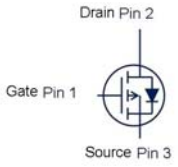
SIPMOS® Power-Transistor

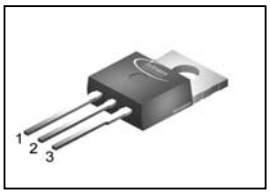
Features

- P-Channel
- Enhancement mode
- Avalanche rated
- d*v*/d*t* rated
- 175°C operating temperature
- ° Pb-free lead finishing; RoHS compliant
- ° Halogen-free according to IEC61249-2-21
- ° Qualified according to AEC Q101

Product Summary

V_{DS}	-60	V
$R_{DS(on),max}$	0.13	Ω
I_D	-18.7	A





Type	Package	Tape and reel information	Marking	Lead free
SPP18P06PH	PG-TO220-3	50pcs / tube	18P06P	Yes

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
			steady state	
Continuous drain current	I_D	T_A=25 °C	-18.7	A
		T_A=100 °C	-13.2	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	-74.8	
Avalanche energy, single pulse	E_{AS}	I_D=18.7 A, R_{GS}=25 Ω	151	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}		8	
Reverse diode d*v*/d*t*	d*v*/d*t*	I_D=18.7 A, V_{DS}=48 V, d*i*/d*t*=-200 A/µs, $T_{j,max}$=175 °C	-6	kV/µs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_A=25 °C[1)]	81.1	W
Operating and storage temperature	T_j, T_{stg}		"-55 ... +175"	°C
ESD class				
Soldering temperature			260 °C	
IEC climatic category; DIN IEC 68-1			55/150/56	

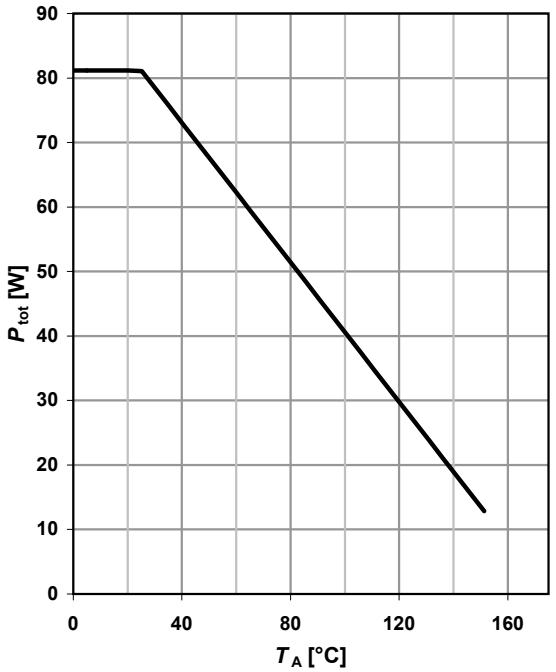
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.85	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}		-	-	62	
SMD version, device on PCB:	R_{thJA}	minimal footprint	-	-	62	K/W
		6 cm^2 cooling area[1)]	-	-	40	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=-250 µA	-60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-1000 µA	-2.1	2.7	-4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=-60 V, V_{GS}=0 V, T_j=25 °C	-	-0.1	-1	µA
		V_{DS}=-60 V, V_{GS}=0 V, T_j=150 °C	-	-10	-100	
Gate-source leakage current	I_{GSS}	V_{GS}=-20 V, V_{DS}=0 V	-	-10	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=-10 V, I_D=-13.2 A	-	102	130	mΩ
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-13.2 A	5	10	-	S

[1)] Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=-25 V, f=1 MHz	-	690	860	pF
Output capacitance	C_{oss}		-	230	290	
Reverse transfer capacitance	C_{rss}		-	95	120	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-30 V, V_{GS}=-10 V, I_D=-13.2 A, R_G=2.7 Ω	-	12.0	18.0	ns
Rise time	t_r		-	5.8	8.7	
Turn-off delay time	$t_{d(off)}$		-	25	37	
Fall time	t_f		-	11	16.5	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=-48 V, I_D=-18.6 A, V_{GS}=0 to -10 V	-	-4.1	-5.5	nC
Gate to drain charge	Q_{gd}		-	-11	-17	
Gate charge total	Q_g		-	-21	-28	
Gate plateau voltage	$V_{plateau}$		-	-5.94	-	V
Reverse Diode						
Diode continuous forward current	I_S	T_A=25 °C	-	-	18.60	A
Diode pulse current	$I_{S,pulse}$		-	-	-74.8	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=-18.6 A, T_j=25 °C	-	-0.99	-1.33	V
Reverse recovery time	t_{rr}	V_R=30 V, I_F=$\|I_S\|$, di_F/dt=100 A/µs	-	70	105	ns
Reverse recovery charge	Q_{rr}		-	139	208	nC

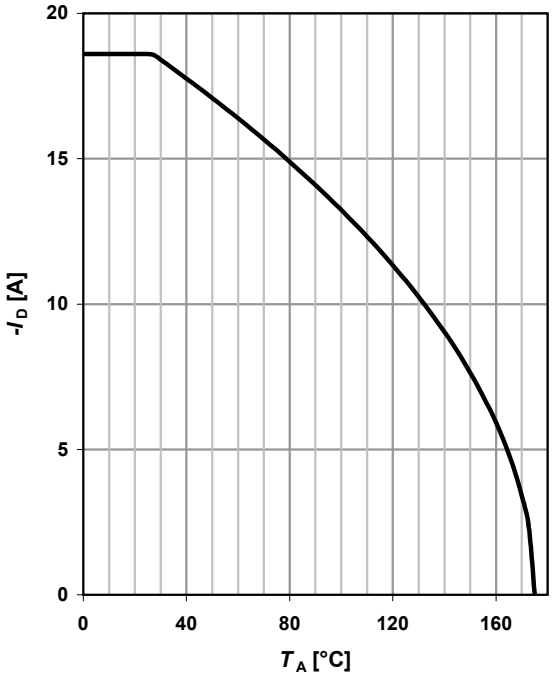
1 Power dissipation

$P_{tot}=f(T_A)$



2 Drain current

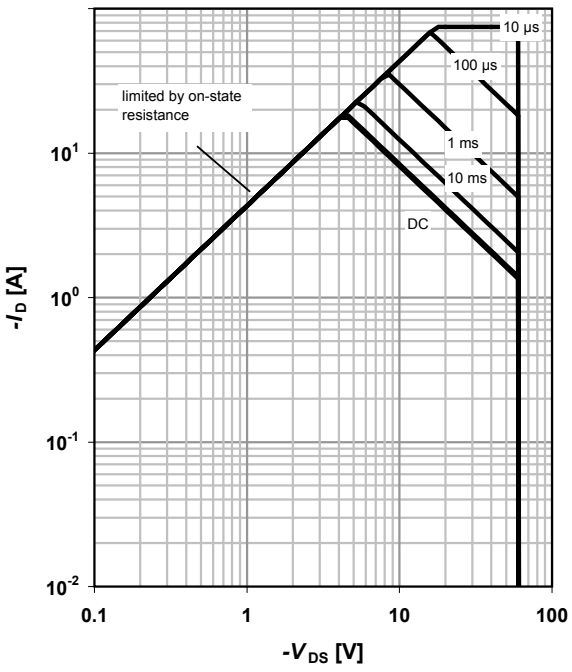
$I_D=f(T_A)$; $|V_{GS}|\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_A=25$ °C[1)]; $D=0$

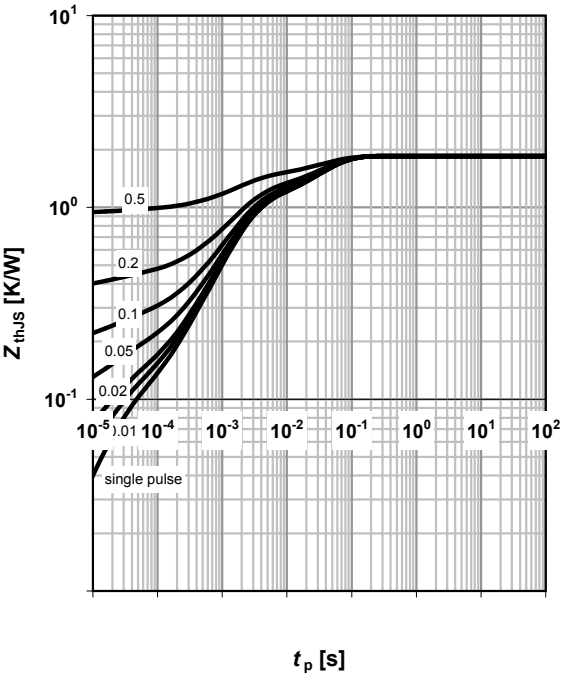
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

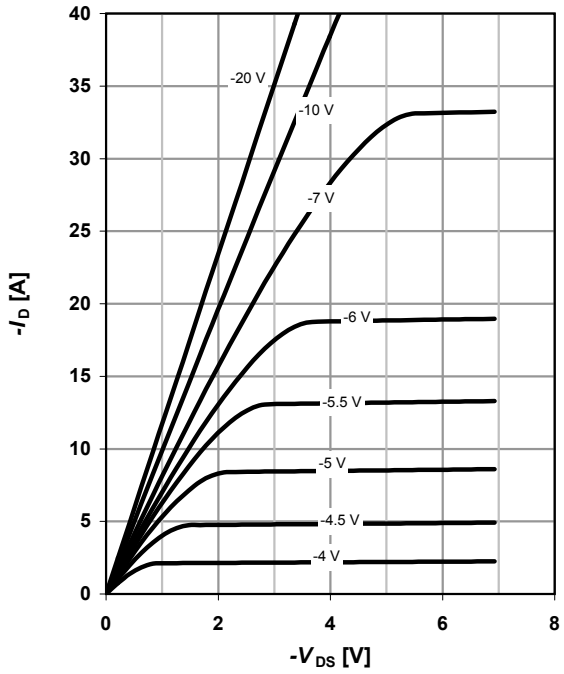
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

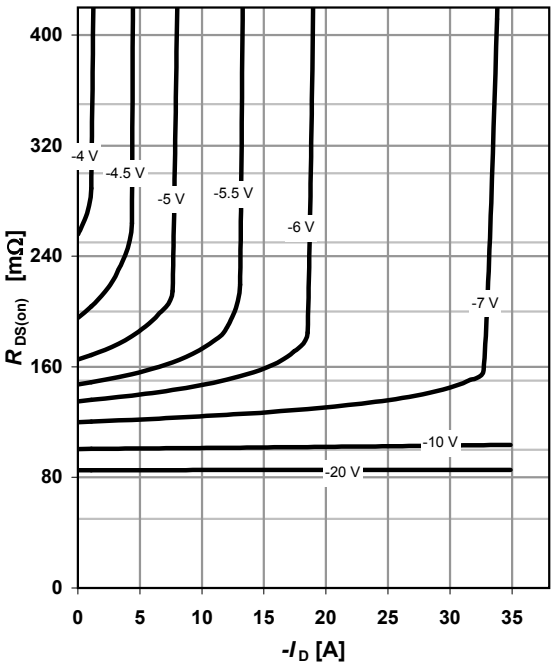
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

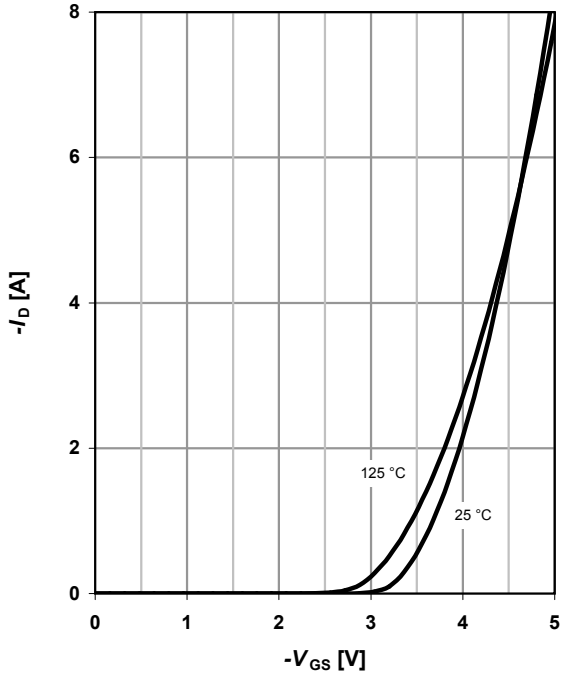
parameter: V_{GS}



7 Typ. transfer characteristics

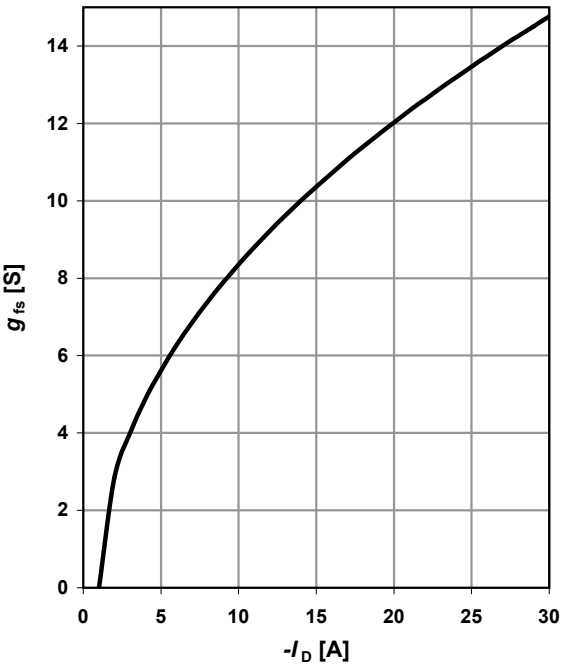
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



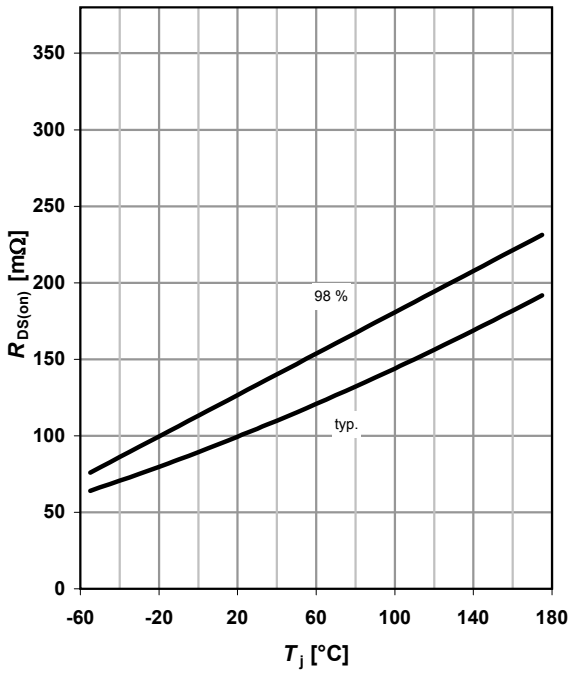
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



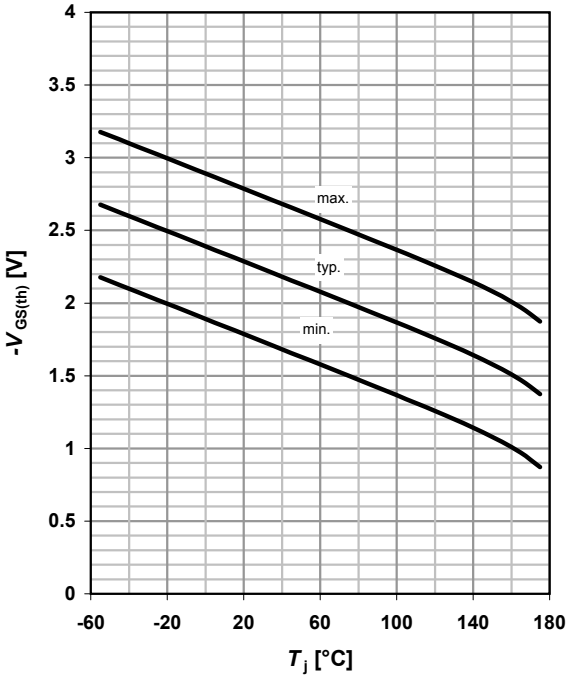
9 Drain-source on-state resistance

$R_{DS(on)}$=f(T_j); I_D=-13.2 A; V_{GS}=-10 V



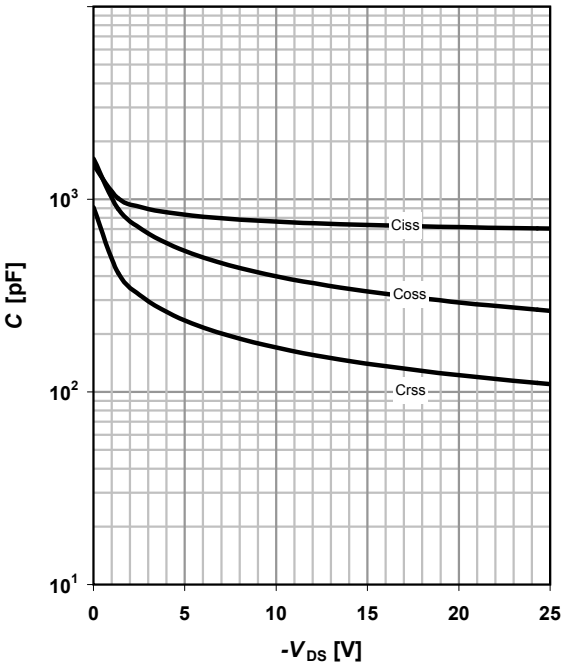
10 Typ. gate threshold voltage

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=-1000 µA



11 Typ. capacitances

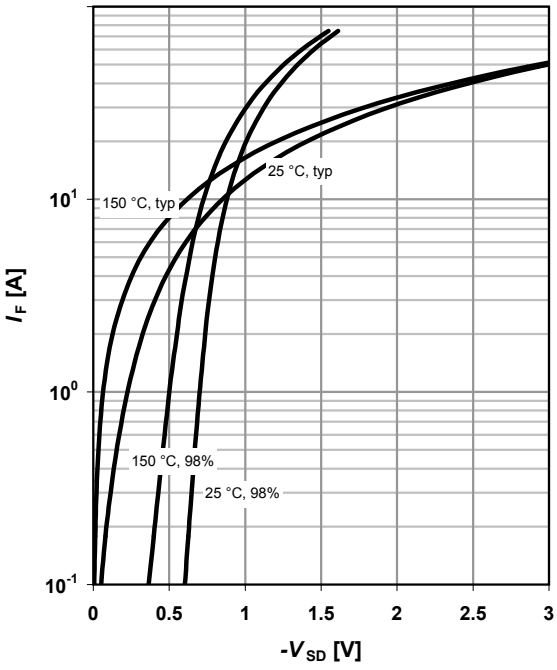
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

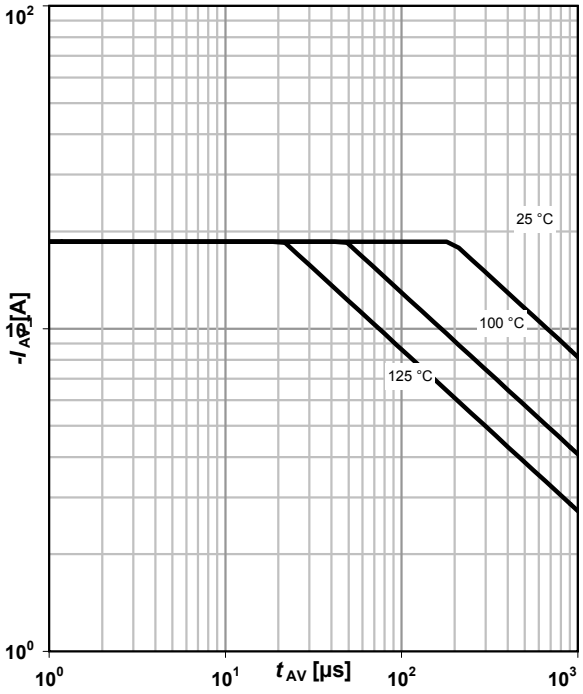
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

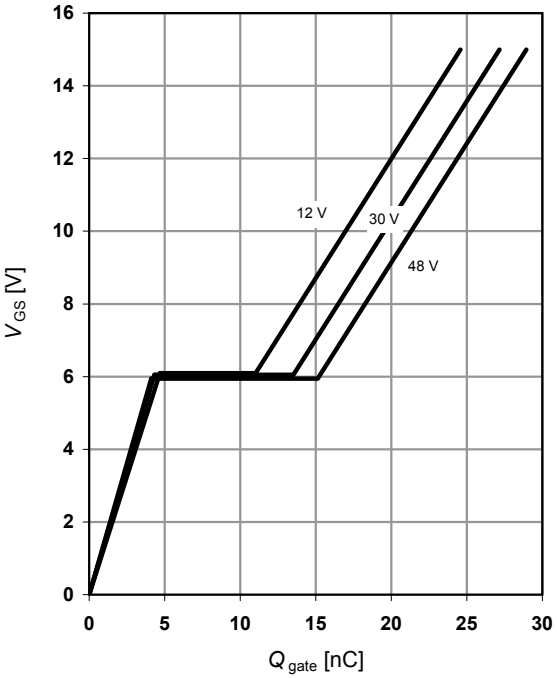
parameter: $T_{j(start)}$



14 Typ. gate charge

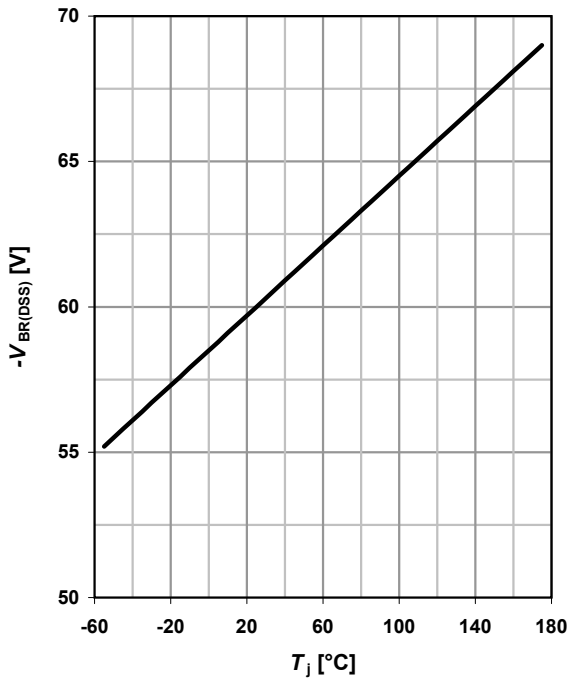
V_{GS}=f(Q_{gate}); I_D=-18.6 A pulsed

parameter: V_{DD}

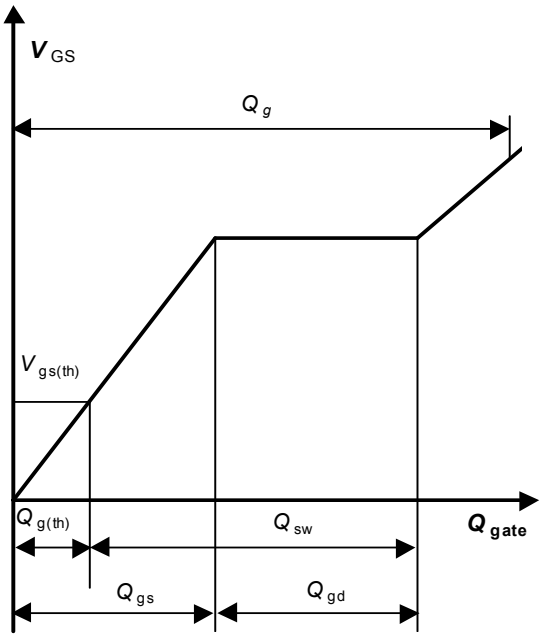


15 Drain-source breakdown voltage

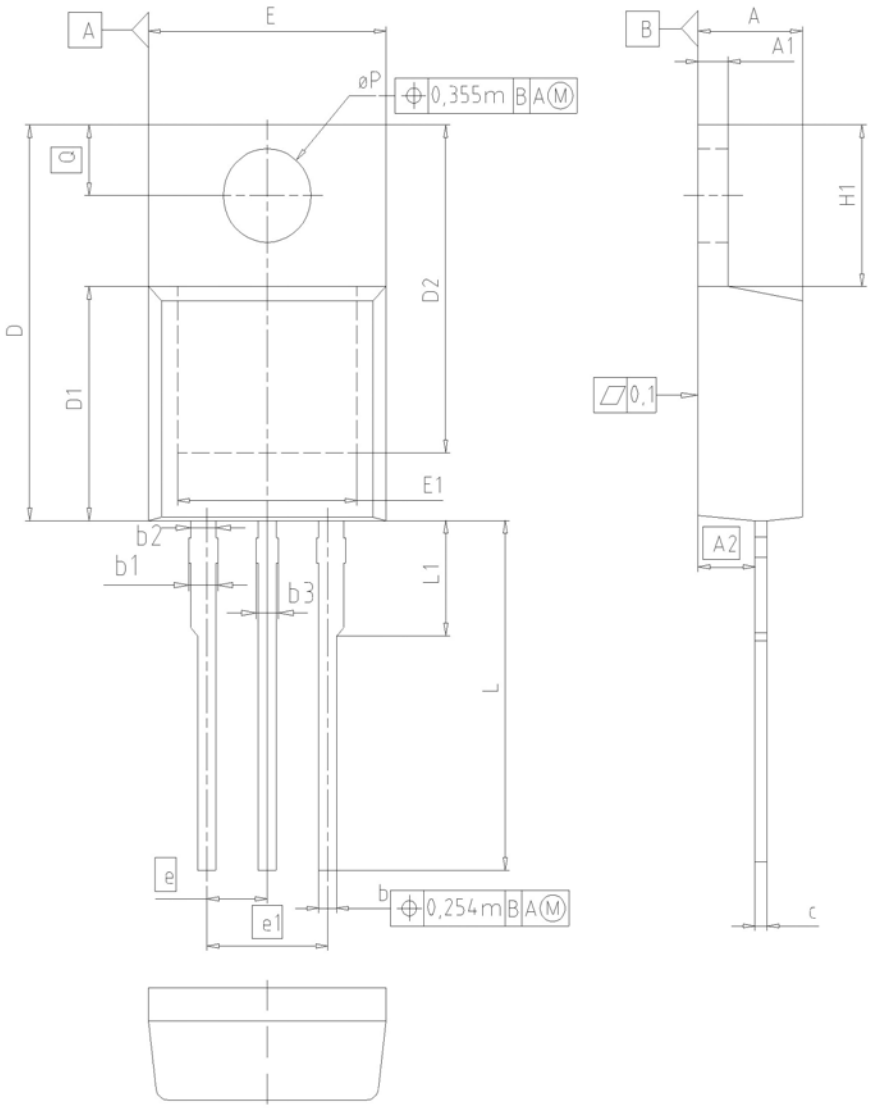
$V_{BR(DSS)}$=f(T_j); I_D=-250 µA



16 Gate charge waveforms



Package Outline: PG-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
øP	3.60	3.89	0.142	0.153
Q	2.60	3.00	0.102	0.118

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SCALE
0 2.5 5mm

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