	–	–	58	A
Pulsed source current	I_{SM}	–	–	232	
Diode forward on-voltage I_F = 58 A, V_{GS} = 0	V_{SD}	–	1.4	1.8	V
Reverse recovery time $I_F = I_S$, di_F/dt = 100 A/µs, V_R = 30 V	t_{rr}	–	100	–	ns
Reverse recovery charge $I_F = I_S$, di_F/dt = 100 A/µs, V_R = 30 V	Q_{rr}	–	0.3	–	µC
Temperature Sensor					
Forward voltage $I_{TS(on)}$ = 10 mA, T_j = – 55 ... + 150 °C Sensor override, $t_p \leq$ 100 µs T_j = – 55 ... + 160 °C	$V_{TS(on)}$	0.7 –	1.4 –	1.5 10	V
Forward current T_j = – 55 ... + 150 °C Sensor override, $t_p \leq$ 100 µs T_j = – 55 ... + 160 °C	$I_{TS(on)}$	– –	– –	10 600	mA
Holding current, $V_{TS(off)}$ = 5 V, T_j = 25 °C T_j = 150 °C	I_H	0.05 0.05	0.1 0.2	0.5 0.3	
Switching temperature V_{TS} = 5 V	$T_{TS(on)}$	150	–	–	°C
Turn-off time V_{TS} = 5 V, $I_{TS(on)}$ = 2 mA	t_{off}	0.5	–	2.5	µs

Examples for short-circuit protection

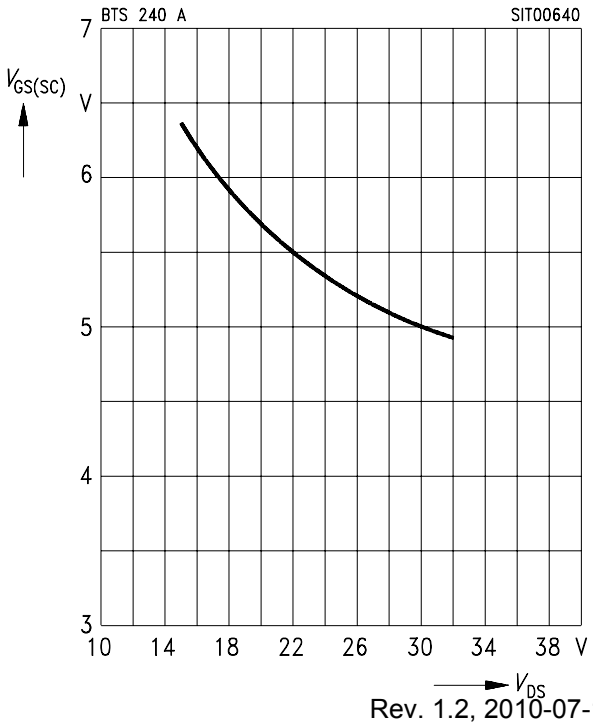
at T_j = – 55 ... + 150 °C, unless otherwise specified.

Parameter	Symbol	Examples			Unit
		1	2	–	
Drain-source voltage	V_{DS}	15	30	–	V
Gate-source voltage	V_{GS}	6.4	5.1	–	
Short-circuit current	I_{SC}	< 147	< 67	–	A
Short-circuit dissipation	P_{SC}	< 2200	< 2000	–	W
Response time T_j = 25 °C, before short circuit	$t_{SC(off)}$	< 25	< 25	–	ms

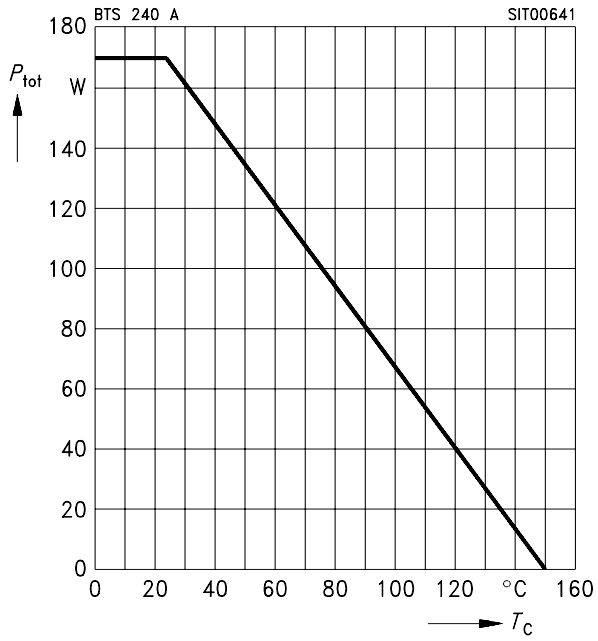
Short-circuit protection $I_{SC} = f(V_{DS})$
Parameter: V_{GS}
Diagram to determine I_{SC} for T_j = – 55 ... + 150°C



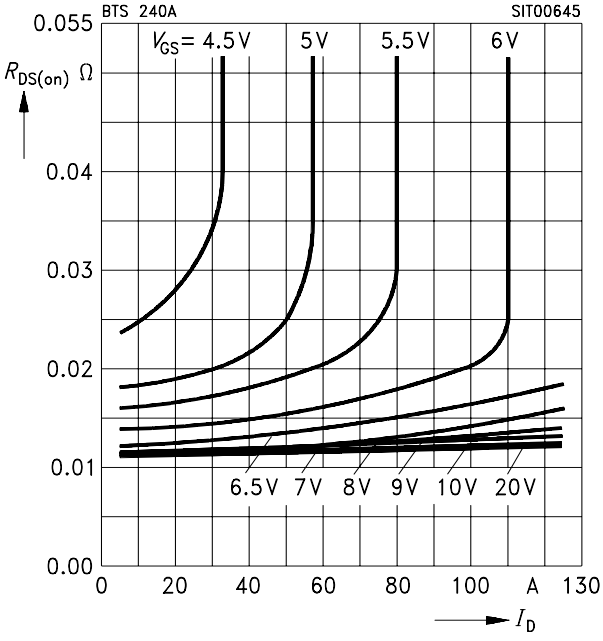
Max. gate voltage $V_{GS(SC)} = f(V_{DS})$
Parameter: T_j = – 55 ... + 150 °C



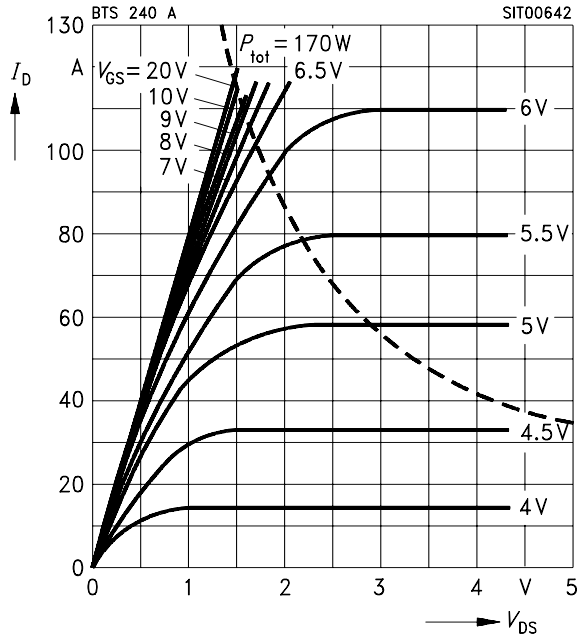
Max. power dissipation $P_{tot} = f(T_C)$



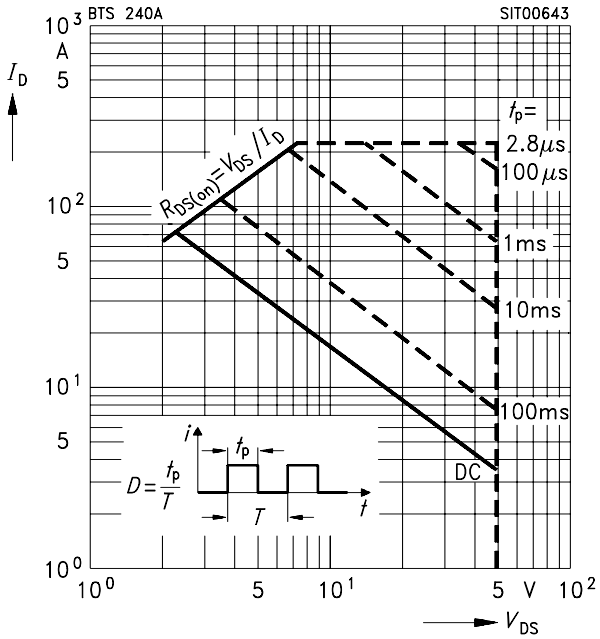
Typ. drain-source on-state resistance
$R_{DS(on)} = f(I_D)$
Parameter: V_{GS}



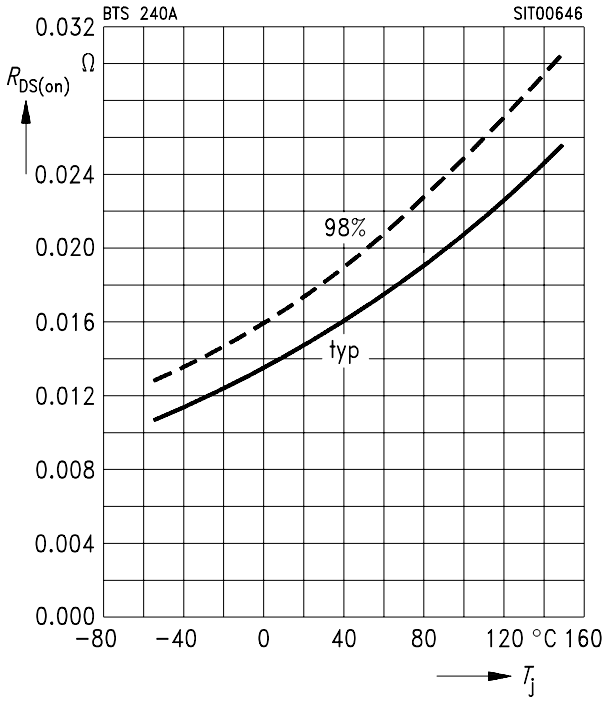
Typical output characteristics $I_D = f(V_{DS})$
Parameter: t_p = 80 µs



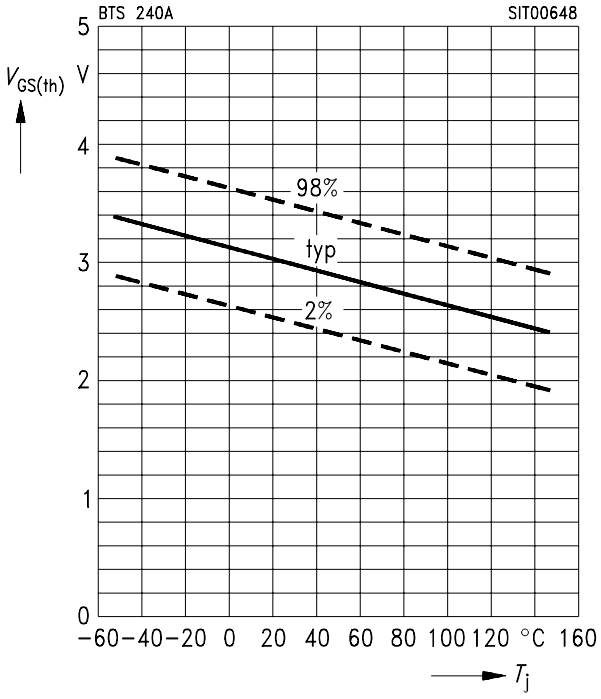
Safe operating area $I_D = f(V_{DS})$
Parameter: D = 0.01, T_C = 25 °C



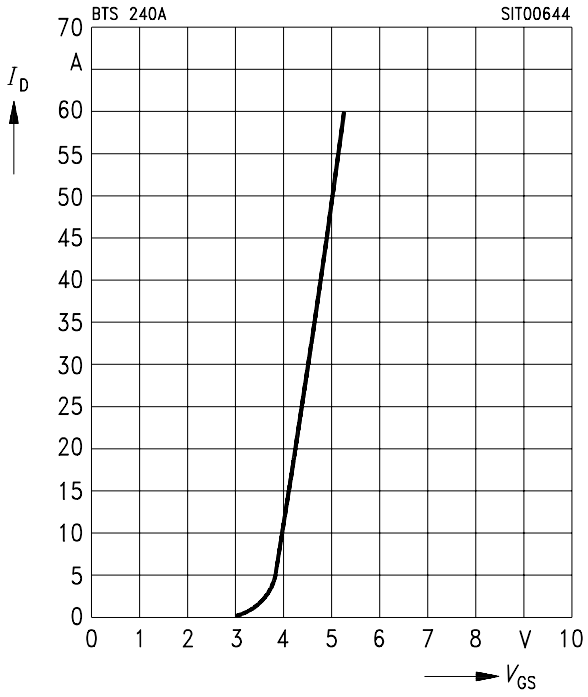
Drain-source on-state resistance
$R_{DS(on)} = f(T_j)$
Parameter: I_D = 47 A, V_{GS} = 10 V (spread)



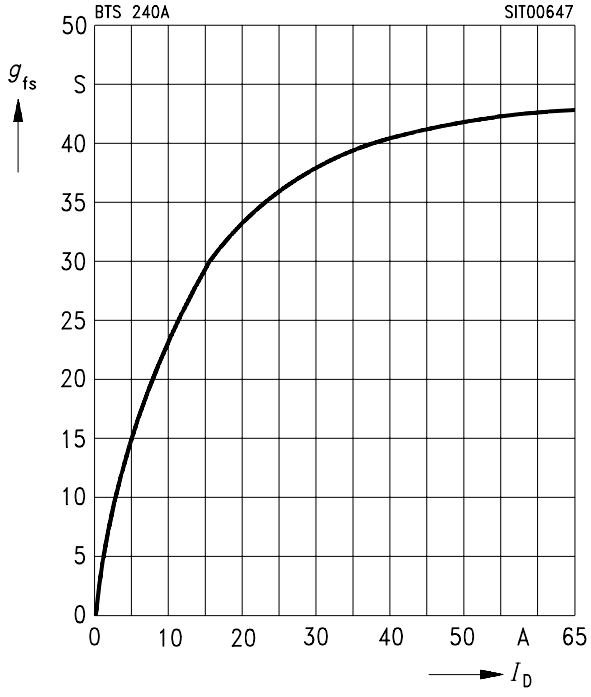
Gate threshold voltage $V_{GS(th)} = f(T_j)$
Parameter: $V_{DS} = V_{GS}$, I_D = 1 mA



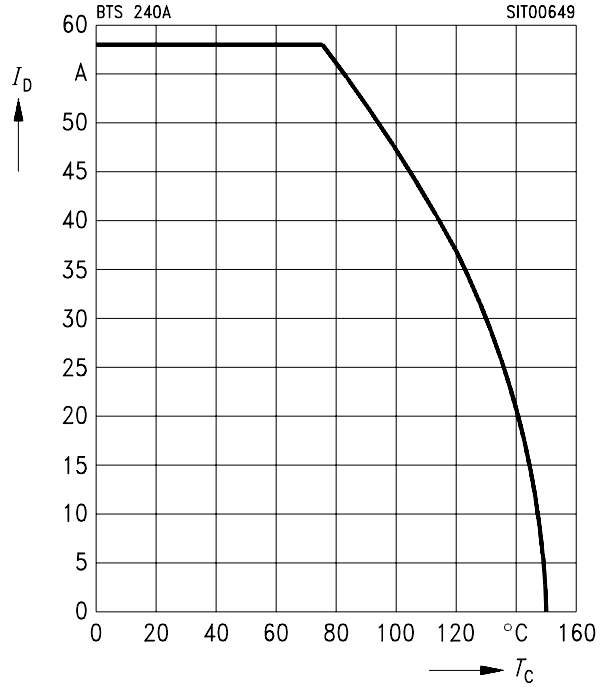
Typ. transfer characteristic
$I_D = f(V_{GS})$
Parameter: t_p = 80 µs, V_{DS} = 25 V



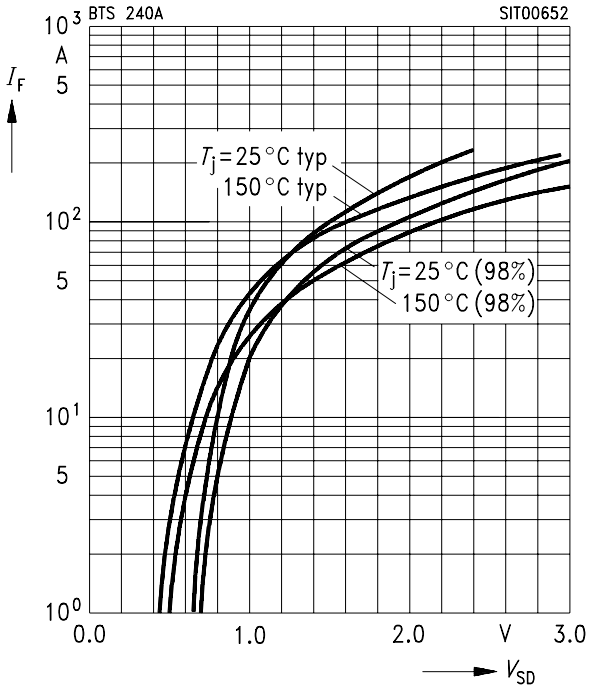
Typ. transconductance $g_{fs} = f(I_D)$
Parameter: t_p = 80 µs, V_{DS} = 25 V



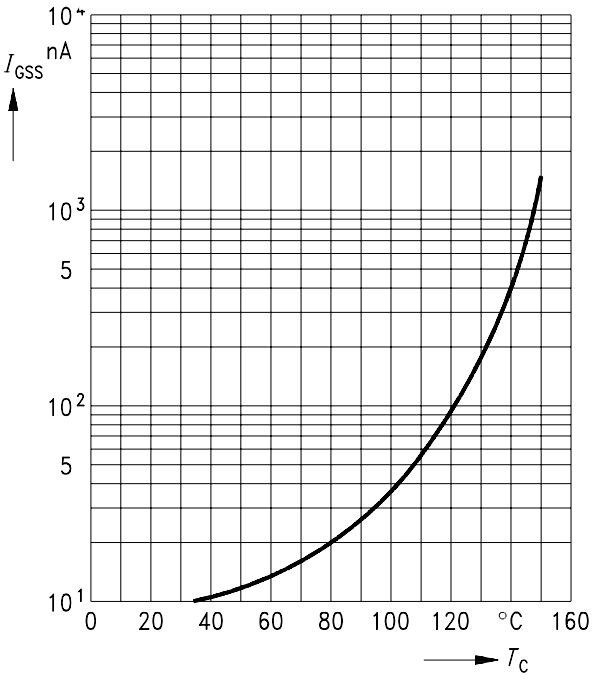
Continuous drain current $I_D = f(T_C)$
Parameter: $V_{GS} \geq 10$ V



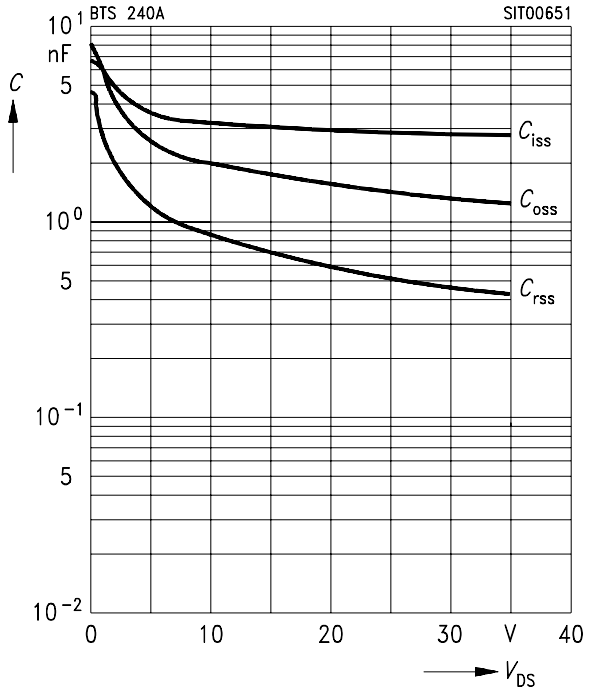
Forward characteristics of reverse diode
$I_F = f(V_{SD})$
Parameter: T_j, t_p = 80 µs (spread)



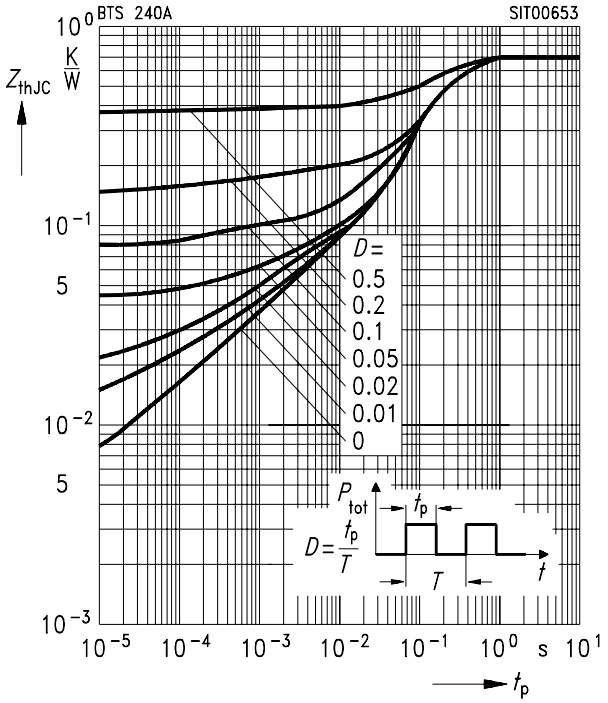
Typ. gate-source leakage current
$I_{GSS} = f(T_C)$
Parameter: V_{GS} = 20 V, V_{DS} = 0



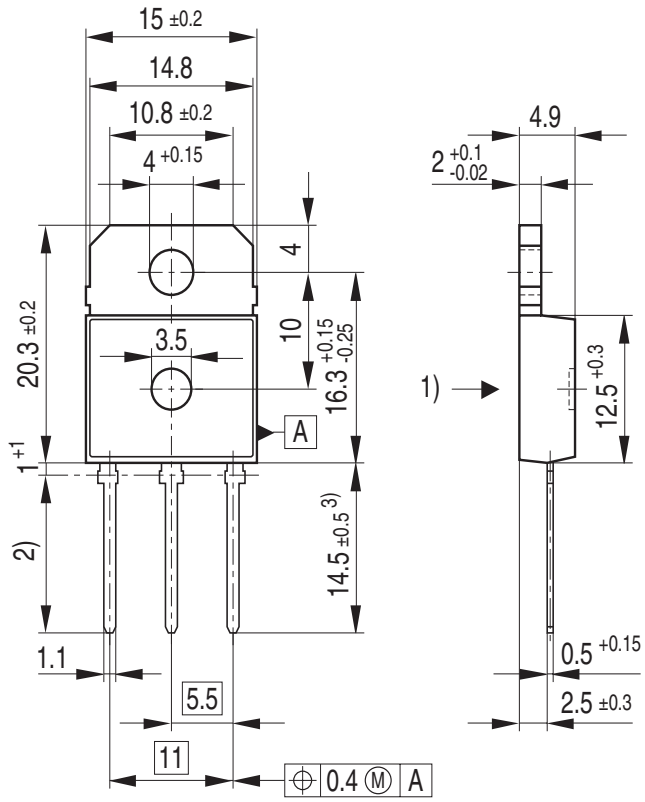
Typ. capacitances $C = f(V_{DS})$
Parameter: V_{GS} = 0, f = 1 MHz



Transient thermal impedance $Z_{thJC} = f(t_p)$
Parameter: $D = t_p/T$



1 Package Outlines



1) Punch direction, burr max. 0.04
2) Dip tinning
3) Max. 15.5 by dip tinning
press burr max. 0.05
radii not dimensioned max. 0.2

GPT05156

Figure 1 PG-TO218-3

To meet the world-wide customer requirements for environmentally friendly products and to be compliant with government regulations the device is available as a green product. Green products are RoHS-Compliant (i.e Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

You can find all of our packages, sorts of packing and others in our Infineon Internet Page “Products”: **http://www.infineon.com/products**.

Dimensions in mm

2 Revision History

Version	Date	Changes
Rev. 1.2	2010-07-12	initial released version of RoHS compliant derivative of BTS240A Page 1 and 9: added RoHS compliance statement and Green product feature Page 1 and 9: Package changed to RoHS compliant version Page 1: removed Package parameter (humidity and climatic) Page 10: added Revision history Page 11: updated Disclaimer

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