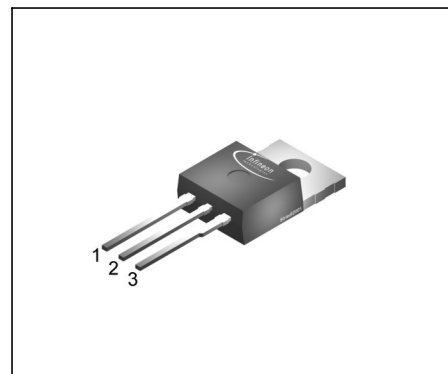


SIPMOS® Power Transistor

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



Pin 1	Pin 2	Pin 3
G	D	S



Type	V _{DS}	I _D	R _{DS(on)}	Package	Pb-free
BUZ 30A H	200 V	21 A	0.13 Ω	PG-TO-220-3	Yes

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current $T_C = 26\text{ °C}$	I_D	21	A
Pulsed drain current $T_C = 25\text{ °C}$	I_{Dpuls}	84	A
Avalanche current, limited by T_{jmax}	I_{AR}	21	A
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	12	mJ
Avalanche energy, single pulse $I_D = 21\text{ A}$, $V_{DD} = 50\text{ V}$, $R_{GS} = 25\text{ Ω}$ $L = 1.53\text{ mH}$, $T_j = 25\text{ °C}$	E_{AS}	450	mJ
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25\text{ °C}$	P_{tot}	125	W
Operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	°C
Thermal resistance, chip case	R_{thJC}	≤ 1	K/W
Thermal resistance, chip to ambient	R_{thJA}	75	K/W
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 $V_{GS} = V_{DS}, I_D = 1\text{ mA}$	$V_{GS(th)}$	2.1	3	4	
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	μA
Gate-source leakage current $V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	-	10	100	nA
Drain-Source on-resistance $V_{GS} = 10\text{ V}, I_D = 13.5\text{ A}$	$R_{DS(on)}$	-	0.1	0.13	Ω

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

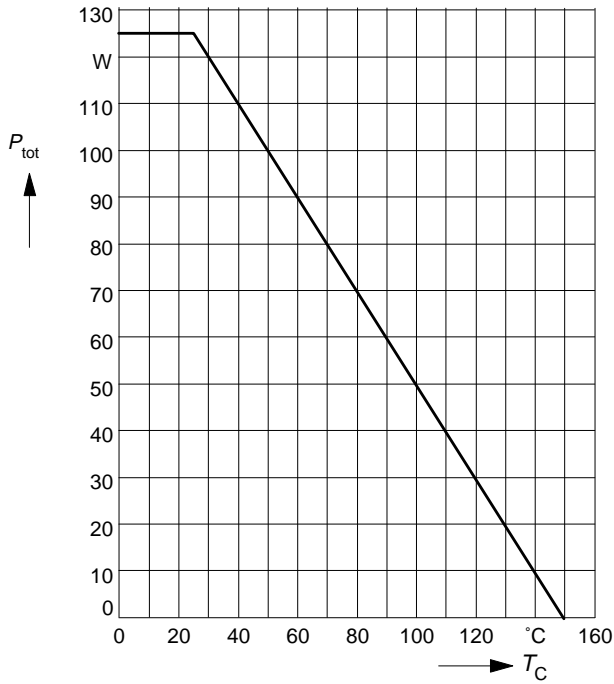
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = 13.5\text{ A}$	g_{fs}	6	15	-	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	1400	1900	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	-	280	400	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	-	130	200	
Turn-on delay time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	$t_{d(on)}$	-	30	45	ns
Rise time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	t_r	-	70	110	
Turn-off delay time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	$t_{d(off)}$	-	250	320	
Fall time $V_{DD} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	t_f	-	90	120	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current $T_C = 25^\circ\text{C}$	I_S	-	-	21	A
Inverse diode direct current, pulsed $T_C = 25^\circ\text{C}$	I_{SM}	-	-	84	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = 42\text{ A}$	V_{SD}	-	1.2	1.6	V
Reverse recovery time $V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	180	-	ns
Reverse recovery charge $V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	1.2	-	μC

Power dissipation

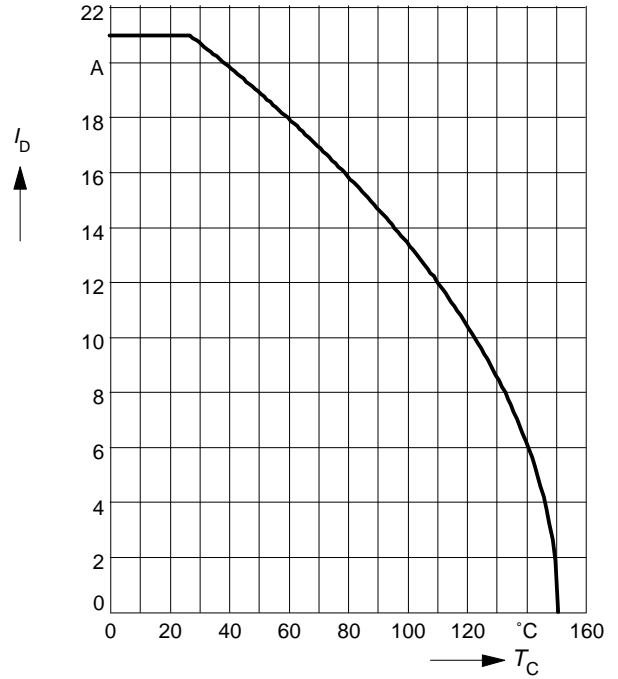
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

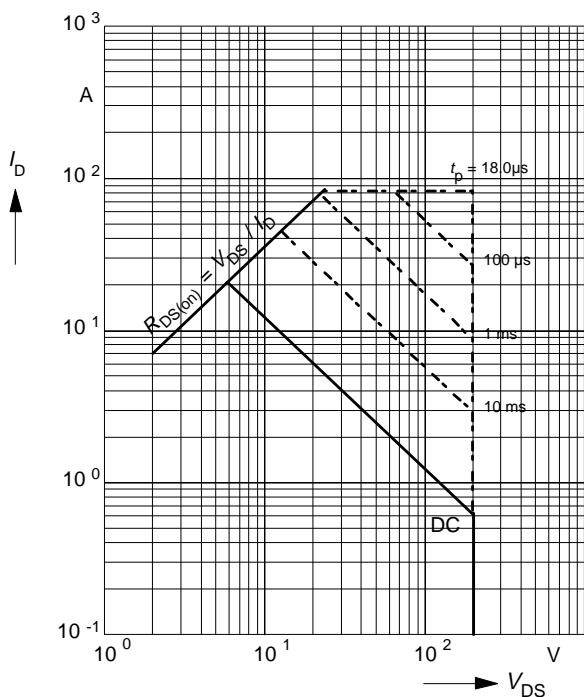
parameter: $V_{GS} \geq 10\text{ V}$



Safe operating area

$I_D = f(V_{DS})$

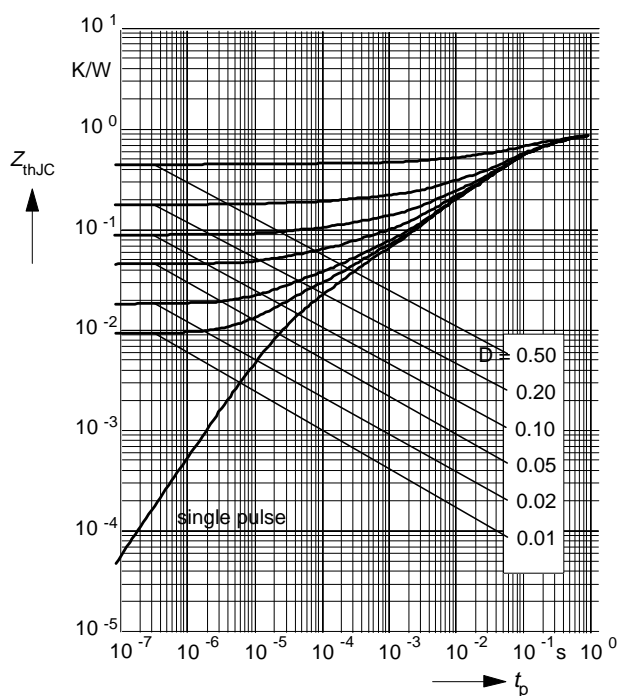
parameter: $D = 0.01, T_C = 25^\circ\text{C}$



Transient thermal impedance

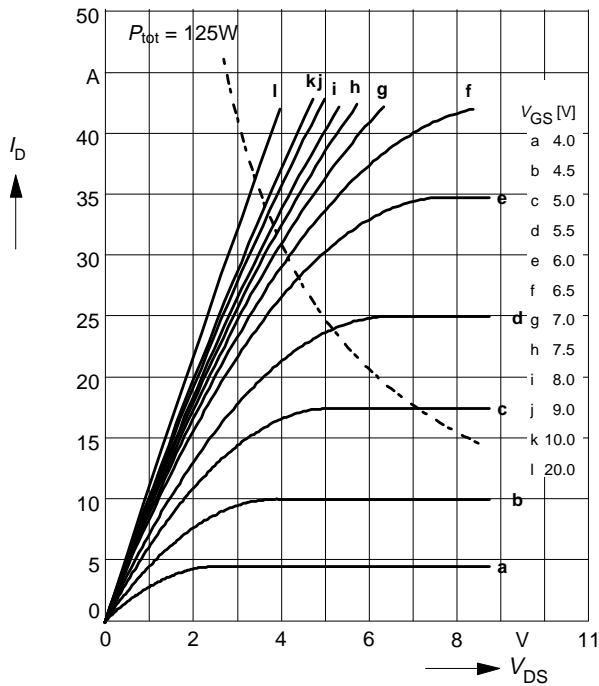
$Z_{thJC} = f(t_p)$

parameter: $D = t_p / T$

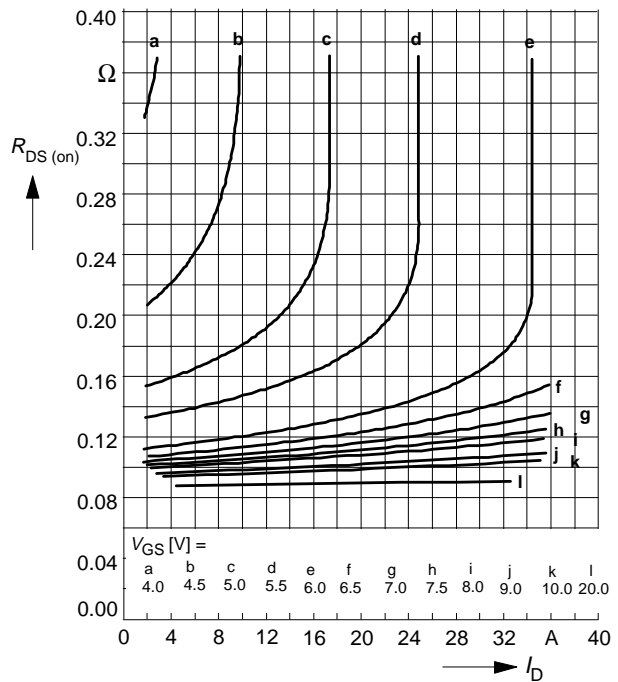


Typ. output characteristics

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

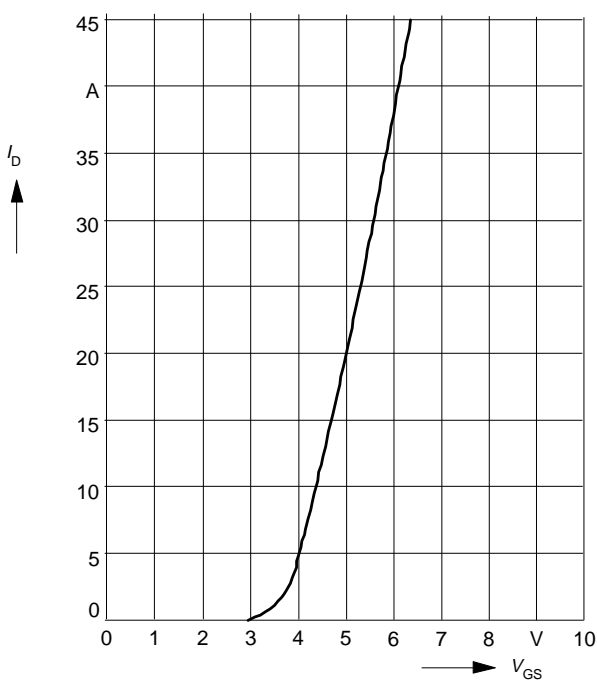
 parameter: $t_p = 80 \mu s$

Typ. drain-source on-resistance

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

 parameter: V_{GS}

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

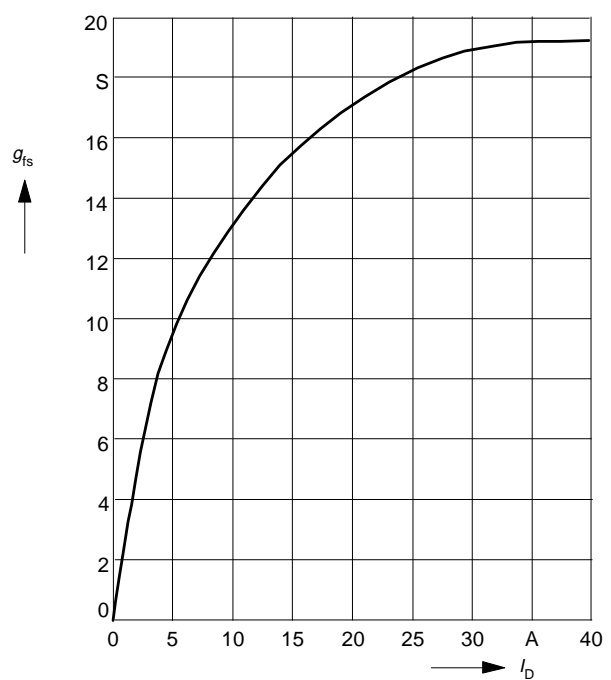
 parameter: $t_p = 80 \mu s$

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


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

 parameter: $t_p = 80 \mu s$,

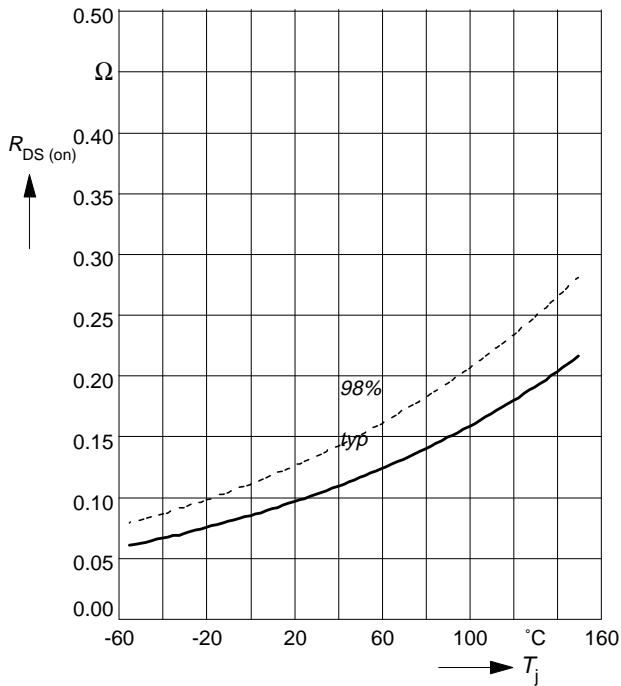
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



Drain-source on-resistance

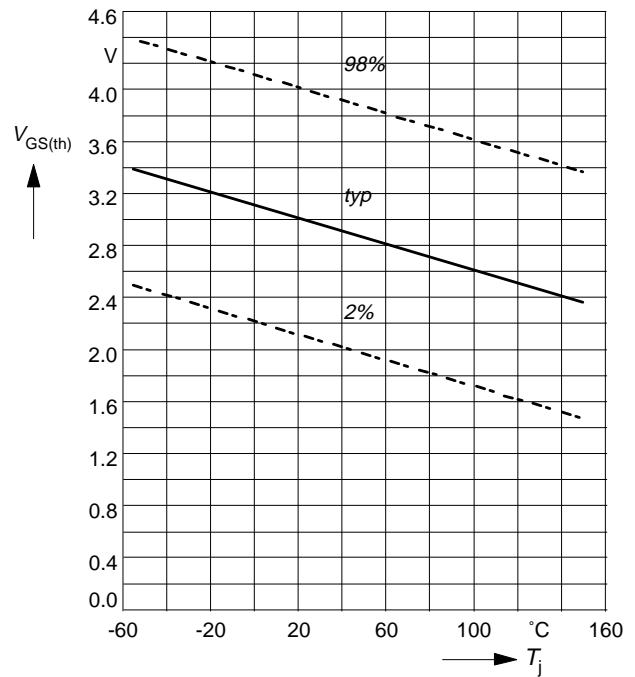
$$R_{DS(on)} = f(T_j)$$

parameter: $I_D = 13.5 \text{ A}$, $V_{GS} = 10 \text{ V}$


Gate threshold voltage

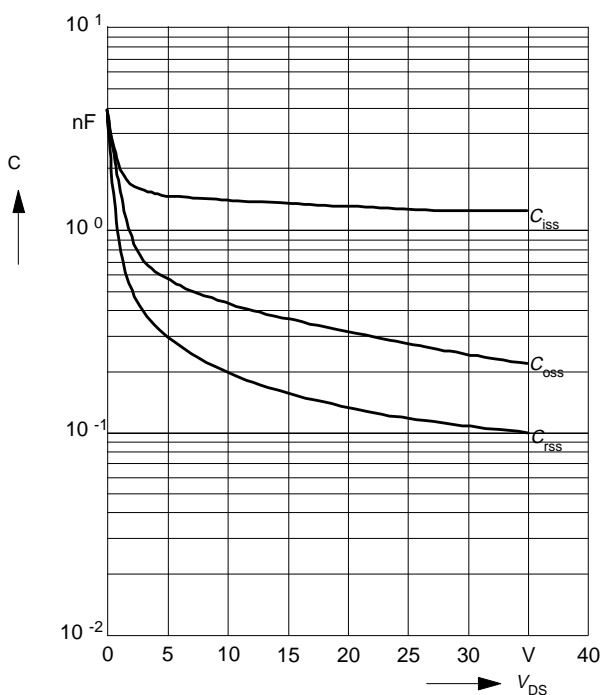
$$V_{GS(th)} = f(T_j)$$

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


Typ. capacitances

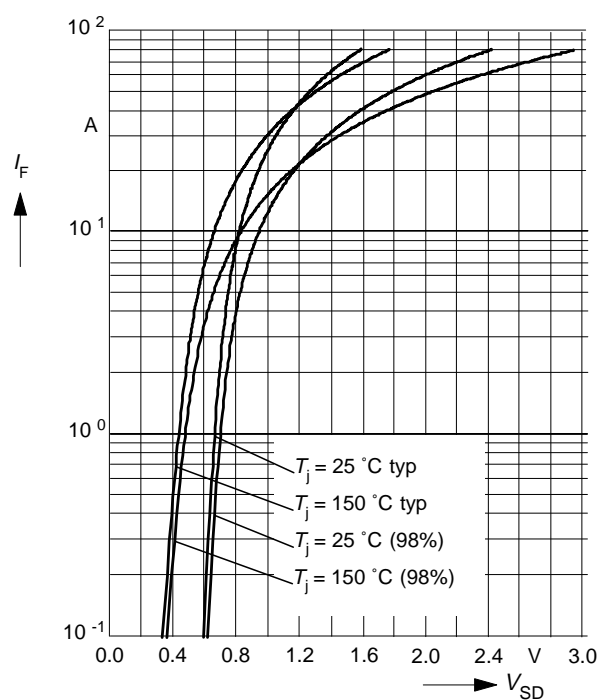
$$C = f(V_{DS})$$

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


Forward characteristics of reverse diode

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

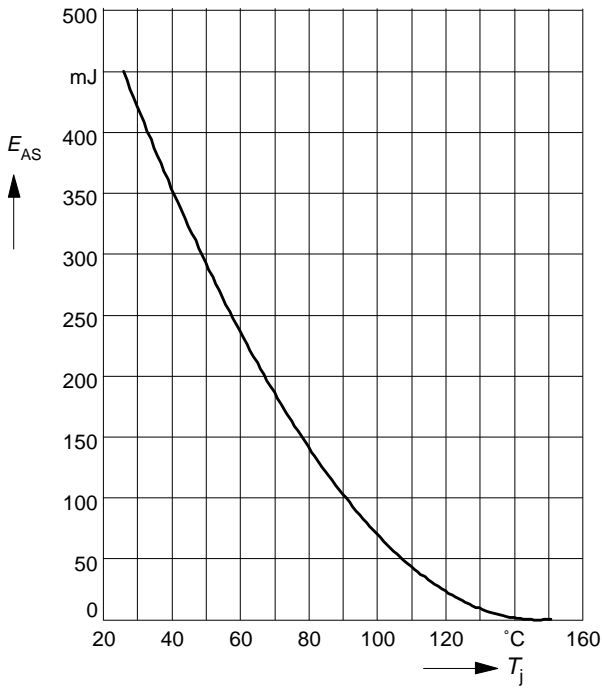
parameter: T_j , $t_p = 80 \mu\text{s}$



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

parameter: $I_D = 21\text{ A}$, $V_{DD} = 50\text{ V}$

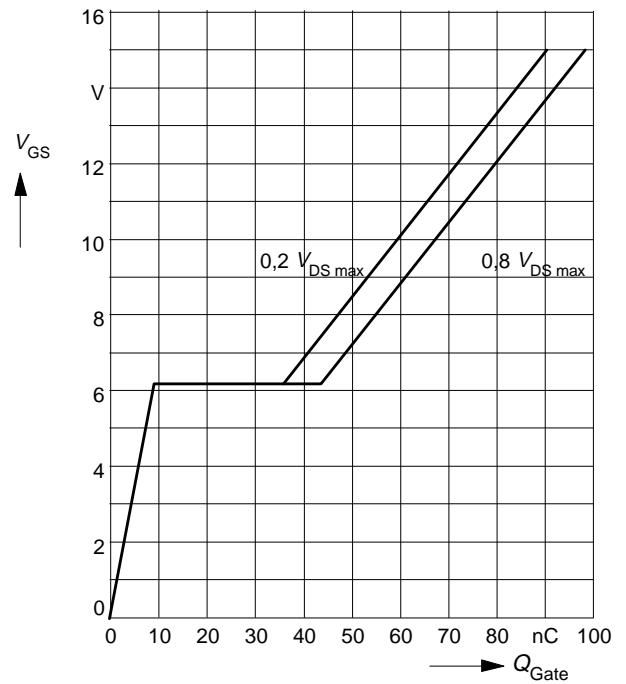
$R_{GS} = 25\ \Omega$, $L = 1.53\text{ mH}$



Typ. gate charge

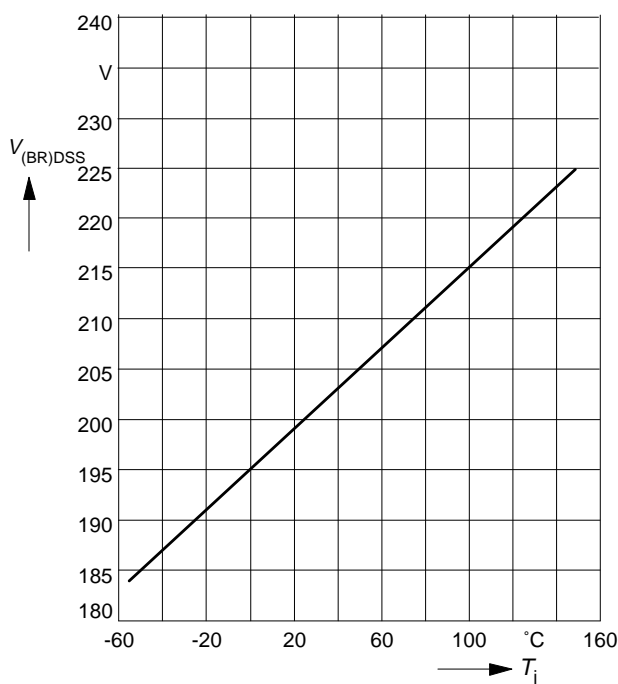
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\text{ puls}} = 32\text{ A}$

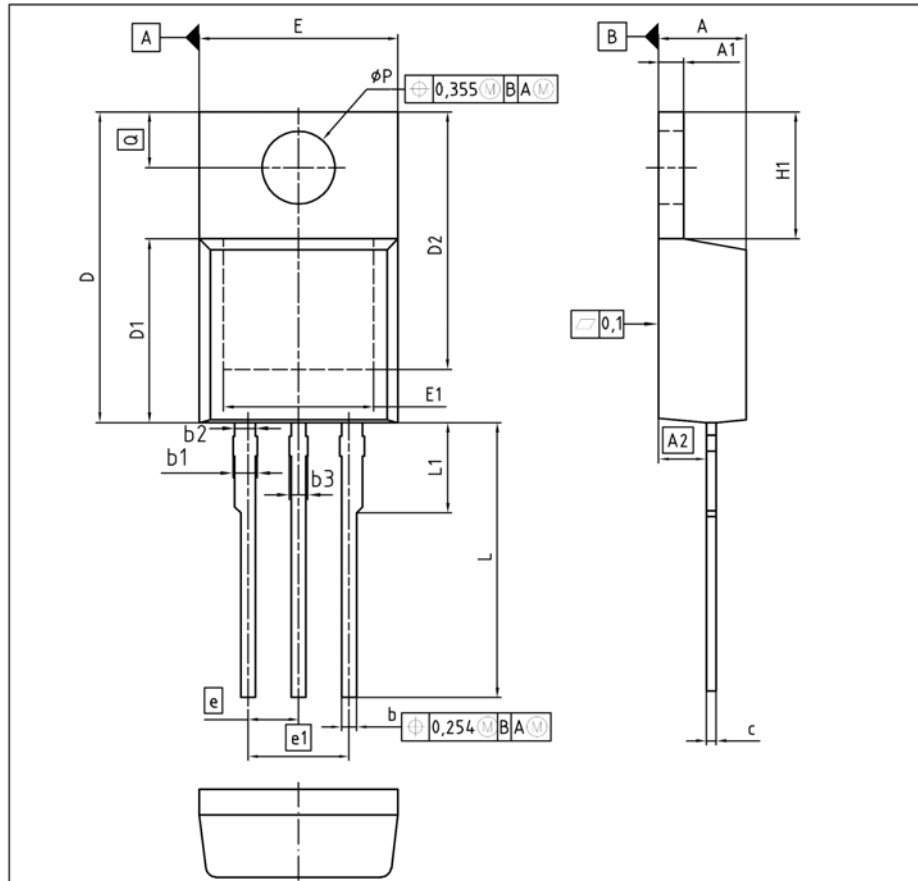


Drain-source breakdown voltage

$V_{(BR)DSS} = f(T_j)$



TO220-3



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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