BUZ31 H3045 A

SIPMOS ® Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated

. Pb-free lead plating; RoHS compliant

. Halogen-free according to IEC61249-2-21



Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Pb-free
BUZ31 H3045A	200 V	14.5 A	0.2 Ω	PG-TO263-3	Yes

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 30 °C	I_D	14.5	A
Pulsed drain current T_C = 25 °C	I_{Dpuls}	58	
Avalanche current,limited by T_{jmax}	I_{AR}	14.5	
Avalanche energy,periodic limited by T_{jmax}	E_{AR}	9	mJ
Avalanche energy, single pulse I_D = 14.5 A, V_{DD} = 50 V, R_{GS} = 25 Ω L = 1.42 mH, T_j = 25 °C	E_{AS}	200	
Gate source voltage	V_{GS}	± 20	V
Power dissipation T_C = 25 °C	P_{tot}	95	W
Operating temperature	T_j	-55 ... + 150	°C
Storage temperature	T_{stg}	-55 ... + 150	
Thermal resistance, chip case	R_{thJC}	≤ 1.32	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°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage V_{GS} = 0 V, I_D = 0.25 mA, T_j = 25 °C	$V_{(BR)DSS}$	200	-	-	V
Gate threshold voltage V_{GS}=V_{DS}, I_D = 1 mA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current V_{DS} = 200 V, V_{GS} = 0 V, T_j = 25 °C V_{DS} = 200 V, V_{GS} = 0 V, T_j = 125 °C	I_{DSS}	- -	0.1 10	1 100	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-resistance V_{GS} = 10 V, I_D = 9 A	$R_{DS(on)}$	-	0.16	0.2	Ω

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

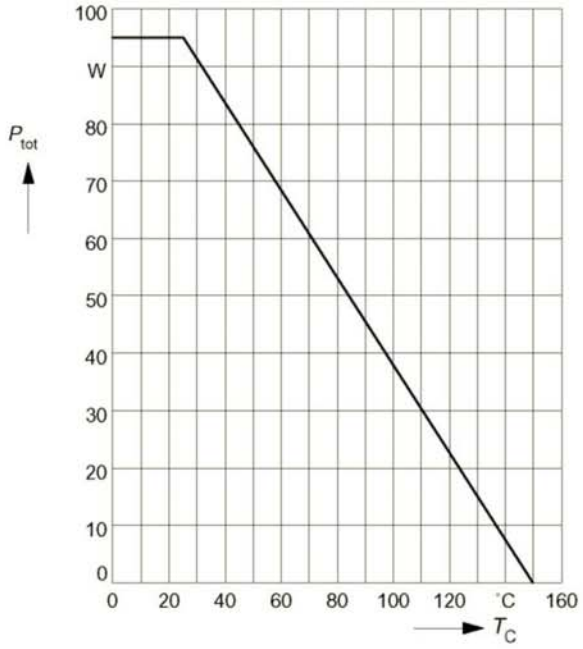
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 9 A	g_{fs}	5	10	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	840	1120	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	180	270	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	95	150	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	$t_{d(on)}$	-	12	20	ns
Rise time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	t_r	-	50	75	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	$t_{d(off)}$	-	150	200	
Fall time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	t_f	-	60	80	

Electrical Characteristics, at T_j = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current T_C = 25 °C	I_S	-	-	14.5	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	58	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 29 A	V_{SD}	-	1.1	1.6	V
Reverse recovery time V_R = 100 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	170	-	ns
Reverse recovery charge V_R = 100 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	1.1	-	µC

Power dissipation

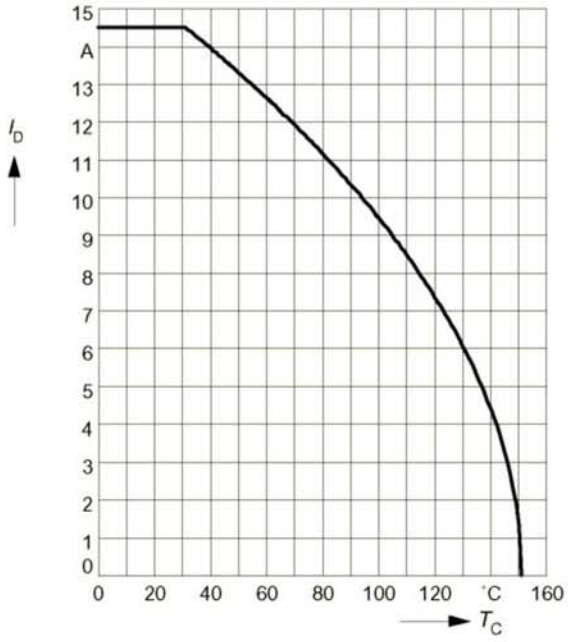
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

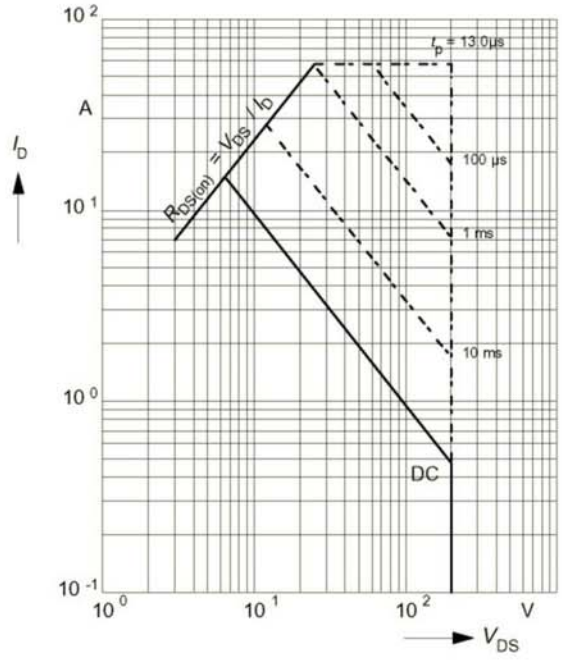
parameter: $V_{GS} \geq 10$ V



Safe operating area

$I_D = f(V_{DS})$

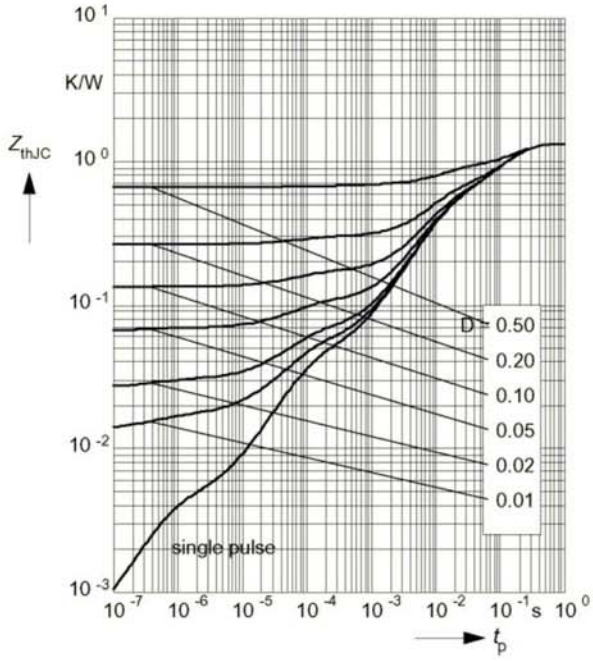
parameter: $D = 0.01$, $T_C = 25$°C



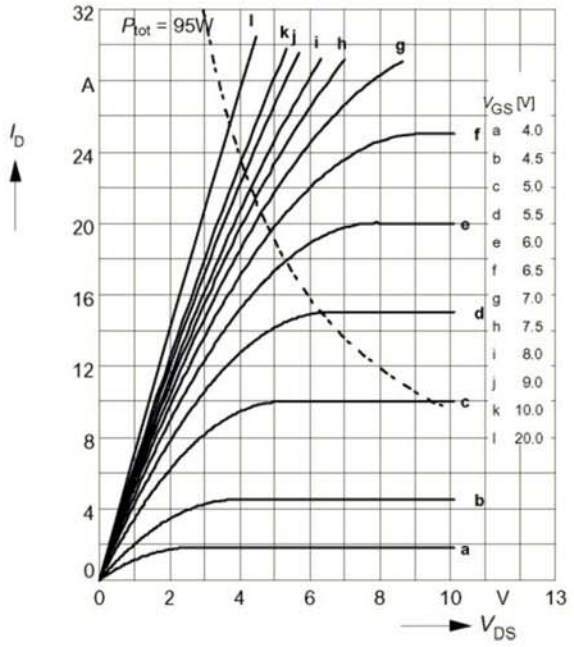
Transient thermal impedance

$Z_{th\,JC} = f(t_p)$

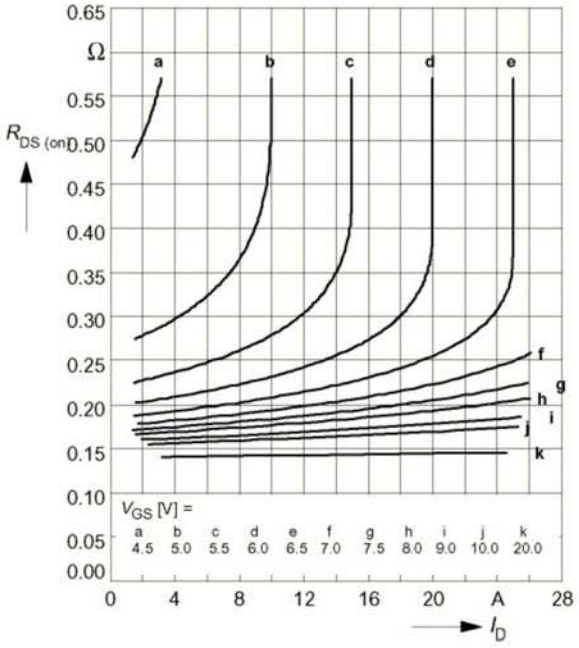
parameter: $D = t_p / T$



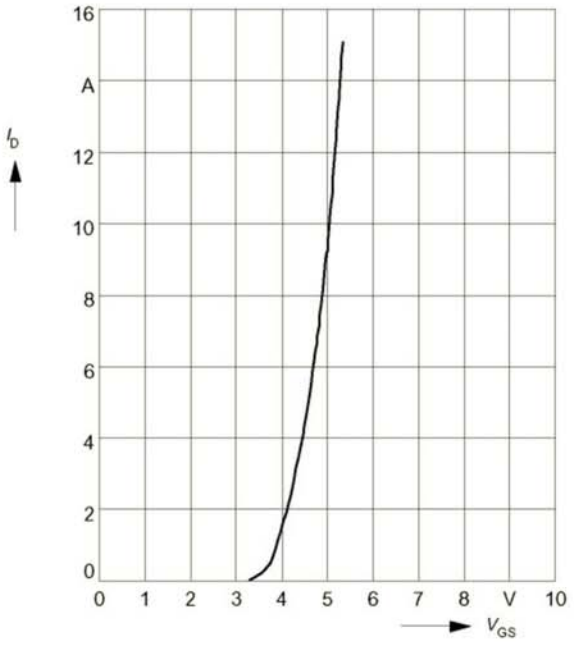
Typ. output characteristics
$I_D = f(V_{DS})$
parameter: t_p = 80 µs



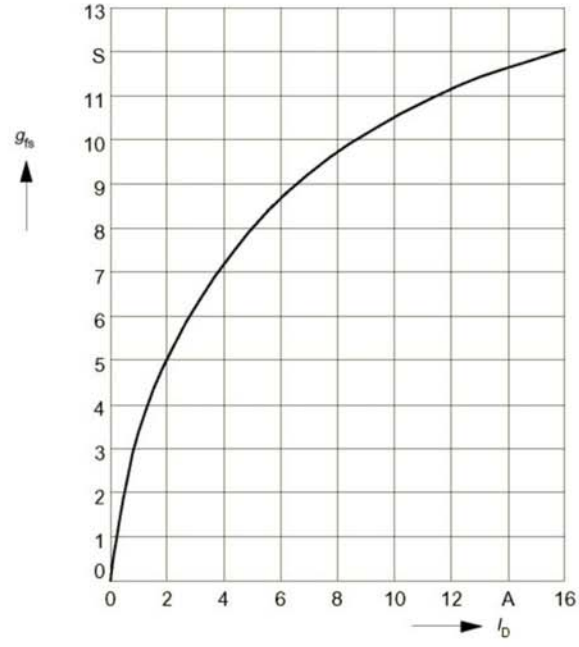
Typ. drain-source on-resistance
$R_{DS\ (on)} = f(I_D)$
parameter: V_{GS}



Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: t_p = 80 µs
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



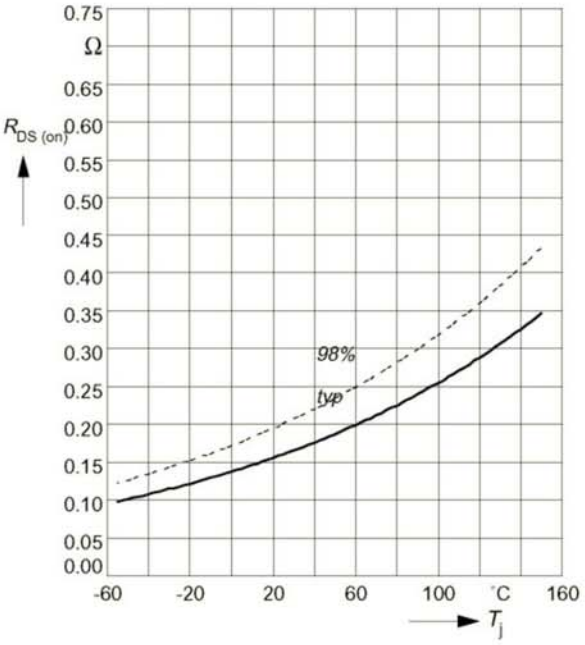
Typ. forward transconductance $g_{fs} = f(I_D)$
parameter: t_p = 80 µs,
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Drain-source on-resistance

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

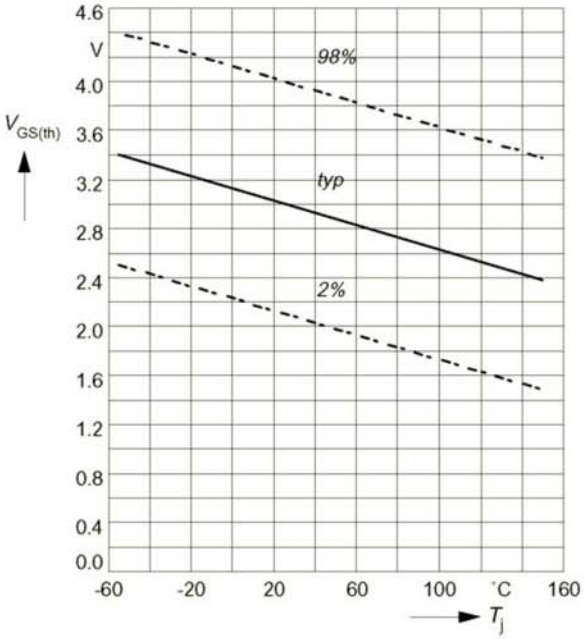
parameter: I_D = 9 A, V_{GS} = 10 V



Gate threshold voltage

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

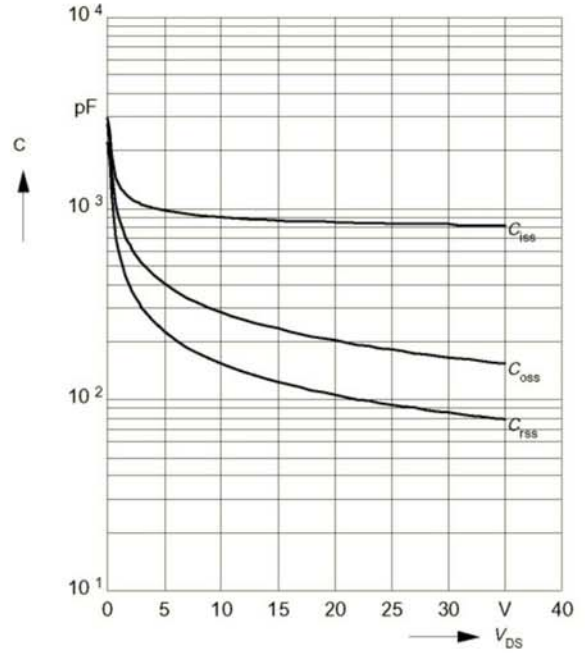
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA



Typ. capacitances

$C = f(V_{DS})$

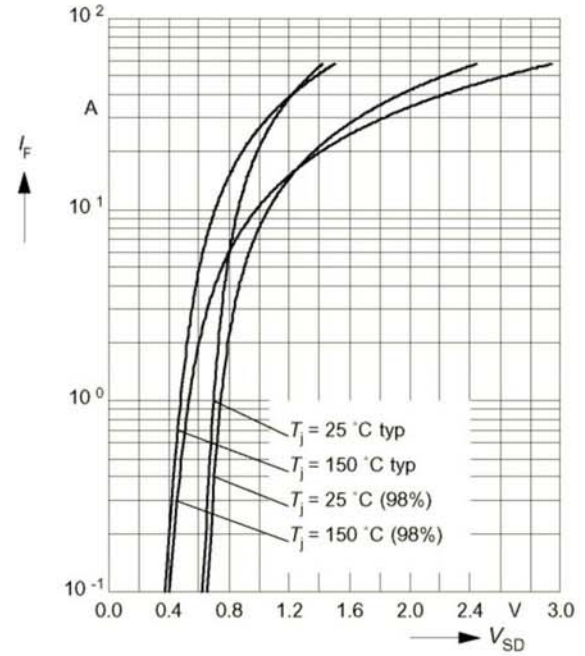
parameter: V_{GS} = 0V, f = 1MHz



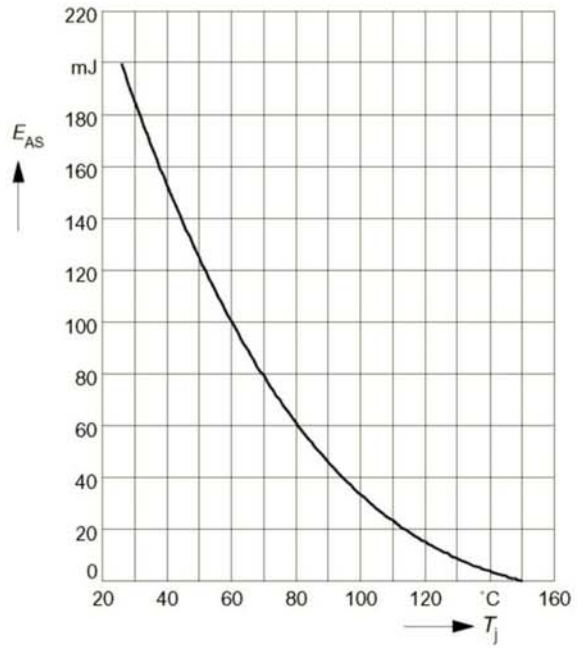
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

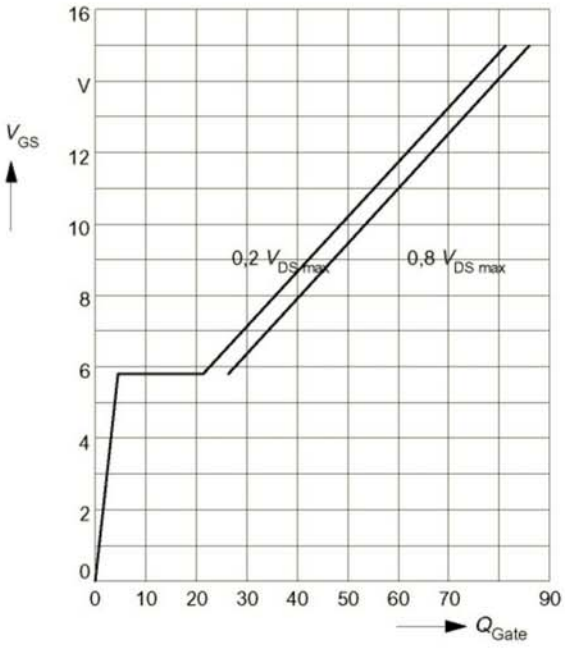
parameter: T_j, t_p = 80 µs



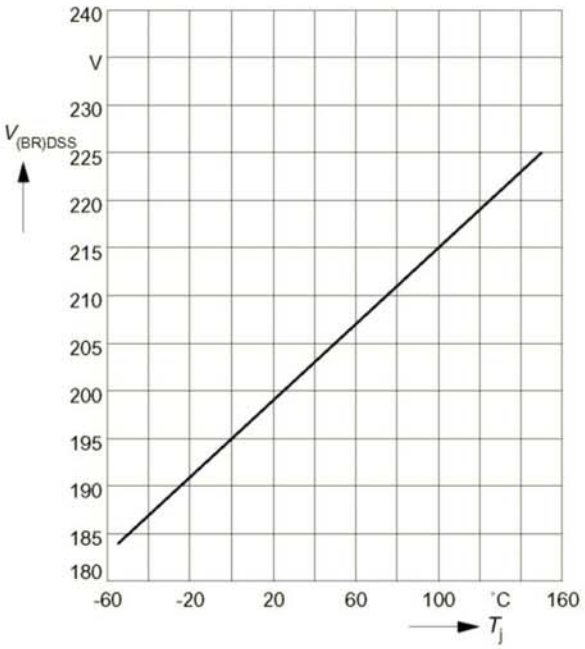
Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 14.5 A, V_{DD} = 50 V
R_{GS} = 25 Ω, L = 1.42 mH



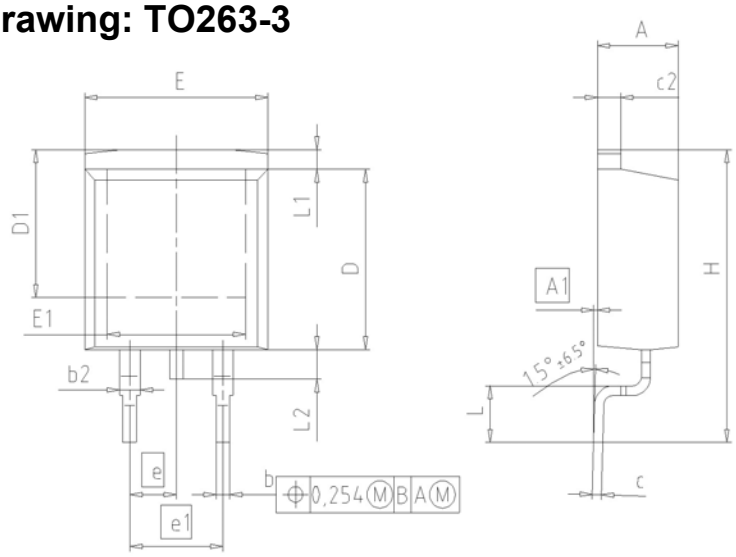
Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\ puls}$ = 20 A



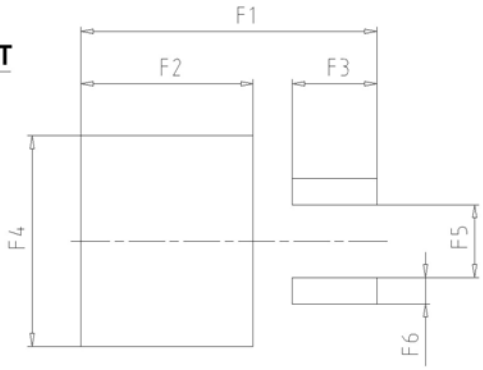
Drain-source breakdown voltage
$V_{(BR)DSS} = f(T_j)$



Package Drawing: TO263-3



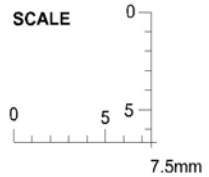
FOOTPRINT



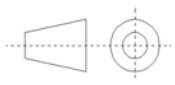
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	0.00	0.25	0.000	0.010
b	0.65	0.85	0.026	0.033
b2	0.95	1.15	0.037	0.045
c	0.33	0.65	0.013	0.026
c2	1.17	1.40	0.046	0.055
D	8.51	9.45	0.335	0.372
D1	7.10	7.90	0.280	0.311
E	9.80	10.31	0.386	0.406
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	2		2	
H	14.61	15.88	0.575	0.625
L	2.29	3.00	0.090	0.118
L1	0.70	1.60	0.028	0.063
L2	1.00	1.78	0.039	0.070
F1	16.05	16.25	0.632	0.640
F2	9.30	9.50	0.366	0.374
F3	4.50	4.70	0.177	0.185
F4	10.70	10.90	0.421	0.429
F5	3.65	3.85	0.144	0.152
F6	1.25	1.45	0.049	0.057

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SCALE



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