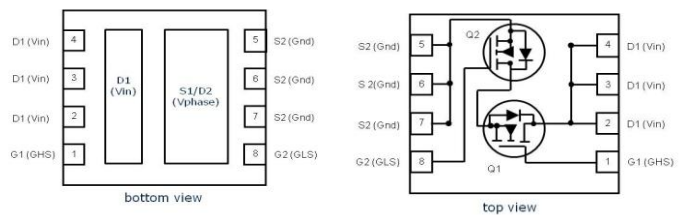


PowerStage 3x3
Features

- Dual N-channel OptiMOS™ MOSFET
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- 100% Lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21


Product Summary

		Q1	Q2	
V_{DS}		30	30	V
$R_{DS(on),max}$	$V_{GS}=10\text{ V}$	18	9	mΩ
	$V_{GS}=4.5\text{ V}$	25	13	
I_D		19	30	A

PG-WISON-8


Type	Package	Marking	Lead Free
BSZ0908ND	PG-WISON-8	0908ND	Yes

Maximum ratings, at $T_j=25\text{ °C}$, unless otherwise specified ¹⁾

Parameter	Symbol	Conditions	Value		Unit
			Q1	Q2	
Continuous drain current	I_D	$T_C=70\text{ °C}$	19	30	A
		$T_A=25\text{ °C}^{(2)}$	8.1	12.4	
		$T_A=70\text{ °C}^{(2)}$	6.4	9.9	
		$T_A=25\text{ °C}^{(3)}$	4.8	7.6	
Pulsed drain current	$I_{D,pulse}$	$T_C=25\text{ °C}$	40		
Avalanche energy, single pulse	E_{AS}	$I_D=9\text{ A}$, $R_{GS}=25\text{ Ω}$	4	20	mJ
Gate source voltage	V_{GS}		±20		V
Power dissipation	P_{tot}	$T_A=25\text{ °C}^{(2)}$	1.9	2.3	W
		$T_A=25\text{ °C}^{(3)}$	0.70	0.86	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150		°C
IEC climatic category; DIN IEC 68-1			55/150/56		

¹⁾ Remark: only one of both transistors active

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	Q1	R_{thJC}	-	-	7.5	K/W
	Q2		-	-	4	
Thermal resistance, junction - ambient ¹⁾	Q1	R_{thJA}	6 cm ² cooling area ²⁾	-	-	65
	Q2			-	-	55
	Q1		minimal footprint, steady state ³⁾	-	-	180
	Q2			-	-	145

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

Static characteristics

Drain-source breakdown voltage	Q1	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	30	-	-	V
	Q2						
Gate threshold voltage	Q1	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$	1.2	1.6	2	
	Q2						
Zero gate voltage drain current	Q1	I_{DSS}	$V_{DS}=30\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	-	1	μA
	Q2						
	Q1		$V_{DS}=30\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	-	100	
	Q2						
Gate-source leakage current	Q1	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	-	100	nA
	Q2						
Drain-source on-state resistance	Q1	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=9\text{ A}$	-	20	25	m Ω
	Q2			-	10	12	
	Q1		$V_{GS}=10\text{ V}, I_D=9\text{ A}$	-	14.4	18	
	Q2			-	7.5	9	
Gate resistance	Q1	R_G		3.5	7	14	Ω
	Q2			1.8	3.5	7.0	
Transconductance	Q1	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=9\text{ A}$	11	22	-	S
	Q2			16	33	-	

²⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

³⁾ device mounted on a minimum pad (one layer, 70 μm thick)

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	Q1	C_{iss}	$V_{GS}=0\text{ V},$ $V_{DS}=15\text{ V}, f=1\text{ MHz}$	-	250	340	pF
	Q2			-	550	730	
Output capacitance	Q1	C_{oss}		-	120	160	
	Q2			-	220	293	
Reverse transfer capacitance	Q1	C_{rss}		-	18	-	
	Q2			-	34	-	
Turn-on delay time	Q1	$t_{d(on)}$	$V_{DD}=15\text{ V},$ $V_{GS}=10\text{ V}, R_G=6\ \Omega,$ $I_D=9\text{ A}$	-	5	-	ns
	Q2			-	6.2	-	
Rise time	Q1	t_r		-	2.5	-	
	Q2			-	3.2	-	
Turn-off delay time	Q1	$t_{d(off)}$		-	15	-	
	Q2			-	18.5	-	
Fall time	Q1	t_f		-	2	-	
	Q2			-	2.8	-	

Gate Charge Characteristics

Gate to source charge	Q1	Q_{gs}	$V_{DD}=15\text{ V},$ $I_D=9\text{ A},$ $V_{GS}=0\text{ to }4.5\text{ V}$	-	0.7	0.9	nC
Gate to drain charge		Q_{gd}		-	0.7	0.9	
Switching charge		Q_g		-	2.0	3.0	
Gate plateau voltage		$V_{plateau}$		-	2.8	-	
Gate to source charge	Q2	Q_{gs}		-	1.4	1.9	
Gate to drain charge		Q_{gd}		-	1.4	1.8	
Switching charge		Q_g		-	4.3	6.4	
Gate plateau voltage		$V_{plateau}$		-	2.6	-	

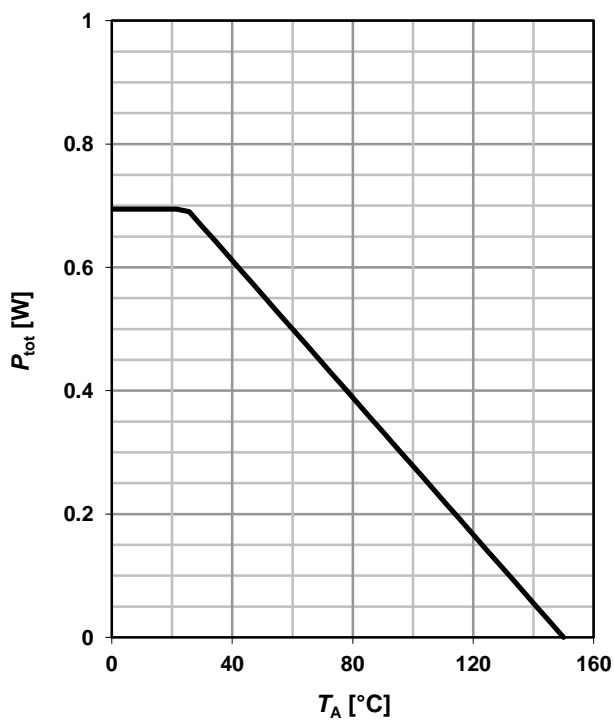
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Reverse Diode

Diode continuous forward current	Q1	I_S	$T_C=25\text{ °C}$	-	-	14	A
	Q2					26	
Diode pulse current	Q1	$I_{S,pulse}$		-	-	40	
	Q2					40	
Diode forward voltage	Q1	V_{SD}	$V_{GS}=0\text{ V}, I_F=9\text{ A},$ $T_j=25\text{ °C}$	-	0.92	1.2	V
	Q2			-	0.85	1.2	
Reverse recovery charge	Q1	Q_{rr}	$V_R=15\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	5	-	nC
	Q2			-	5	-	

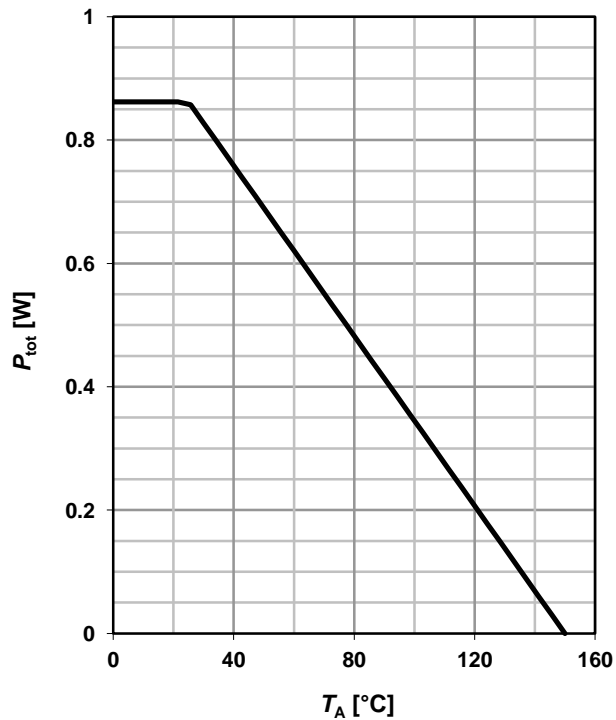
1 Power dissipation (Q1)

$$P_{\text{tot}}=f(T_A)^3$$



2 Power dissipation (Q2)

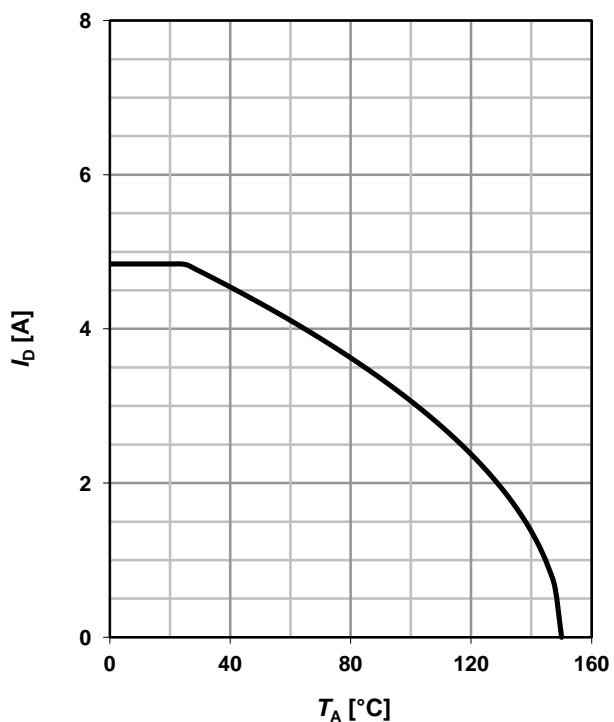
$$P_{\text{tot}}=f(T_A)^3$$



3 Drain current (Q1)

$$I_D=f(T_A)^3$$

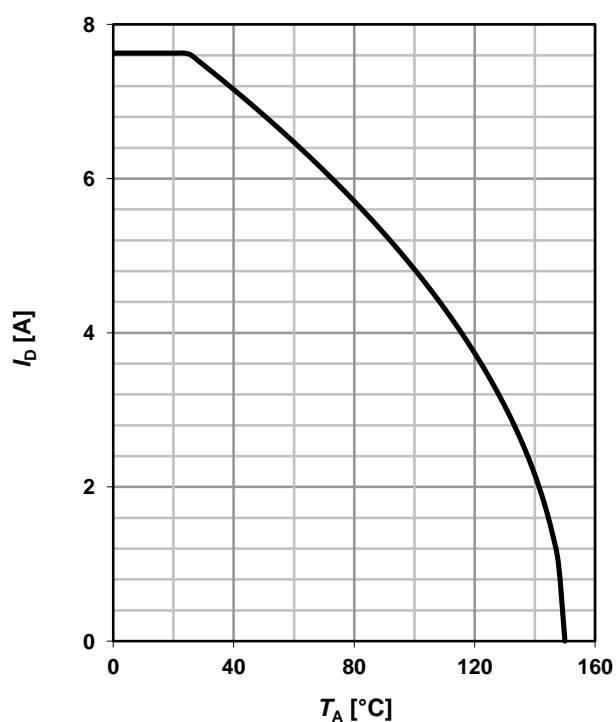
parameter: V_{GS} ≥ 10 V



4 Drain current (Q2)

$$I_D=f(T_A)^3$$

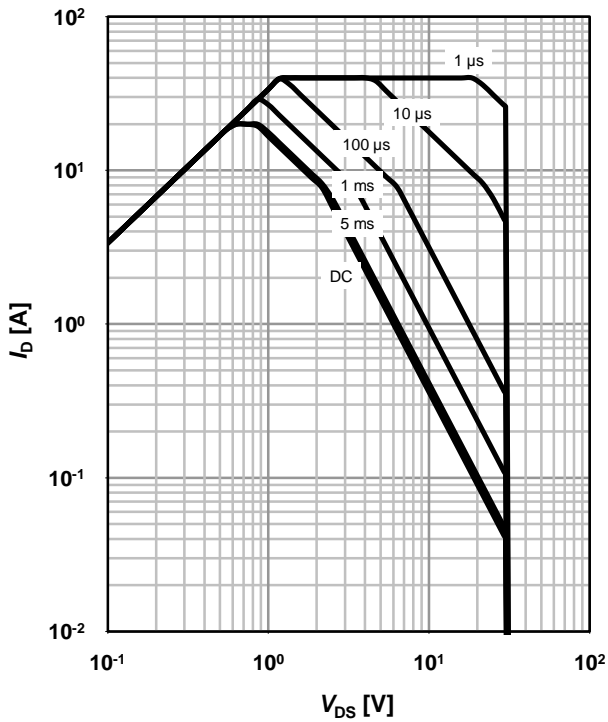
parameter: V_{GS} ≥ 10 V



5 Safe operating area (Q1)

$I_D=f(V_{DS}); T_C=25\text{ }^\circ\text{C}; D=0$

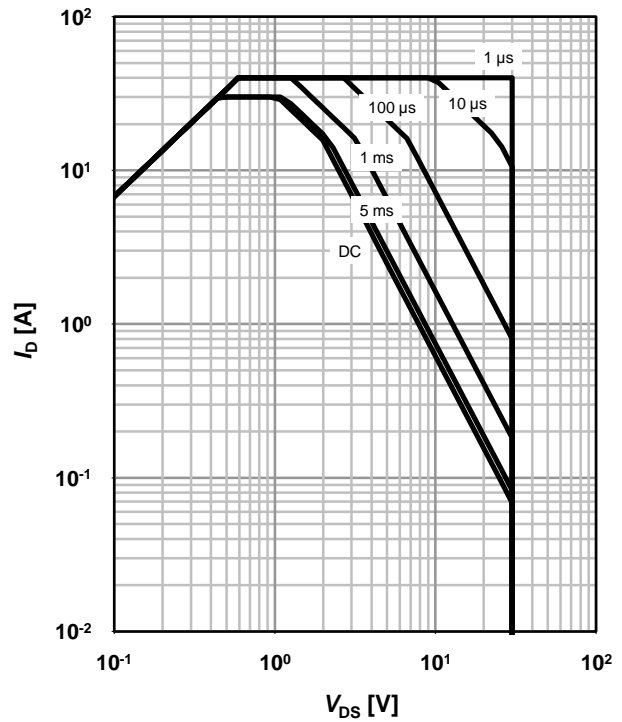
parameter: t_p



6 Safe operating area (Q2)

$I_D=f(V_{DS}); T_C=25\text{ }^\circ\text{C}; D=0$

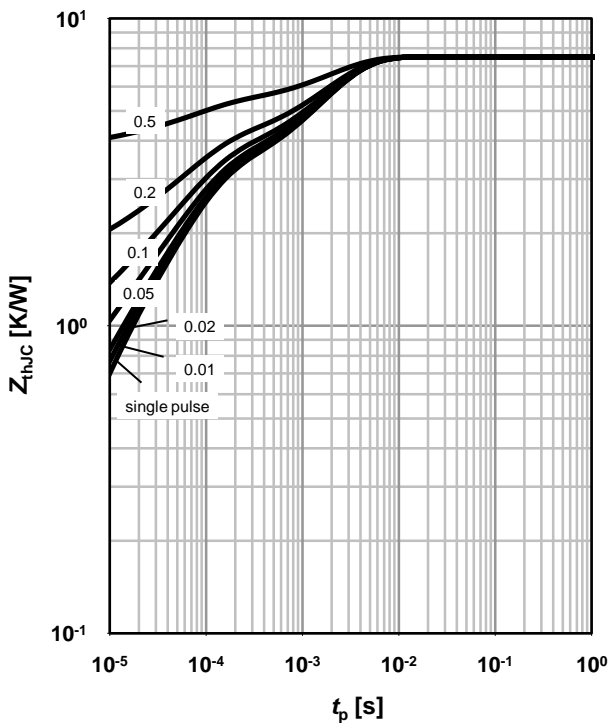
parameter: t_p



7 Max. transient thermal impedance (Q1)

$Z_{thJC}=f(t_p)$

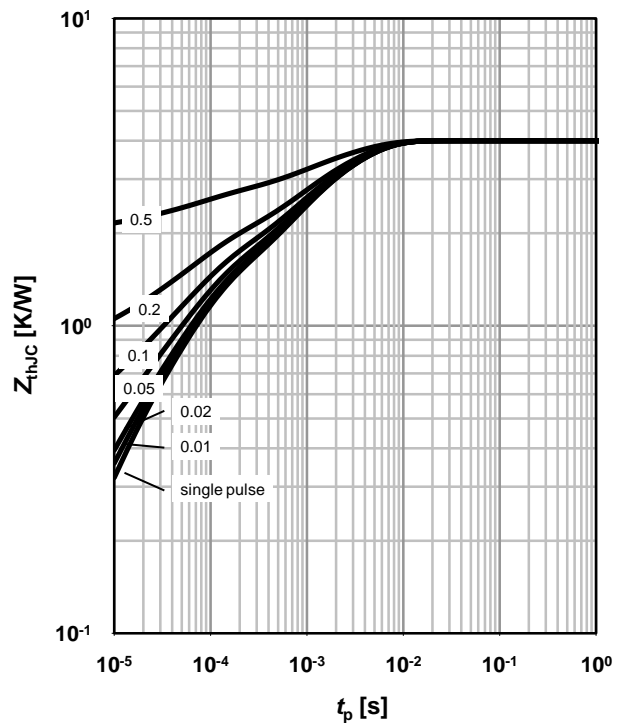
parameter: $D=t_p/T$



8 Max. transient thermal impedance (Q2)

$Z_{thJC}=f(t_p)$

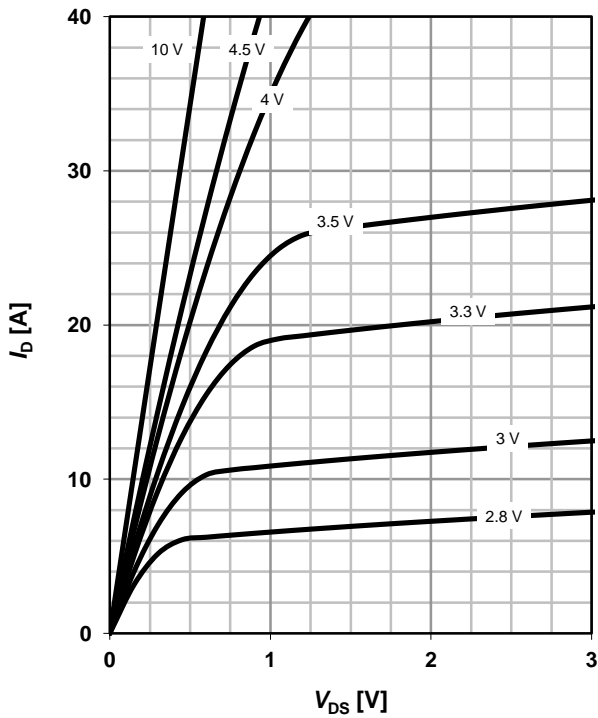
parameter: $D=t_p/T$



9 Typ. output characteristics (Q1)

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

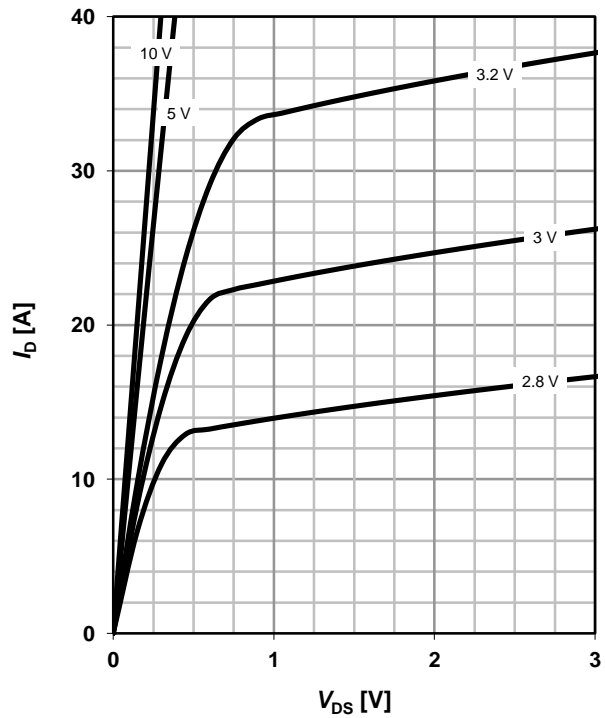
parameter: V_{GS}



10 Typ. output characteristics (Q2)

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

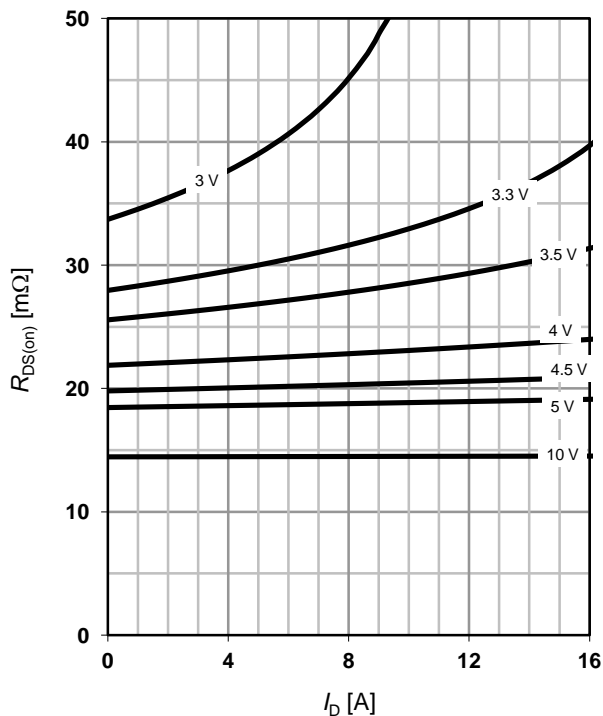
parameter: V_{GS}



11 Typ. drain-source on resistance (Q1)

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

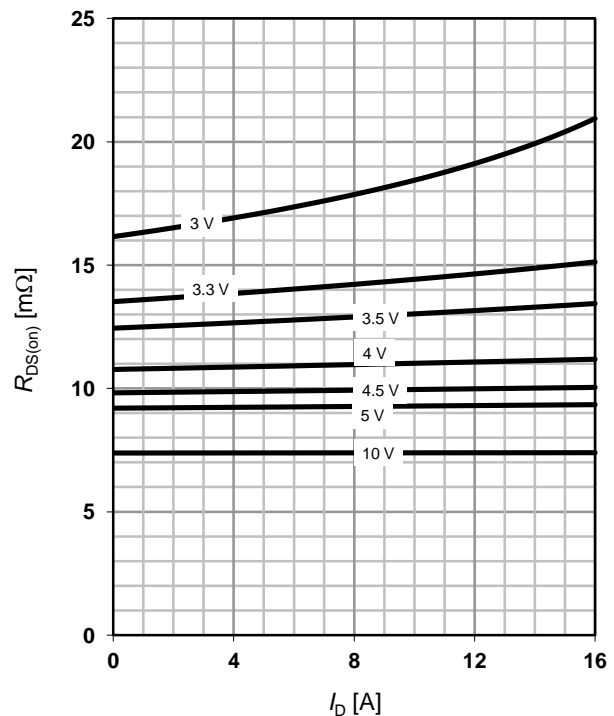
parameter: V_{GS}



12 Typ. drain-source on resistance (Q2)

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

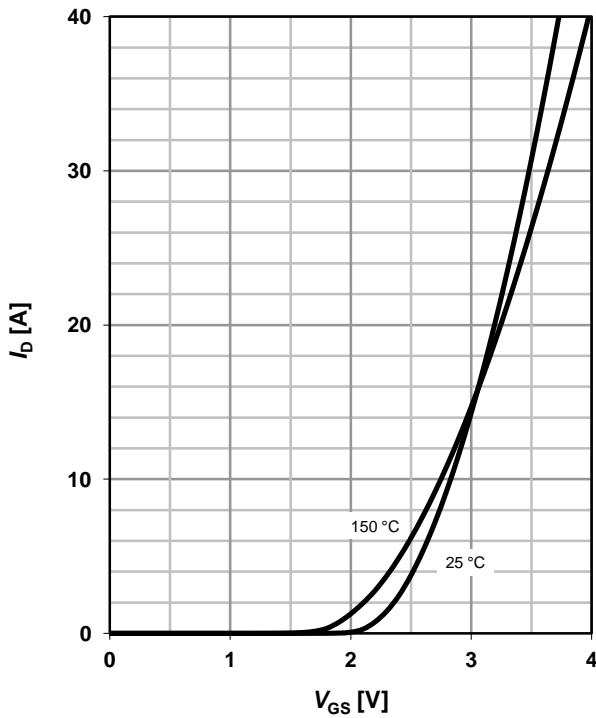
parameter: V_{GS}



13 Typ. transfer characteristics (Q1)

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

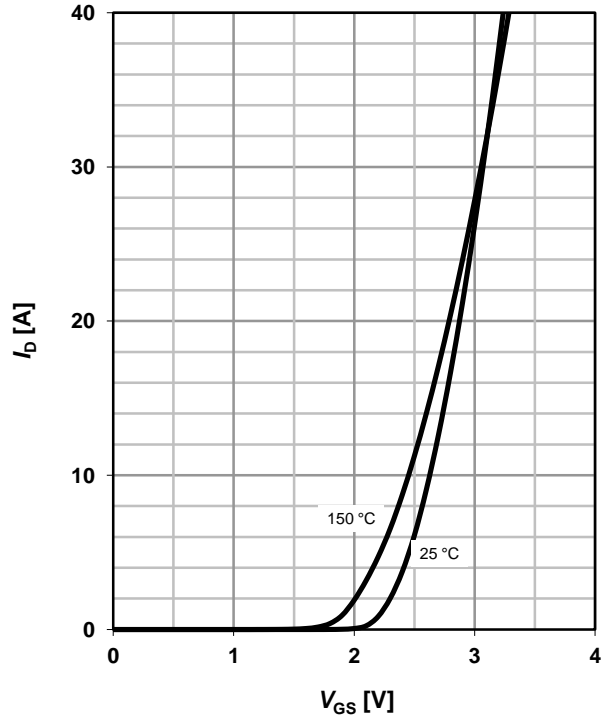
parameter: T_j



14 Typ. transfer characteristics (Q2)

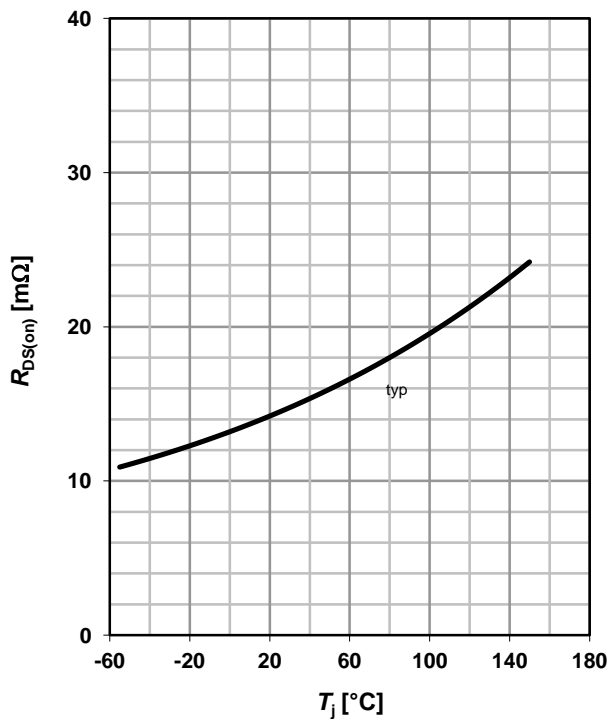
$$I_D = f(V_{GS}); |V_{DS}| > 2 |I_D| R_{DS(on)max}$$

parameter: T_j



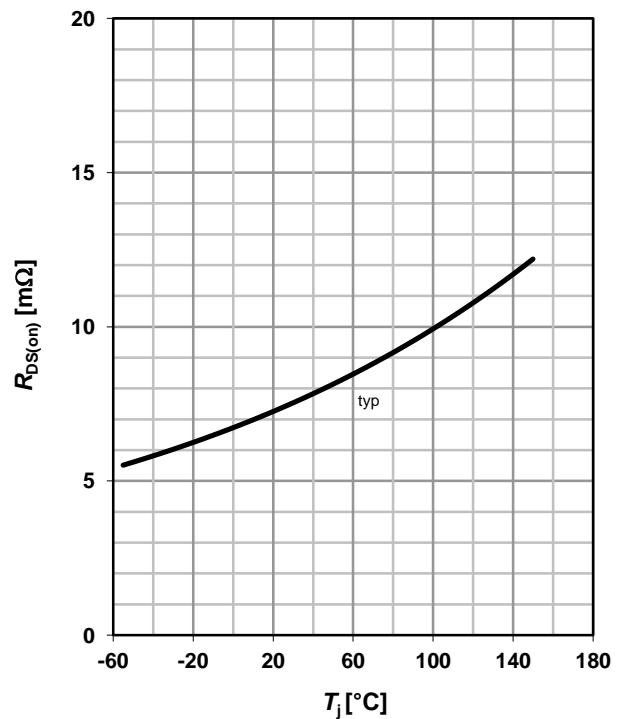
15 Drain-source on-state resistance (Q1)

$$R_{DS(on)} = f(T_j); I_D = 9 \text{ A}; V_{GS} = 10 \text{ V}$$



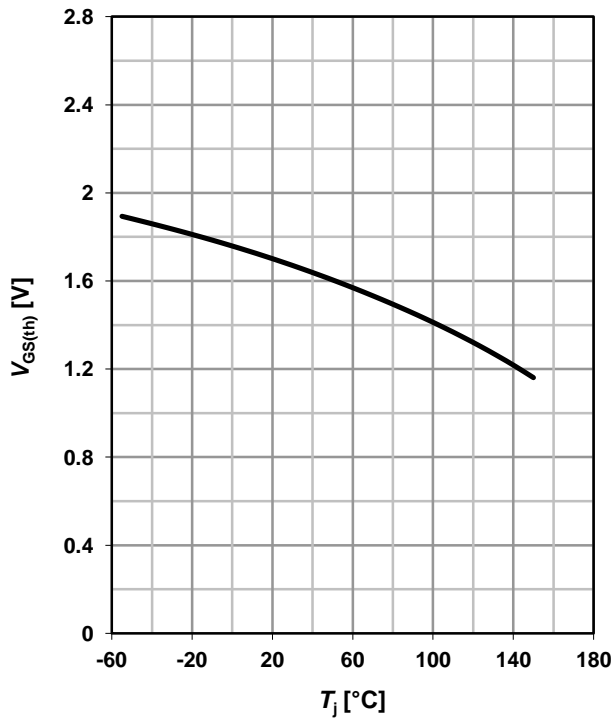
16 Drain-source on-state resistance (Q2)

$$R_{DS(on)} = f(T_j); I_D = 9 \text{ A}; V_{GS} = 10 \text{ V}$$



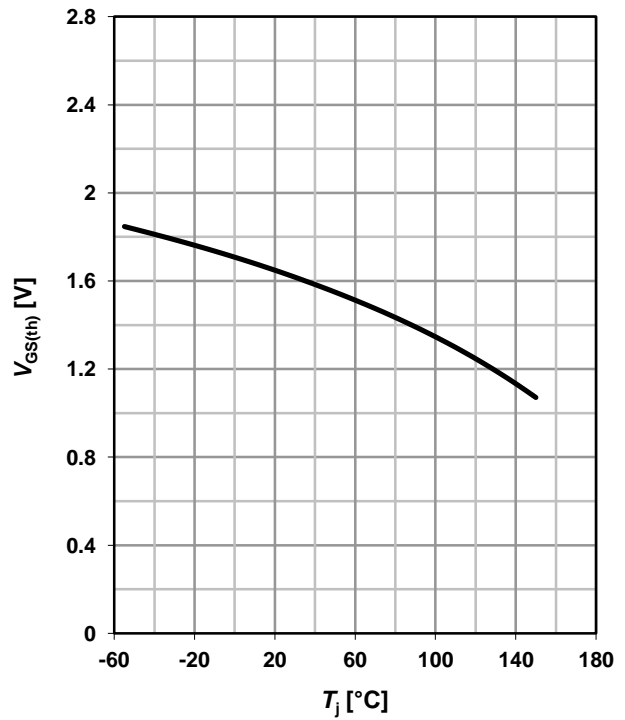
17 Typ. gate threshold voltage (Q1)

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



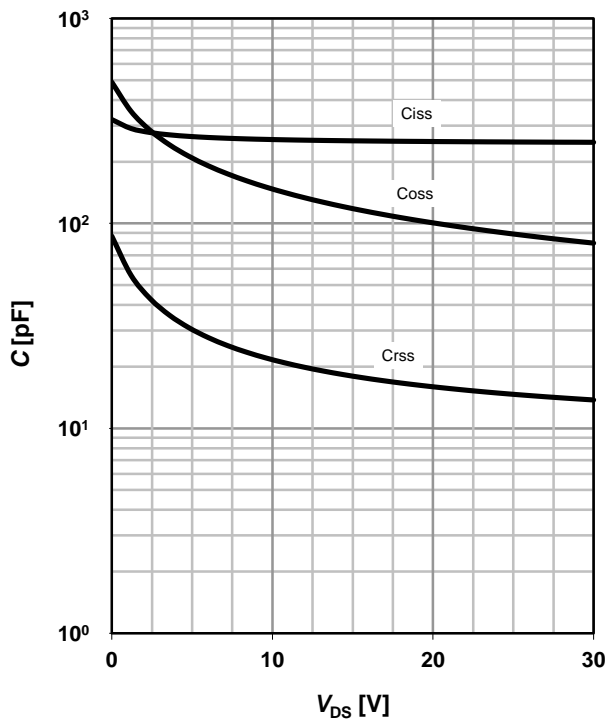
18 Typ. gate threshold voltage (Q2)

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



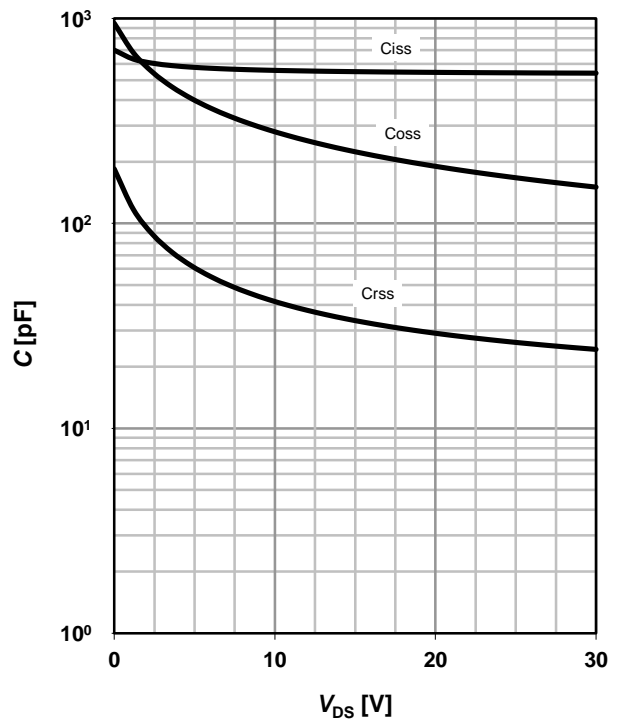
19 Typ. capacitances (Q1)

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



20 Typ. capacitances (Q2)

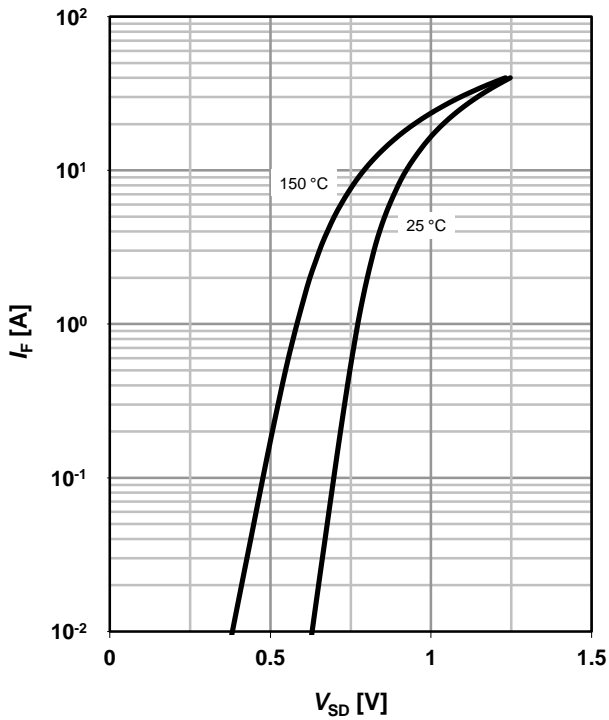
$C=f(V_{DS}); V_{GS}=0 V; f=1 MHz$



21 Forward characteristics of reverse diode (Q1)

$I_F=f(V_{SD})$

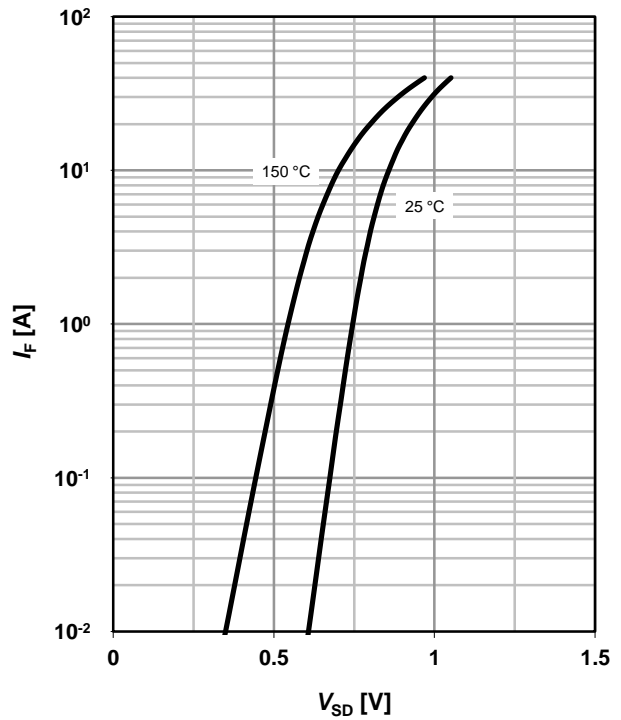
parameter: T_j



22 Forward characteristics of reverse diode (Q2)

$I_F=f(V_{SD})$

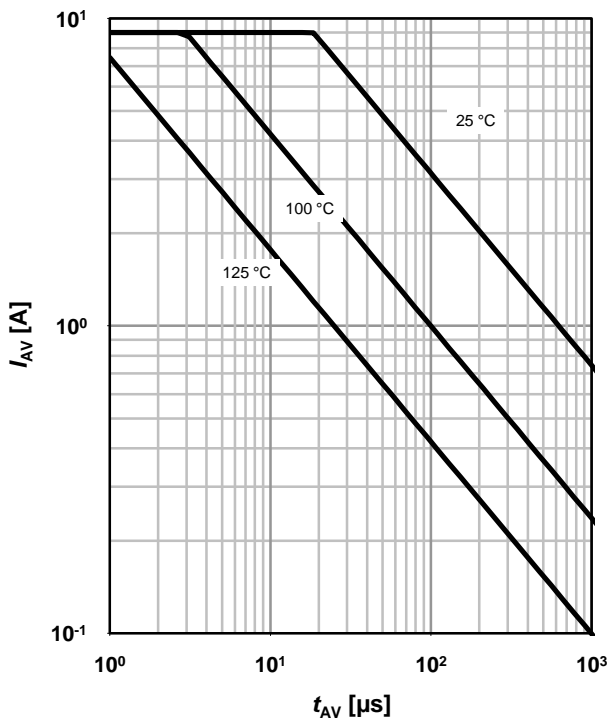
parameter: T_j



23 Avalanche characteristics (Q1)

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

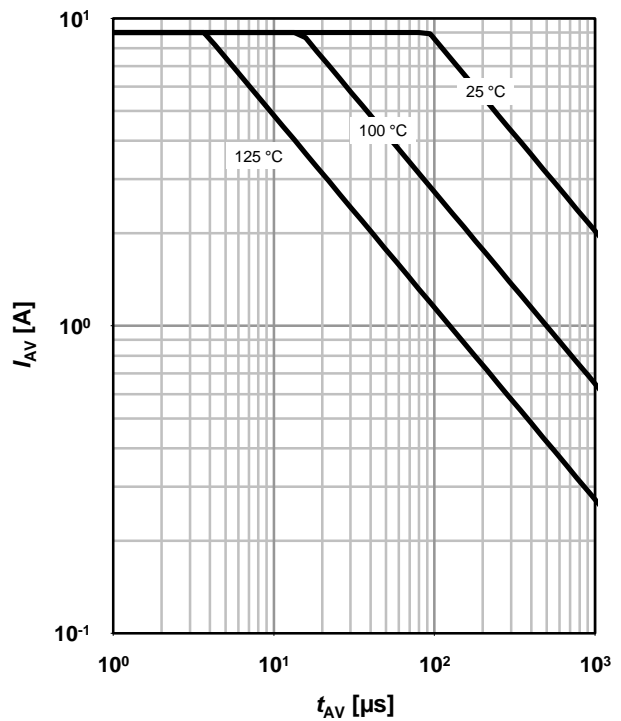
parameter: $T_{j(start)}$



24 Avalanche characteristics (Q2)

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

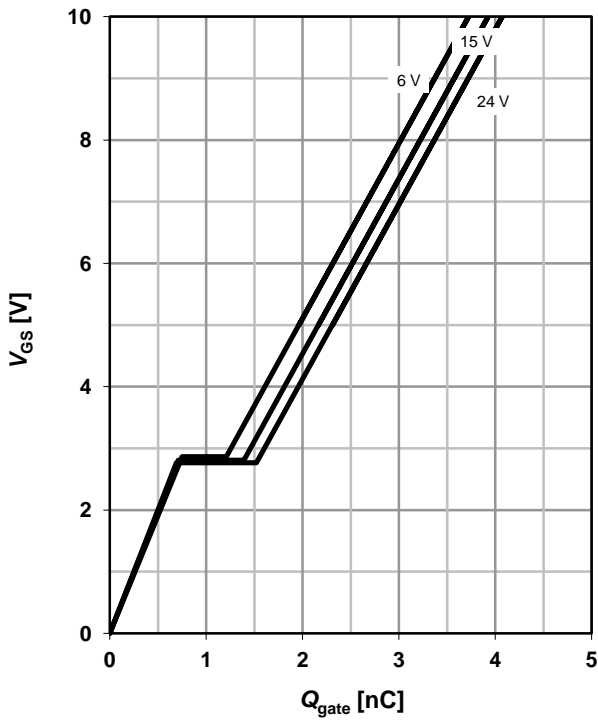
parameter: $T_{j(start)}$



25 Typ. gate charge (Q1)

$V_{GS}=f(Q_{gate}); I_D=9\text{ A pulsed}$

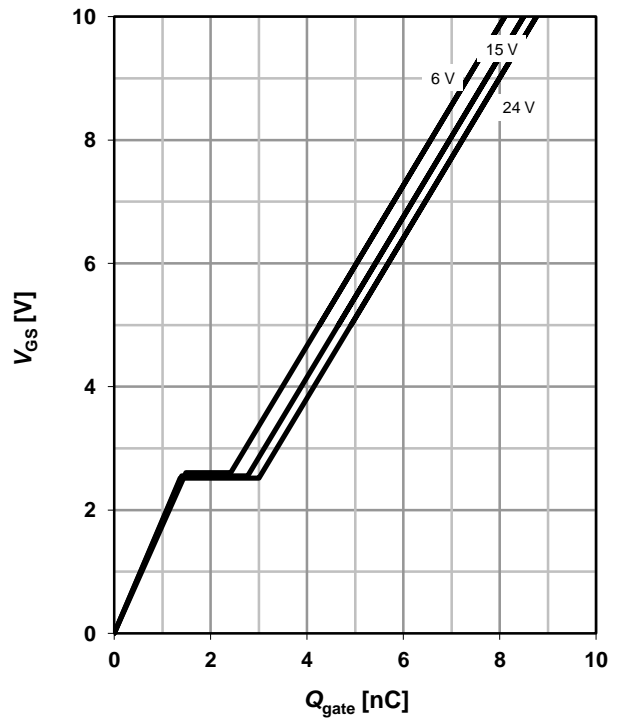
parameter: V_{DD}



26 Typ. gate charge (Q2)

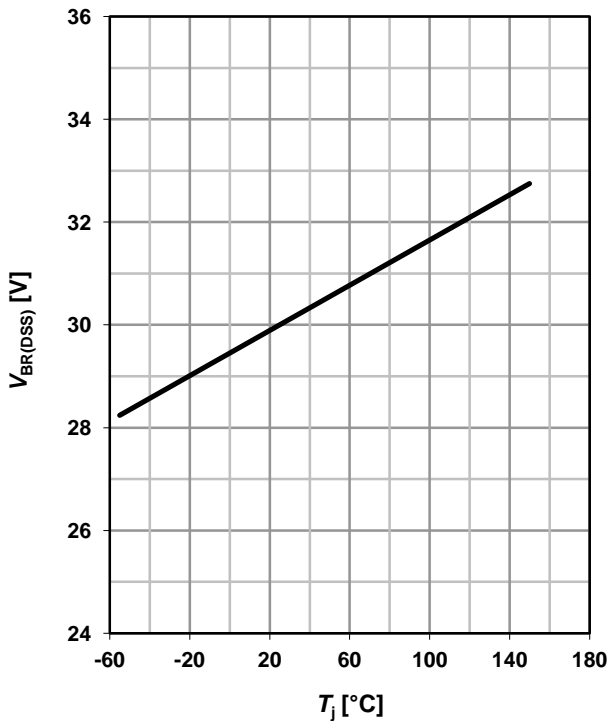
$V_{GS}=f(Q_{gate}); I_D=9\text{ A pulsed}$

parameter: V_{DD}



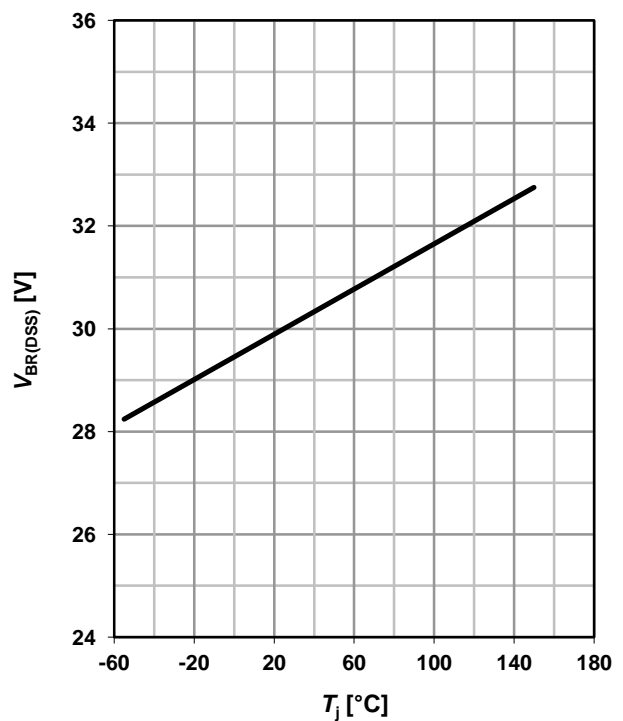
27 Drain-source breakdown voltage (Q1)

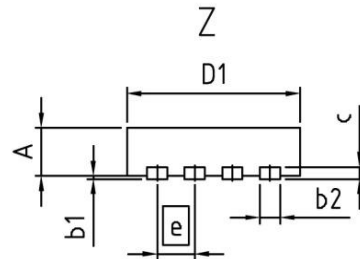
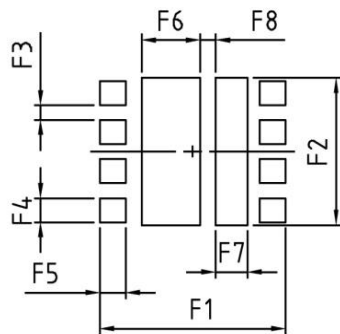
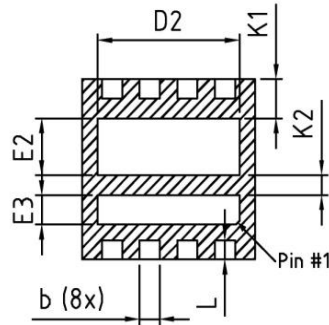
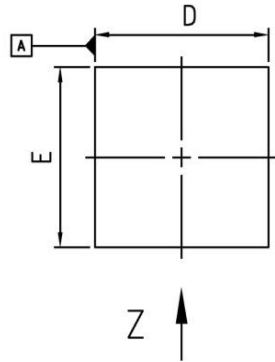
$V_{BR(DSS)}=f(T_j); I_D=1\text{ mA}$



28 Drain-source breakdown voltage (Q2)

$V_{BR(DSS)}=f(T_j); I_D=1\text{ mA}$



PG-WISON-8


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
b	0.25	0.45	0.010	0.018
b1	0.00	0.05	0.000	0.002
b2	0.25	0.45	0.010	0.018
c	0.10	0.30	0.004	0.012
D=D1	2.90	3.10	0.114	0.122
D2	2.35	2.55	0.093	0.100
E=E1	2.90	3.10	0.114	0.122
E2	0.85	1.05	0.033	0.041
E3	0.39	0.59	0.015	0.023
K1	0.55	0.75	0.022	0.030
K2	0.23	0.43	0.009	0.017
e	0.65 (BSC)		0.026 (BSC)	
N	8		8	
L	0.22	0.42	0.009	0.017
F1	3.21		0.126	
F2	2.45		0.096	
F3	0.25		0.010	
F4	0.40		0.016	
F5	0.45		0.018	
F6	1.01		0.040	
F7	0.55		0.022	
F8	0.27		0.011	

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SCALE

EUROPEAN PROJECTION

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REVISION
01

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