



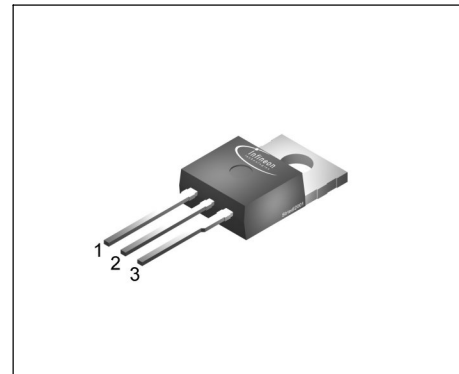
# THE DATASHEET OF BUZ73AL



## SIPMOS<sup>®</sup> Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated
- Logic Level
- Pb-free lead plating; RoHS compliant

## BUZ 73AL



Pin 1	Pin 2	Pin 3
G	D	S

Type	V <sub>DS</sub>	I <sub>D</sub>	R <sub>DS(on)</sub>	Package	Pb-free
BUZ 73 AL	200 V	5.5 A	0.6 Ω	PG-TO220-3	Yes

### Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current $T_C = 37\text{ °C}$	$I_D$	5.5	A
Pulsed drain current $T_C = 25\text{ °C}$	$I_{Dpuls}$	22	
Avalanche current, limited by $T_{jmax}$	$I_{AR}$	7	
Avalanche energy, periodic limited by $T_{jmax}$	$E_{AR}$	6.5	mJ
Avalanche energy, single pulse $I_D = 7\text{ A}$ , $V_{DD} = 50\text{ V}$ , $R_{GS} = 25\text{ Ω}$ $L = 3.67\text{ mH}$ , $T_j = 25\text{ °C}$	$E_{AS}$	120	
Gate source voltage	$V_{GS}$	± 20	V
ESD-Sensitivity HBM as per MIL-STD 883		Class 1	
Power dissipation $T_C = 25\text{ °C}$	$P_{tot}$	40	W
Operating temperature	$T_j$	-55 ... + 150	°C
Storage temperature	$T_{stg}$	-55 ... + 150	
Thermal resistance, chip case	$R_{thJC}$	≤ 3.1	K/W
Thermal resistance, chip to ambient	$R_{thJA}$	75	
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**Static Characteristics**

Drain- source breakdown voltage $V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}, T_j = 25^\circ\text{C}$	$V_{(BR)DSS}$	200	-	-	V
Gate threshold voltage $V_{GS}=V_{DS}, I_D = 1\text{ mA}$	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current $V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}, T_j = 25^\circ\text{C}$ $V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}, T_j = 125^\circ\text{C}$	$I_{DSS}$	-	0.1 10	1 100	$\mu\text{A}$
Gate-source leakage current $V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	-	10	100	nA
Drain-Source on-resistance $V_{GS} = 5\text{ V}, I_D = 3.5\text{ A}$	$R_{DS(on)}$	-	0.5	0.6	$\Omega$

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**Dynamic Characteristics**

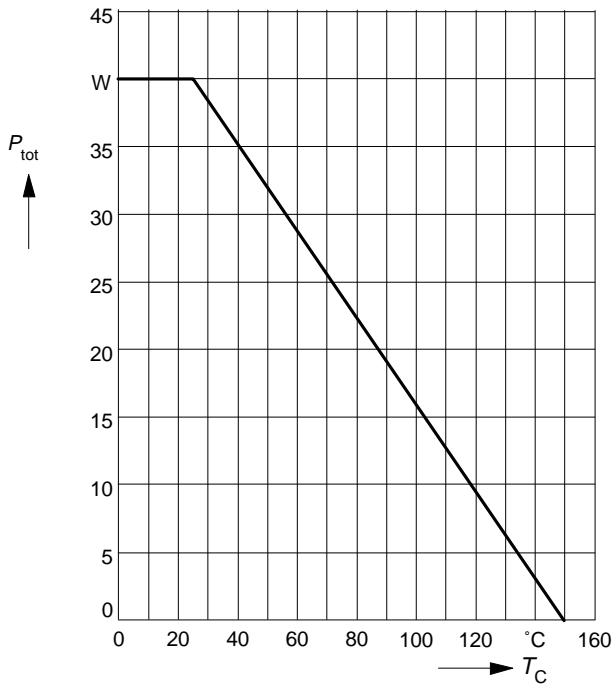
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$ , $I_D = 3.5 \text{ A}$	$g_{fs}$	5	6.5	-	S
Input capacitance $V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{iss}$	-	630	840	pF
Output capacitance $V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{oss}$	-	120	200	
Reverse transfer capacitance $V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$	$C_{rss}$	-	60	90	
Turn-on delay time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$	$t_{d(on)}$	-	15	20	ns
Rise time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$	$t_r$	-	60	90	
Turn-off delay time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$	$t_{d(off)}$	-	100	130	
Fall time $V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$ $R_{GS} = 50 \Omega$	$t_f$	-	40	50	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Reverse Diode</b>					
Inverse diode continuous forward current $T_C = 25^\circ\text{C}$	$I_S$	-	-	5.5	A
Inverse diode direct current, pulsed $T_C = 25^\circ\text{C}$	$I_{SM}$	-	-	22	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = 14\text{ A}$	$V_{SD}$	-	1.1	1.7	V
Reverse recovery time $V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	$t_{rr}$	-	140	-	ns
Reverse recovery charge $V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	$Q_{rr}$	-	0.7	-	$\mu\text{C}$

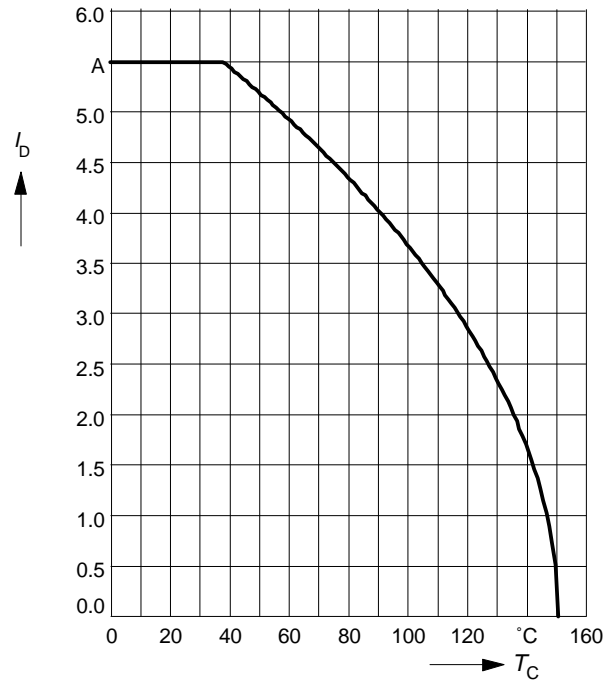
**Power dissipation**

$P_{tot} = f(T_C)$



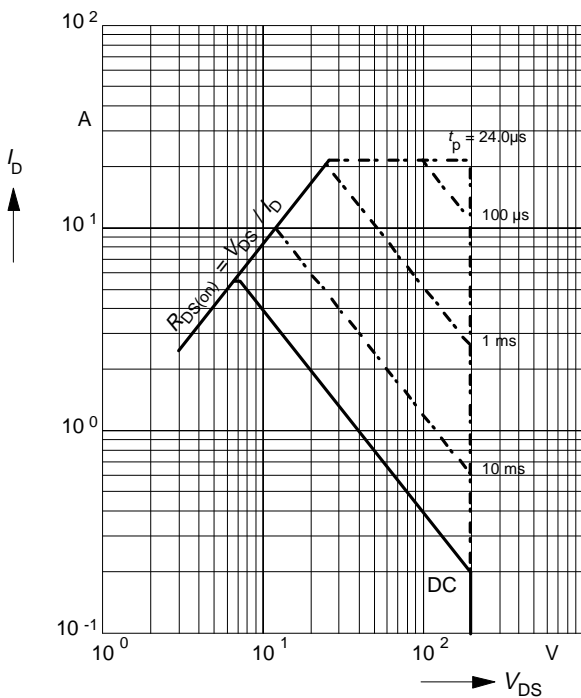
**Drain current**

$I_D = f(T_C)$   
parameter:  $V_{GS} \geq 5 \text{ V}$



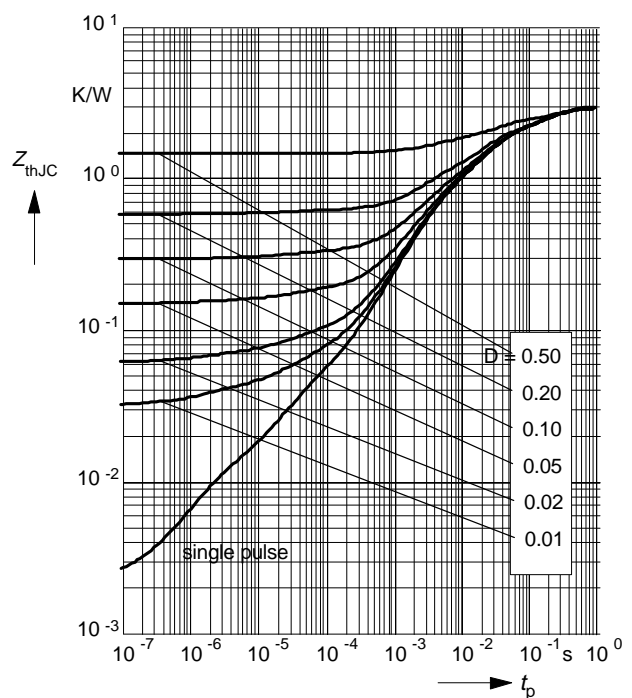
**Safe operating area**

$I_D = f(V_{DS})$   
parameter:  $D = 0.01, T_C = 25^\circ\text{C}$



**Transient thermal impedance**

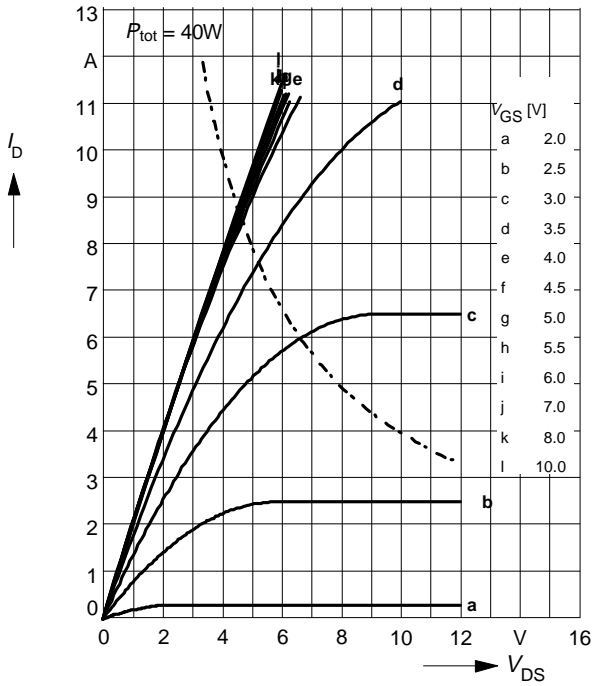
$Z_{thJC} = f(t_p)$   
parameter:  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

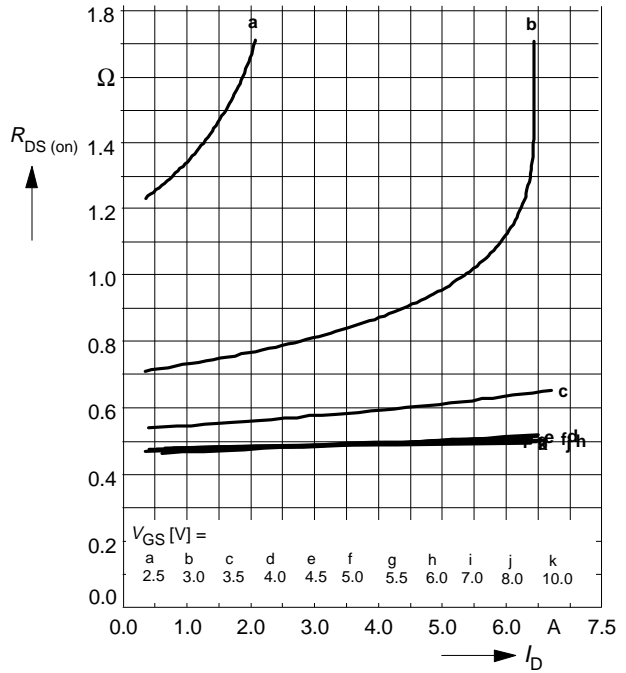
parameter:  $t_p = 80 \mu s$



**Typ. drain-source on-resistance**

$R_{DS(on)} = f(I_D)$

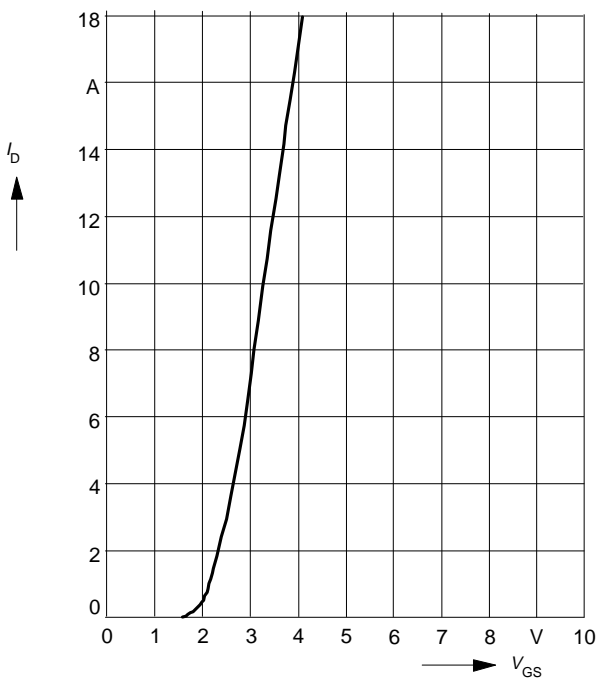
parameter:  $V_{GS}$



**Typ. transfer characteristics  $I_D = f(V_{GS})$**

parameter:  $t_p = 80 \mu s$

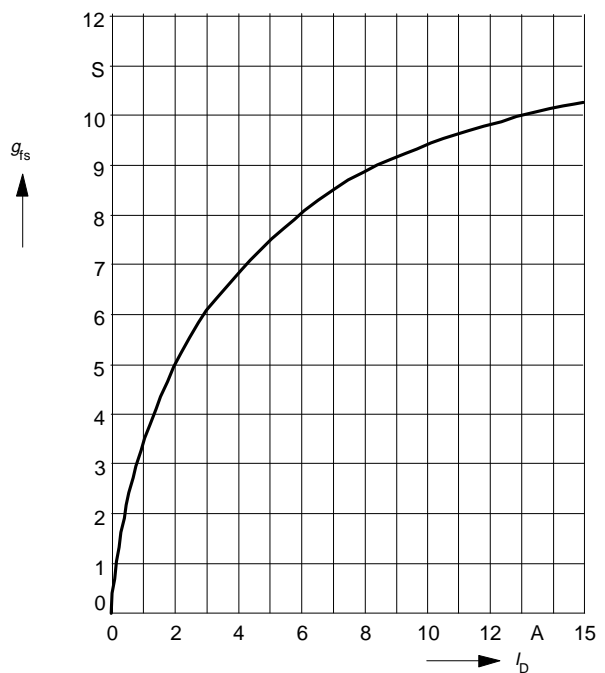
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



**Typ. forward transconductance  $g_{fs} = f(I_D)$**

parameter:  $t_p = 80 \mu s$ ,

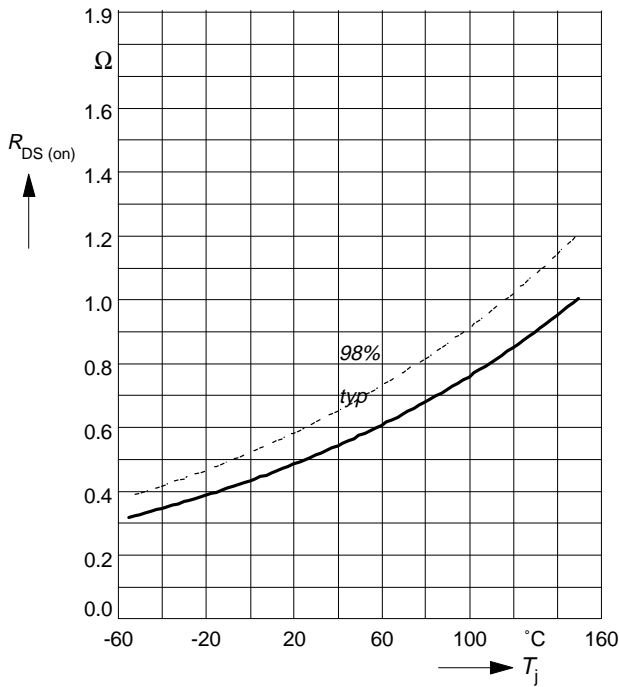
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



**Drain-source on-resistance**

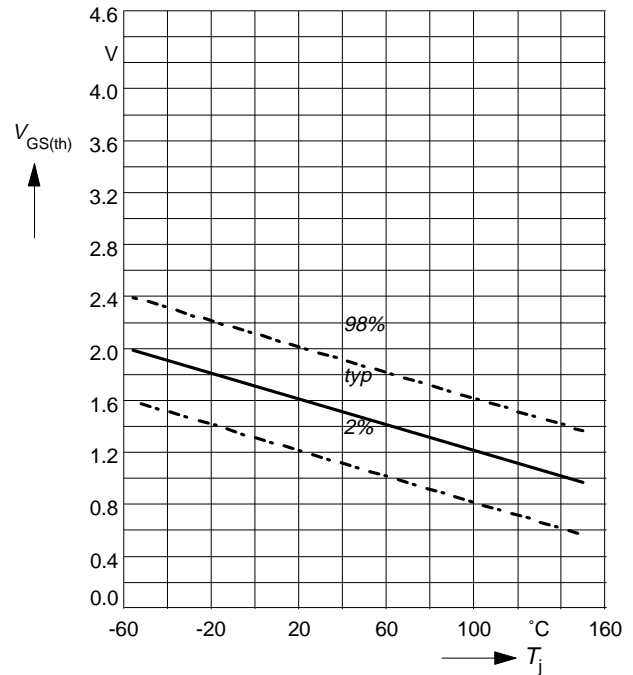
$$R_{DS(on)} = f(T_j)$$

parameter:  $I_D = 3.5 \text{ A}$ ,  $V_{GS} = 5 \text{ V}$


**Gate threshold voltage**

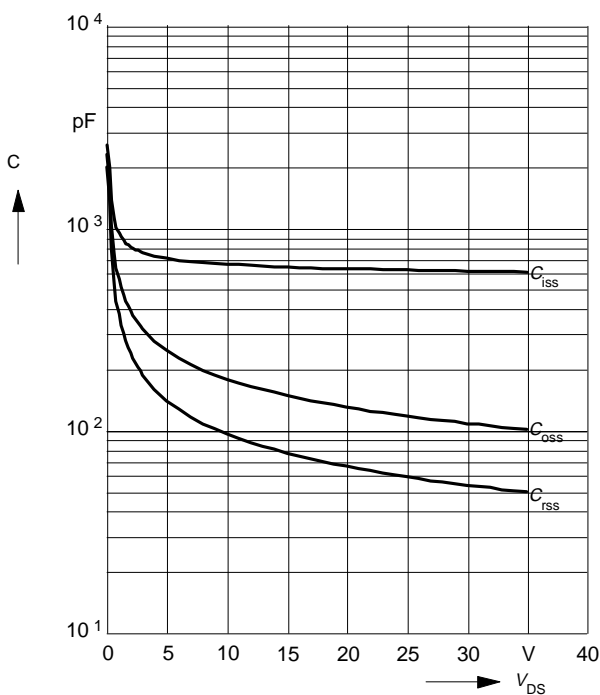
$$V_{GS(th)} = f(T_j)$$

parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1 \text{ mA}$


**Typ. capacitances**

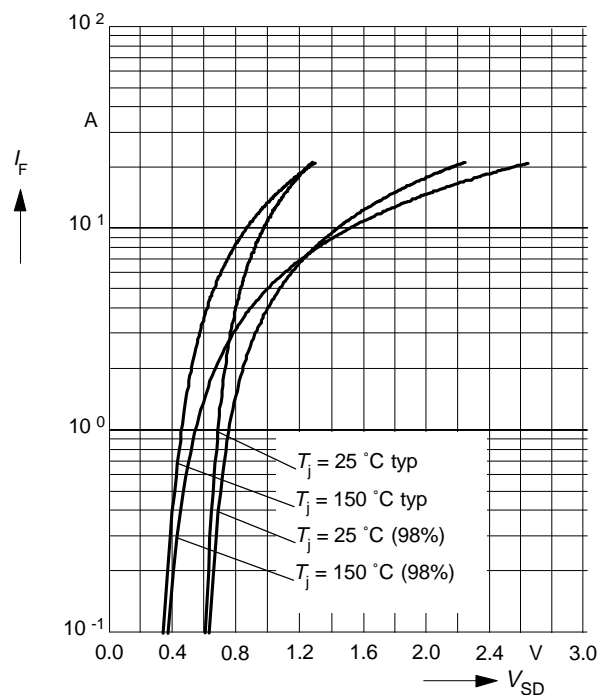
$$C = f(V_{DS})$$

parameter:  $V_{GS} = 0 \text{ V}$ ,  $f = 1 \text{ MHz}$

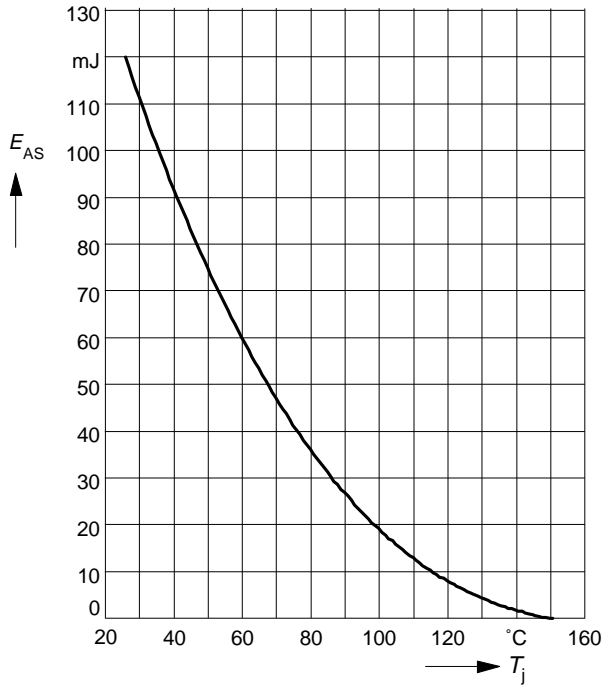

**Forward characteristics of reverse diode**

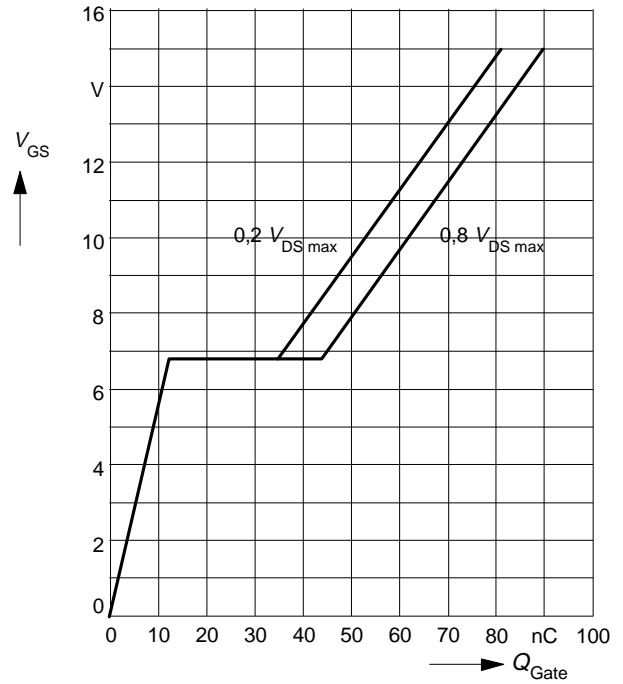
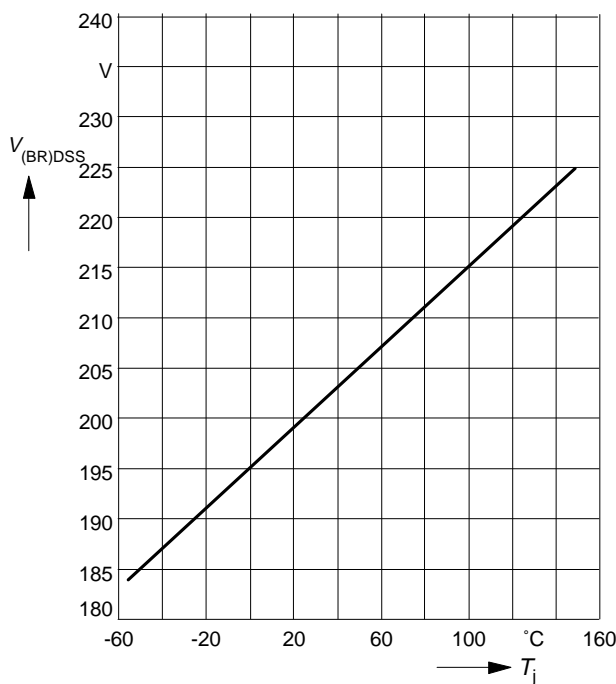
$$I_F = f(V_{SD})$$

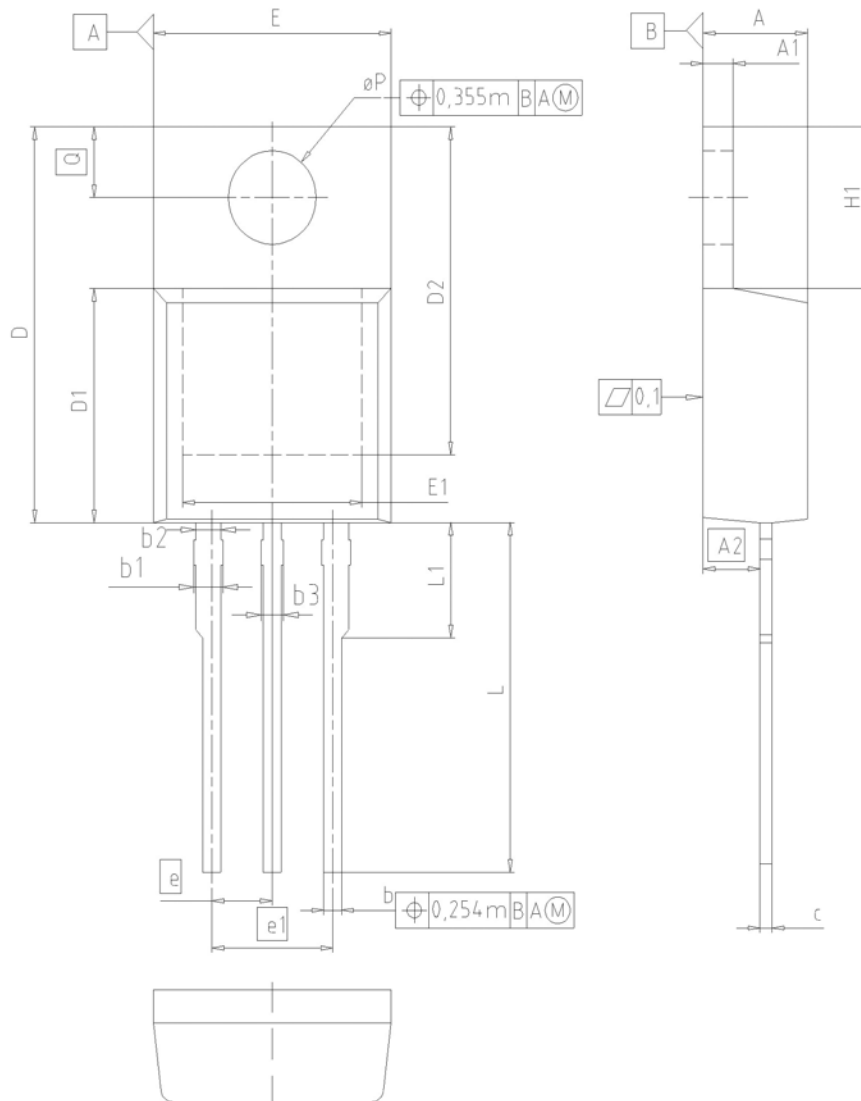
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$



**Avalanche energy  $E_{AS} = f(T_j)$** 

 parameter:  $I_D = 7\text{ A}$ ,  $V_{DD} = 50\text{ V}$ 
 $R_{GS} = 25\ \Omega$ ,  $L = 3.67\text{ mH}$ 

**Typ. gate charge  $V_{GS} = f(Q_{Gate})$** 
 $V_{GS} = f(Q_{Gate})$ 

 parameter:  $I_{D\text{ puls}} = 63\text{ A}$ 

**Drain-source breakdown voltage  $V_{(BR)DSS} = f(T_j)$** 
 $V_{(BR)DSS} = f(T_j)$ 




DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	1.17	1.40	0.046	0.055
A2	2.15	2.72	0.085	0.107
b	0.65	0.86	0.026	0.034
b1	0.95	1.40	0.037	0.055
b2	0.95	1.15	0.037	0.045
b3	0.65	1.15	0.026	0.045
c	0.33	0.60	0.013	0.024
D	14.81	15.95	0.583	0.628
D1	8.51	9.45	0.335	0.372
D2	12.19	13.10	0.480	0.516
E	9.70	10.36	0.382	0.408
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	3		3	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	-	4.80	-	0.189
$\phi P$	3.60	3.89	0.142	0.153
Q	2.60	3.00	0.102	0.118

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