

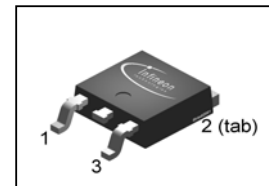
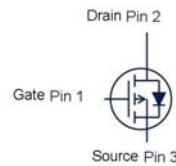
**SIPMOS® Power-Transistor**
**Features**

- P-Channel
- Enhancement mode
- Avalanche rated
- $dv/dt$  rated
- 175°C operating temperature
- Pb-free lead finishing; RoHS compliant
- ° Qualified according to AEC Q101

**Product Summary**

$V_{DS}$	-60	V
$R_{DS(on),max}$	0.3	$\Omega$
$I_D$	-8.8	A

PG-TO252-3



Type	Package	Tape and reel information	Marking	Lead free	Packing
SPD08P06PG	PG-TO252-3	1000 pcs / reel	08P06P	Yes	Non dry

Parameter	Symbol	Conditions	Value	Unit
			steady state	
Continuous drain current	$I_D$	$T_A=25\text{ °C}$	-8.83	A
		$T_A=100\text{ °C}$	-6.25	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	-35.32	
Avalanche energy, single pulse	$E_{AS}$	$I_D=8.83\text{ A}, R_{GS}=25\ \Omega$	70	mJ
Avalanche energy, periodic limited by $T_{j,max}$	$E_{AR}$		4.2	
Reverse diode $dv/dt$	$dv/dt$	$I_D=8.83\text{ A}, V_{DS}=48\text{ V}, di/dt=-200\text{ A}/\mu\text{s}, T_{j,max}=175\text{ °C}$	-6	kV/ $\mu\text{s}$
Gate source voltage	$V_{GS}$		$\pm 20$	V
Power dissipation	$P_{tot}$	$T_A=25\text{ °C}$	42	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			55/175/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
<b>Thermal characteristics</b>						
Thermal resistance, junction - case	$R_{thJC}$		-	-	3.6	K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$		-	-	-	K/W
SMD version, device on PCB:	$R_{thJA}$	minimal footprint	-	-	75	
		6 cm <sup>2</sup> cooling area <sup>1)</sup>	-	-	50	

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

**Static characteristics**

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$	-60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\text{ }\mu\text{A}$	-2.1	-3.0	-4	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-60\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	-0.1	-1	$\mu\text{A}$
		$V_{DS}=-60\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	-10	-100	
Gate-source leakage current	$I_{GSS}$	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	-	-10	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-6.2\text{ V}, I_D=-10\text{ A}$	-	230	300	m $\Omega$
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=-6.2\text{ A}$	2.5	4.9	-	S

<sup>1)</sup> Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6 cm<sup>2</sup> ( one layer, 70 $\mu$ , thick) copper area for drain connection. PCB is vertical without blown air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics**

Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$	-	335	420	pF
Output capacitance	$C_{oss}$		-	105	135	
Reverse transfer capacitance	$C_{rss}$		-	65	95	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-30\text{ V}, V_{GS}=-$ $10\text{ V}, I_D=-6.2\text{ A},$ $R_G=6\ \Omega$	-	16.0	24.0	
Rise time	$t_r$		-	46.0	69	
Turn-off delay time	$t_{d(off)}$		-	48	72	
Fall time	$t_f$		-	14	21	

**Gate Charge Characteristics**

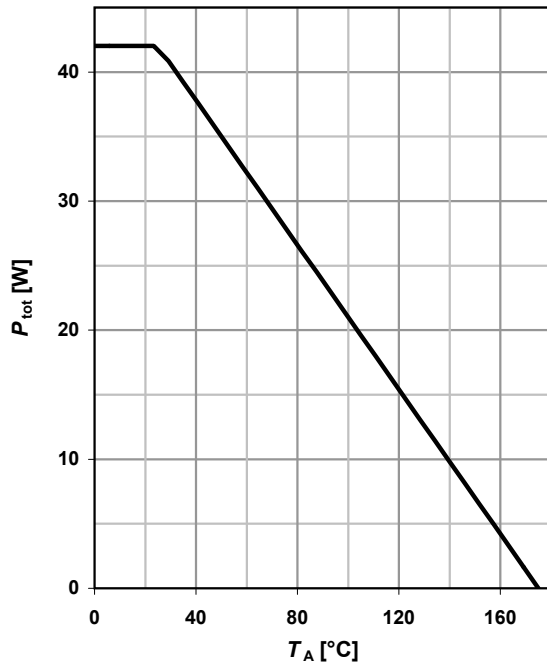
Gate to source charge	$Q_{gs}$	$V_{DD}=-48\text{ V}, I_D=-8.8\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$	-	-1.9	-2.6	nC
Gate to drain charge	$Q_{gd}$		-	-5	-8	
Gate charge total	$Q_g$		-	-10	-13	
Gate plateau voltage	$V_{plateau}$		-	-6	-	V

**Reverse Diode**

Diode continuous forward current	$I_S$	$T_A=25\text{ }^\circ\text{C}$	-	-	-8.80	A
Diode pulse current	$I_{S,pulse}$		-	-	-35.3	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=-8.83\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	-0.98	-1.55	V
Reverse recovery time	$t_{rr}$	$V_R=30\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	60	90	ns
Reverse recovery charge	$Q_{rr}$		-	100	150	

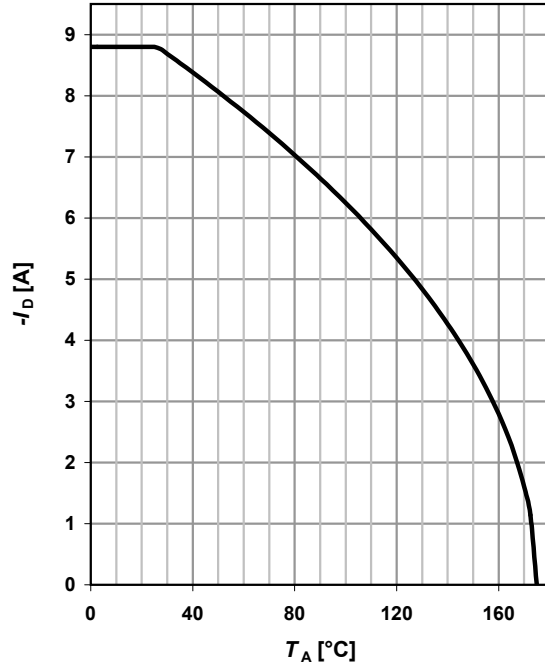
**1 Power dissipation**

$$P_{tot} = f(T_A)$$



**2 Drain current**

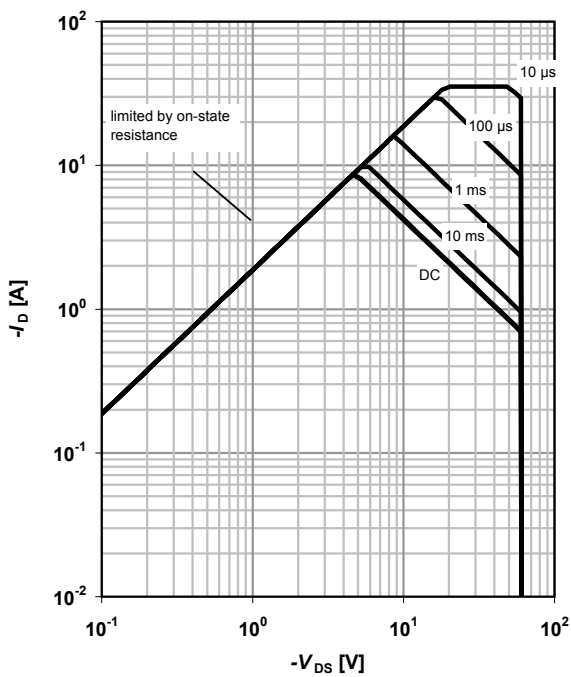
$$I_D = f(T_A); |V_{GS}| \geq 10 \text{ V}$$



**3 Safe operating area**

$$I_D = f(V_{DS}); T_A = 25 \text{ °C}; D = 0$$

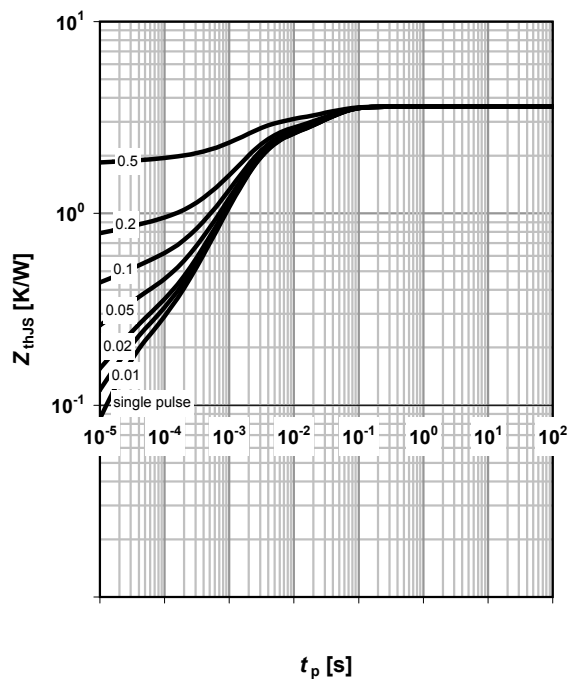
parameter:  $t_p$



**4 Max. transient thermal impedance**

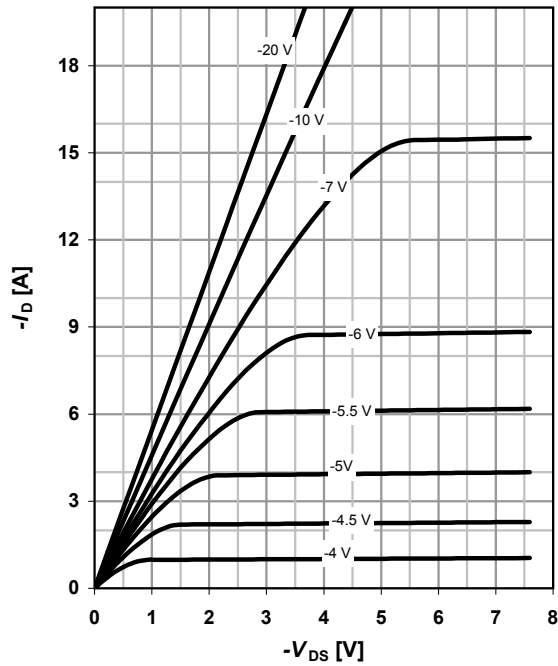
$$Z_{thJA} = f(t_p)$$

parameter:  $D = t_p / T$

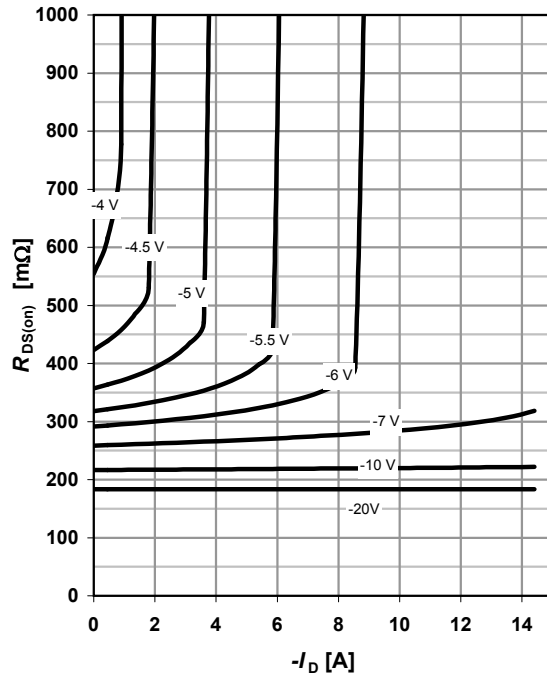


**5 Typ. output characteristics**

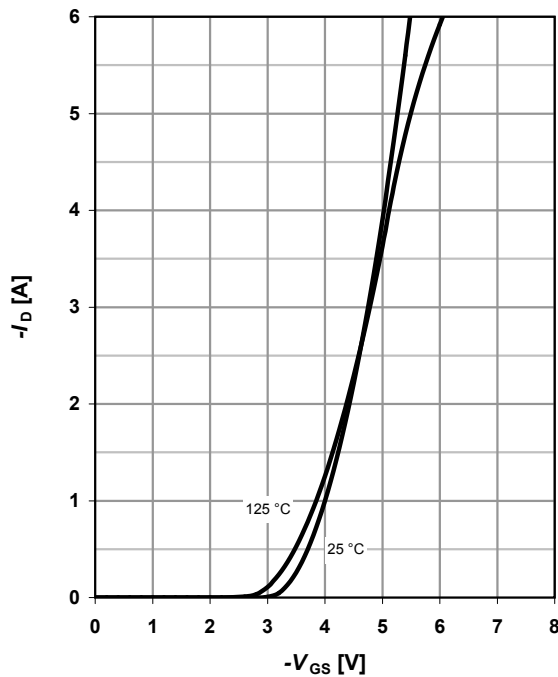
$$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$$

 parameter:  $V_{GS}$ 

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

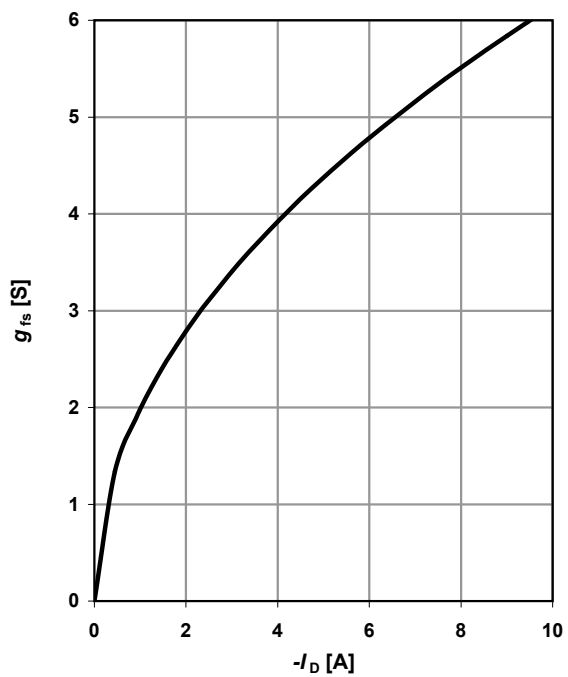
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

 parameter:  $V_{GS}$ 

**7 Typ. transfer characteristics**

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

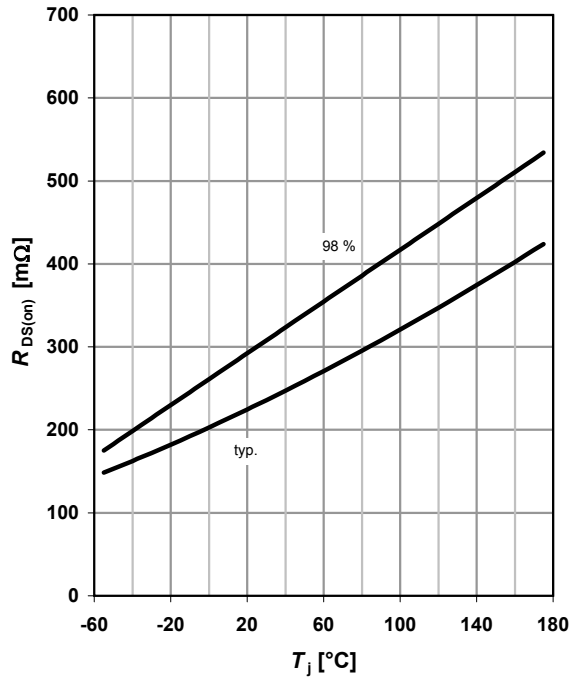
 parameter:  $T_j$ 

**8 Typ. forward transconductance**

$$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$$

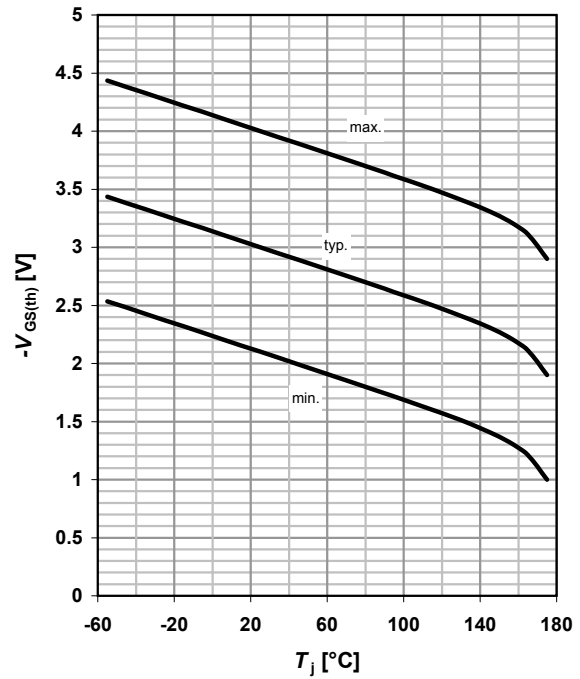


**9 Drain-source on-state resistance**

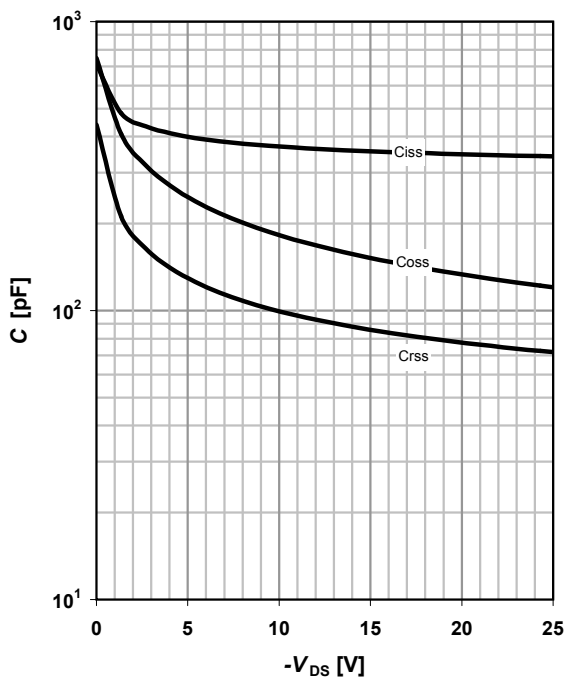
$$R_{DS(on)} = f(T_j); I_D = -6.2 \text{ A}; V_{GS} = -10 \text{ V}$$


**10 Typ. gate threshold voltage**

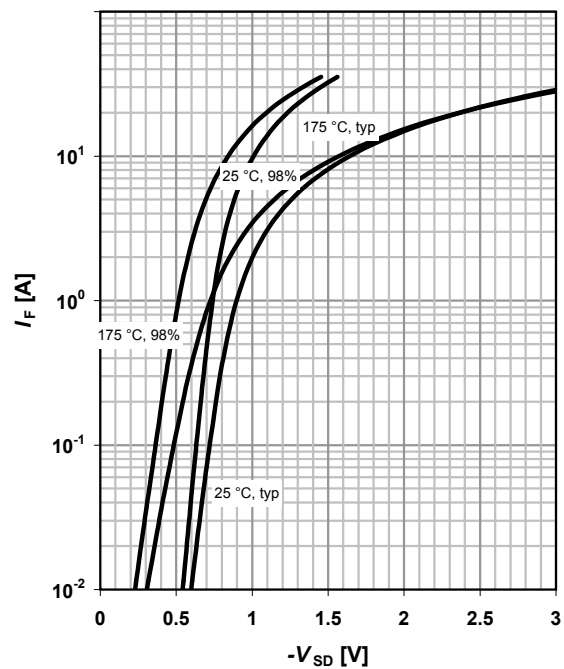
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -250 \mu\text{A}$$


**11 Typ. capacitances**

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

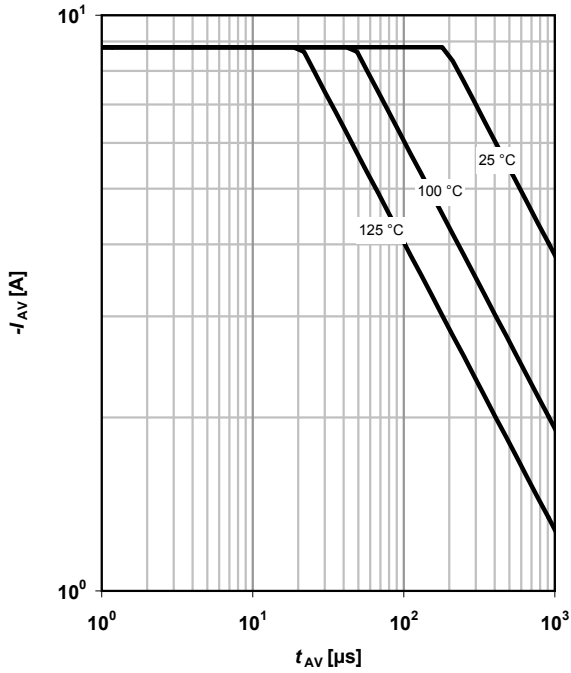

**12 Forward characteristics of reverse diode**

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

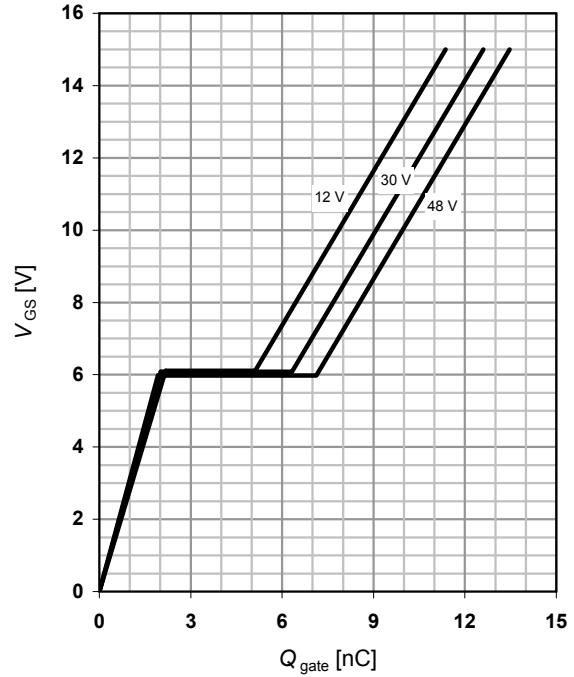
 parameter:  $T_j$ 


**13 Avalanche characteristics**

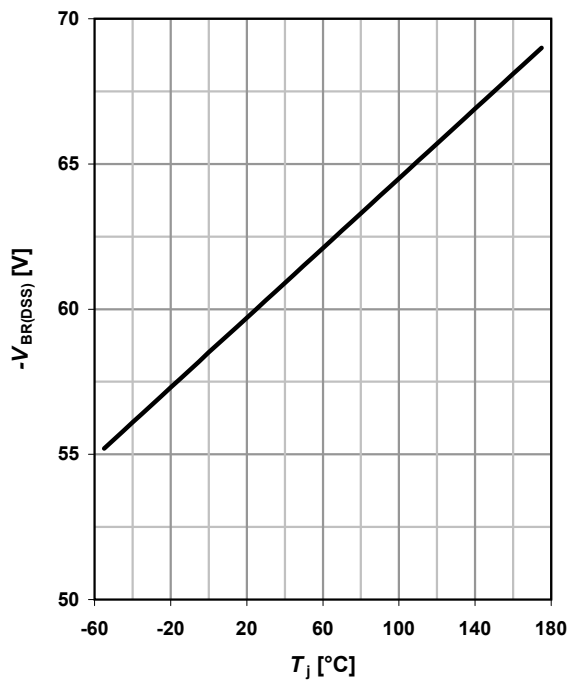
$$I_{AS}=f(t_{AV}); R_{GS}=25\ \Omega$$

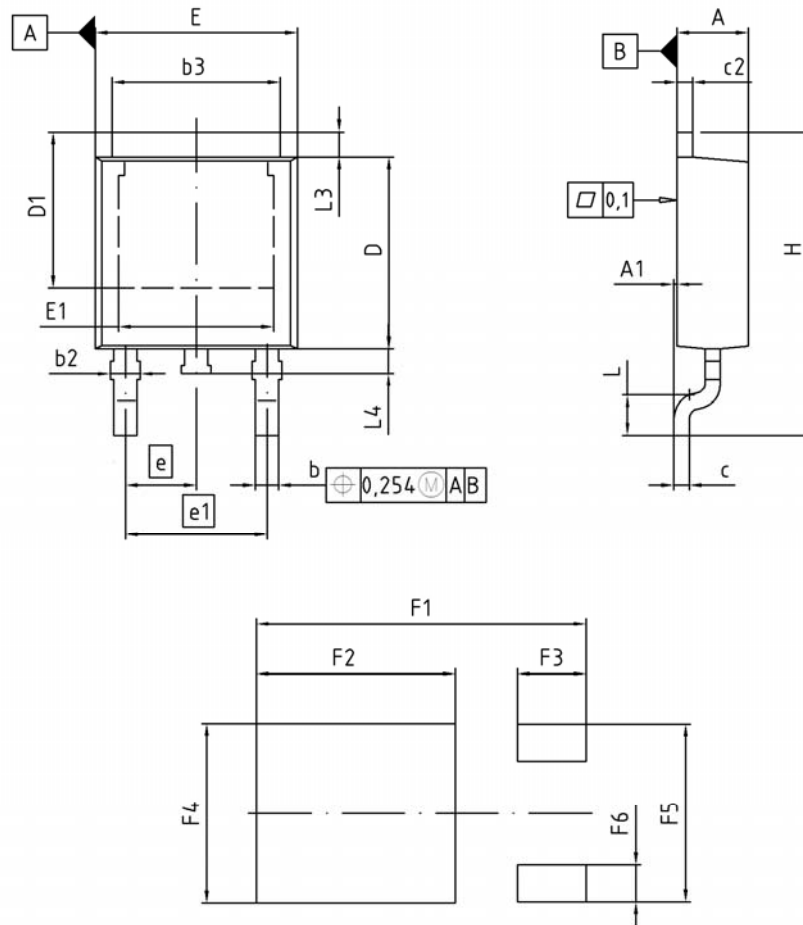
 parameter:  $T_{j(\text{start})}$ 

**14 Typ. gate charge**

$$V_{GS}=f(Q_{\text{gate}}); I_D=-8.8\ \text{A pulsed}$$

 parameter:  $V_{DD}$ 

**15 Drain-source breakdown voltage**

$$V_{BR(DSS)}=f(T_j); I_D=-250\ \mu\text{A}$$



**Package outline: PG-TO252-3**


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.16	2.41	0.085	0.095
A1	0.00	0.15	0.000	0.006
b	0.64	0.89	0.025	0.035
b2	0.65	1.15	0.026	0.045
b3	5.00	5.50	0.197	0.217
c	0.46	0.60	0.018	0.024
c2	0.46	0.98	0.018	0.039
D	5.97	6.22	0.235	0.245
D1	5.02	5.84	0.198	0.230
E	6.40	6.73	0.252	0.265
E1	4.70	5.21	0.185	0.205
e	2.29		0.090	
e1	4.57		0.180	
N	3		3	
H	9.40	10.48	0.370	0.413
L	1.18	1.70	0.046	0.067
L3	0.90	1.25	0.035	0.049
L4	0.51	1.00	0.020	0.039
F1	10.50	10.70	0.413	0.421
F2	6.30	6.50	0.248	0.256
F3	2.10	2.30	0.083	0.091
F4	5.70	5.90	0.224	0.232
F5	5.66	5.86	0.223	0.231
F6	1.10	1.30	0.043	0.051

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