

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	BSZ019N03LS
▶ Overseas	Part Number	BSZ019N03LS
▶ Equivalent	Part Number	BSZ019N03LS

EV is the abbreviation of name EVVO

30V N-Channel Enhancement Mode MOSFET

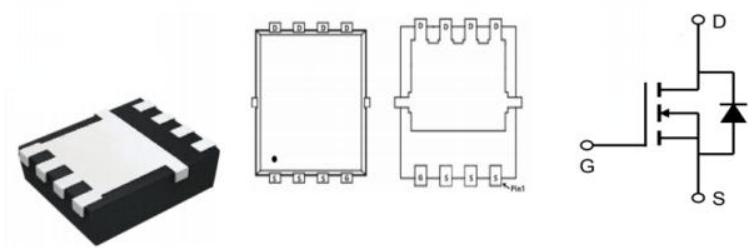
Features

- Fast switching MOSFET for SMPS
- Optimized technology for DC/DC converters
- Qualified according to JEDEC¹⁾ for target applications
- N-channel
- Logic level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- Superior thermal resistance
- 100% Avalanche tested
- Pb-free plating; RoHS compliant;
- Halogen-free according to IEC61249-2-21

Product Summary

$V_{DS} = 30V$ $I_D = 150 A$
 $R_{DS(ON)} < 2.3 m\Omega @ V_{GS}=4.5 V$
 $R_{DS(ON)} < 1.6 m\Omega @ V_{GS}=10 V$

PDFN3*3-8LPin Configuration



Maximum ratings, at $T_J=25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$V_{GS}=10 V, T_C=25\text{ }^{\circ}\text{C}$	150	A
		$V_{GS}=10 V, T_C=100\text{ }^{\circ}\text{C}$	120	
Pulsed drain current ³⁾	$I_{D,pulse}$	$T_C=25\text{ }^{\circ}\text{C}$	400	
Avalanche current, single pulse ⁴⁾	I_{AS}	$T_C=25\text{ }^{\circ}\text{C}$	50	
Avalanche energy, single pulse	E_{AS}	$I_D=50 A, R_{GS}=25\text{ }\Omega$	295	mJ
Gate source voltage	V_{GS}		± 20	V

¹⁾ J-STD20 and JESD22

30V N-Channel Enhancement Mode MOSFET
Maximum ratings, at $T = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	139	W
		$T_A = 25\text{ °C}$, $R_{\text{thJA}} = 50\text{ K/W}^{(2)}$	2.5	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°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}	bottom	-	-	0.9	K/W
		top			20	
Device on PCB	R_{thJA}	6 cm ² cooling area ²⁾	-	-	50	

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

Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0\text{ V}$, $I_{\text{D}} = 1\text{ mA}$	30	-	-	V
Gate threshold voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}} = V_{\text{GS}}$, $I_{\text{D}} = 85\text{ }\mu\text{A}$	1.2	-	2	
Zero gate voltage drain current	I_{DSS}	$V_{\text{DS}} = 40\text{ V}$, $V_{\text{GS}} = 0\text{ V}$, $T_j = 25\text{ °C}$	-	0.1	1	μA
		$V_{\text{DS}} = 40\text{ V}$, $V_{\text{GS}} = 0\text{ V}$, $T_j = 125\text{ °C}$	-	10	100	
Gate-source leakage current	I_{GSS}	$V_{\text{GS}} = 20\text{ V}$, $V_{\text{DS}} = 0\text{ V}$	-	10	100	nA
Drain-source on-state resistance	$R_{\text{DS(on)}}$	$V_{\text{GS}} = 4.5\text{ V}$, $I_{\text{D}} = 50\text{ A}$	-	1.8	2.3	m Ω
		$V_{\text{GS}} = 10\text{ V}$, $I_{\text{D}} = 50\text{ A}$	-	1.3	1.6	
Gate resistance	R_{G}		-	1.5	-	Ω
Transconductance	g_{fs}	$ V_{\text{DS}} > 2 I_{\text{D}} R_{\text{DS(on)max}}$, $I_{\text{D}} = 50\text{ A}$	95	190	-	S

⁽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⁾ See figure 3 for more detailed information

⁽⁴⁾ See figure 13 for more detailed information

30V N-Channel Enhancement Mode MOSFET

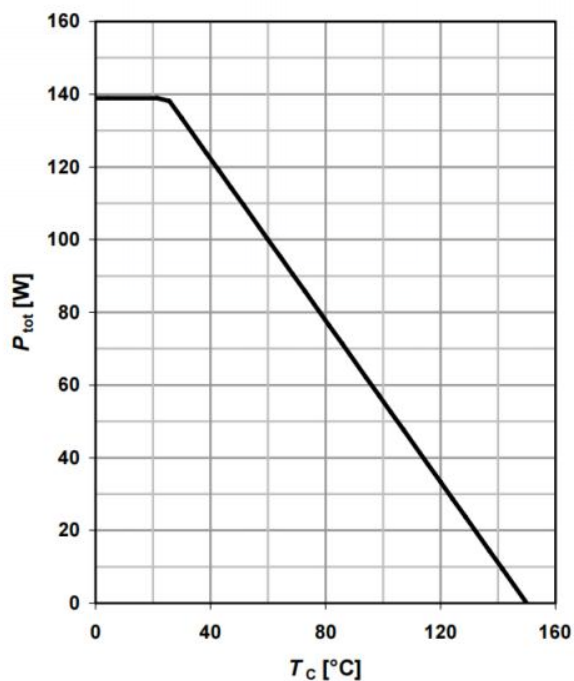
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=20\text{ V},$ $f=1\text{ MHz}$	-	8900	12000	pF
Output capacitance	C_{oss}		-	1800	2400	
Reverse transfer capacitance	C_{rss}		-	100	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=20\text{ V}, V_{GS}=10\text{ V},$ $I_D=30\text{ A}, R_G=1.6\ \Omega$	-	14	-	ns
Rise time	t_r		-	7.6	-	
Turn-off delay time	$t_{d(off)}$		-	56	-	
Fall time	t_f		-	9.4	-	
Gate Charge Characteristics ⁵⁾						
Gate to source charge	Q_{gs}	$V_{DD}=20\text{ V}, I_D=30\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	25	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	14	-	
Gate to drain charge	Q_{gd}		-	11	-	
Switching charge	Q_{sw}		-	23	-	
Gate charge total	Q_g		-	113	150	
Gate plateau voltage	$V_{plateau}$		-	2.9	-	V
Gate charge total	Q_g	$V_{DD}=20\text{ V}, I_D=30\text{ A},$ $V_{GS}=0\text{ to }4.5\text{ V}$	-	54	-	nC
Gate charge total, sync. FET	$Q_{g(sync)}$	$V_{DS}=0.1\text{ V},$ $V_{GS}=0\text{ to }10\text{ V}$	-	106	-	
Output charge	Q_{oss}	$V_{DD}=20\text{ V}, V_{GS}=0\text{ V}$	-	69	-	
Reverse Diode						
Diode continuous forward current	I_S	$T_C=25\text{ }^\circ\text{C}$	-	-	100	A
Diode pulse current	$I_{S,pulse}$		-	-	400	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=50\text{ A},$ $T_J=25\text{ }^\circ\text{C}$	-	0.8	1.2	V
Reverse recovery charge	Q_{rr}	$V_R=20\text{ V}, I_F=I_S,$ $di_F/dt=400\text{ A}/\mu\text{s}$	-	125	-	nC

⁵⁾ See figure 16 for gate charge parameter definition

30V N-Channel Enhancement Mode MOSFET

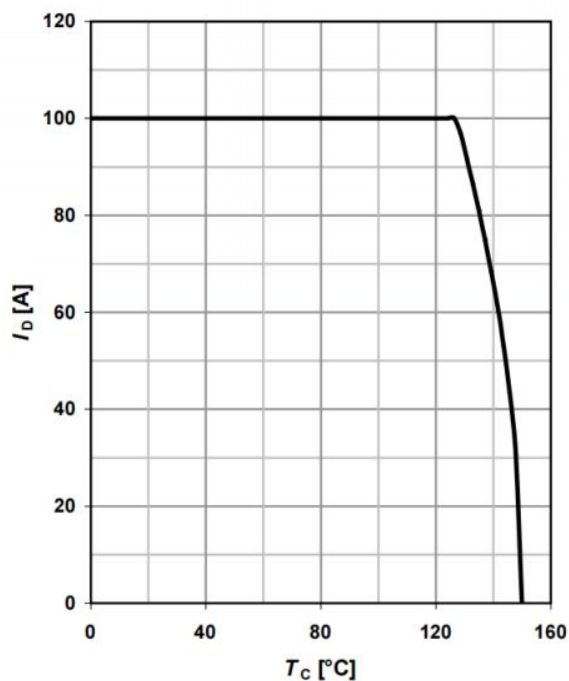
1 Power dissipation

$$P_{\text{tot}} = f(T_C)$$



2 Drain current

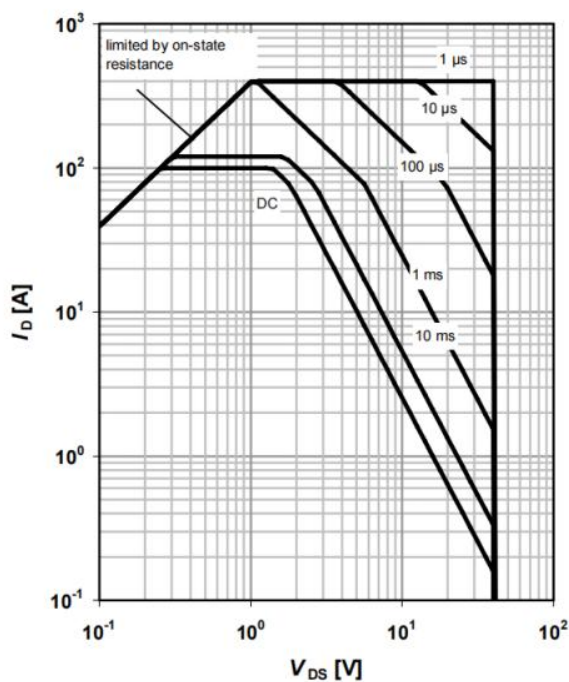
$$I_D = f(T_C); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

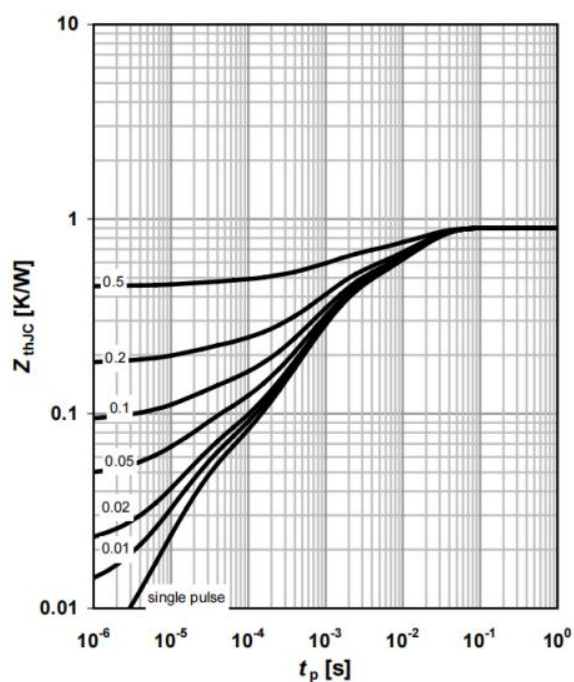
parameter: t_p



4 Max. transient thermal impedance

$$Z_{\text{thJC}} = f(t_p)$$

parameter: $D = t_p/T$

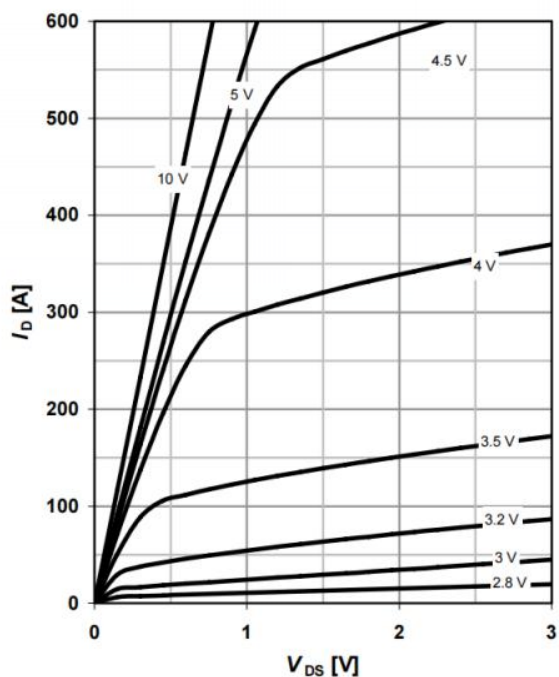


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5 Typ. output characteristics

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

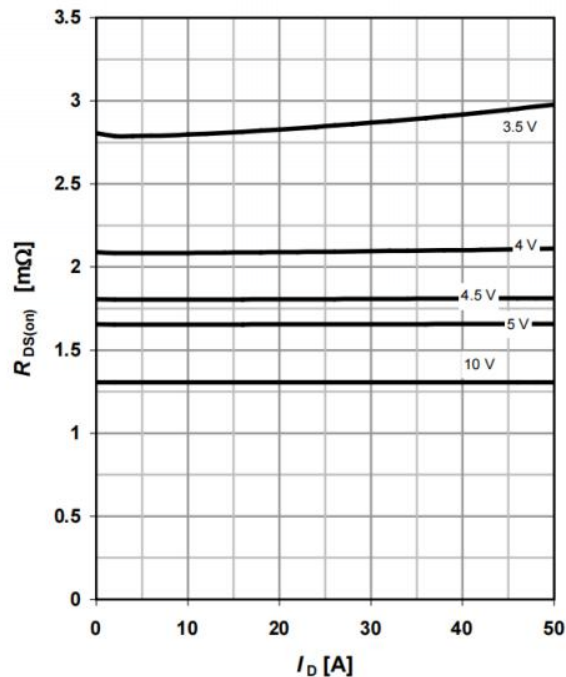
parameter: V_{GS}



6 Typ. drain-source on resistance

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

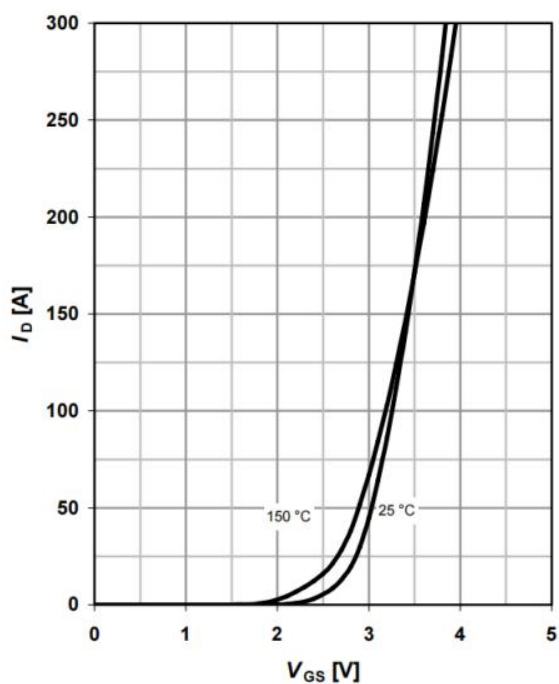
parameter: V_{GS}



7 Typ. transfer characteristics

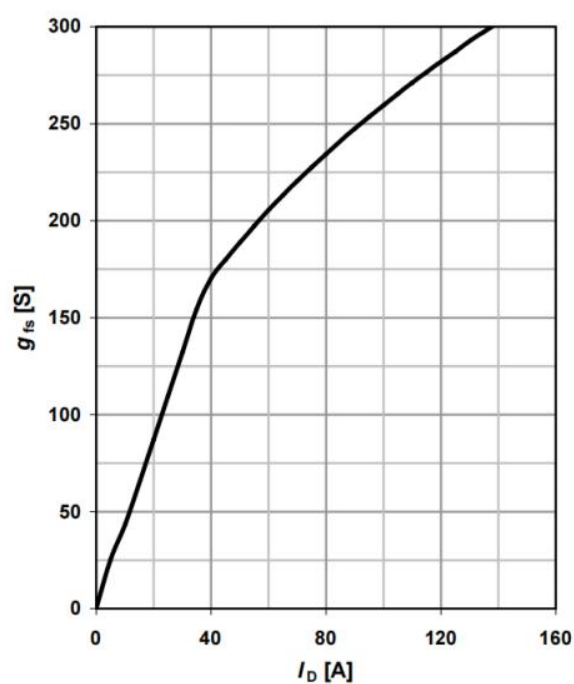
$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$$

parameter: T_J



8 Typ. forward transconductance

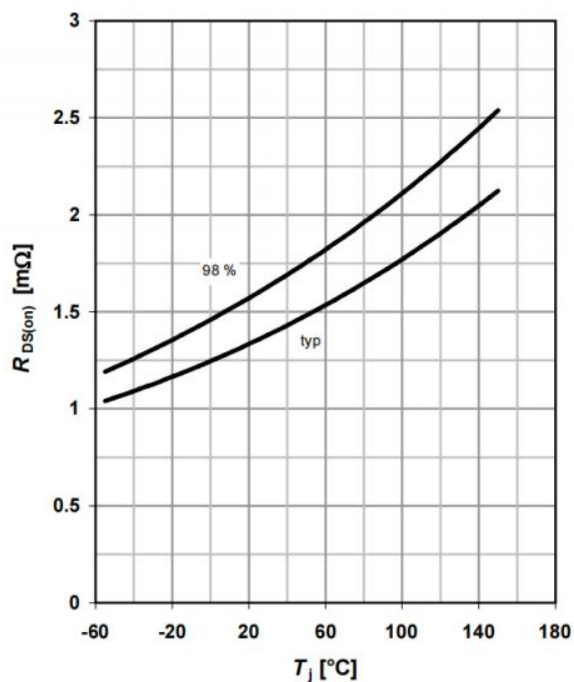
$$g_{fs} = f(I_D); T_J = 25^\circ\text{C}$$



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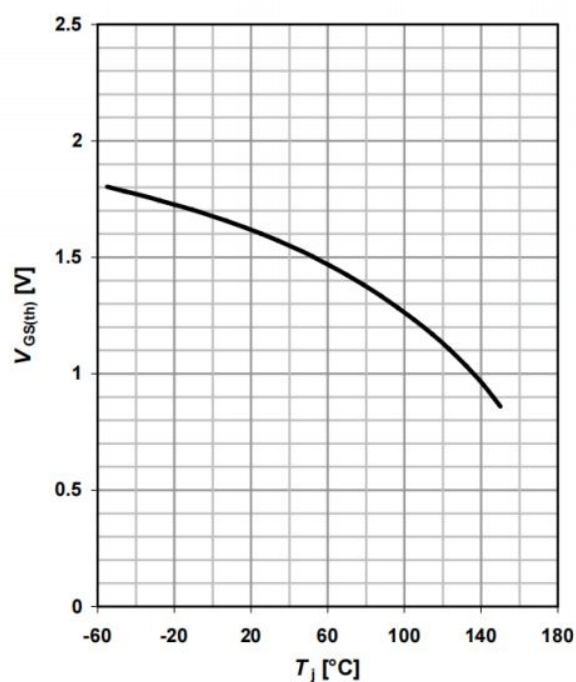
9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = 50 \text{ A}; V_{GS} = 10 \text{ V}$$



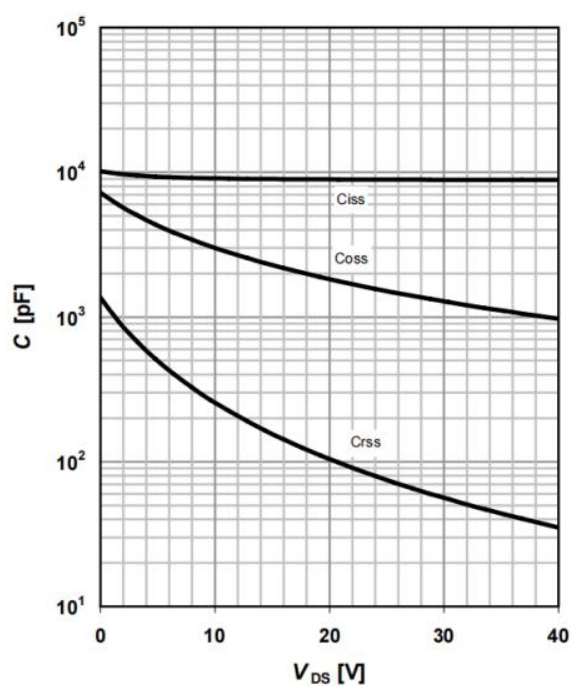
10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = 85 \mu\text{A}$$



11 Typ. capacitances

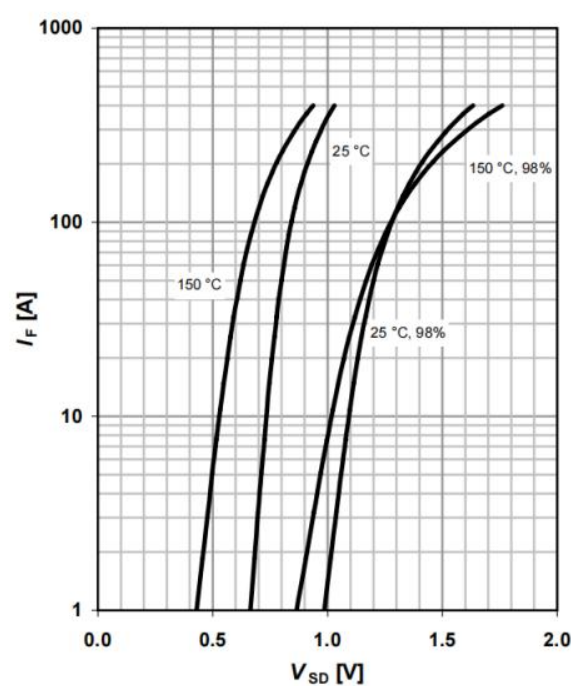
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

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

parameter: T_j

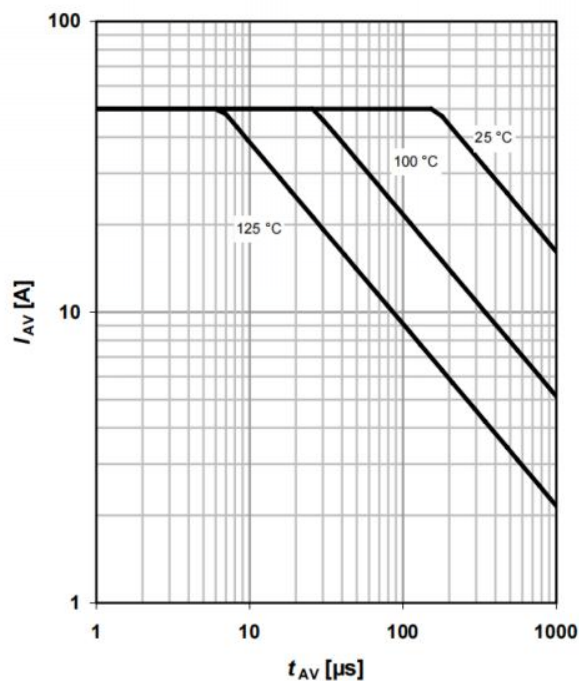


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13 Avalanche characteristics

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

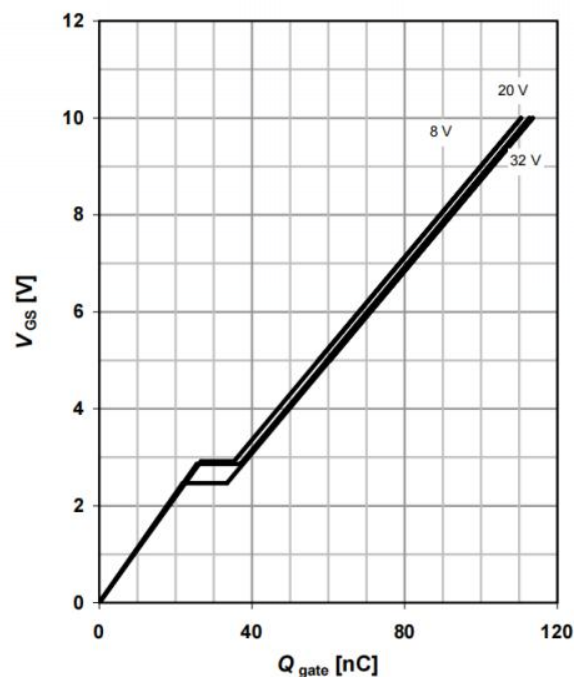
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

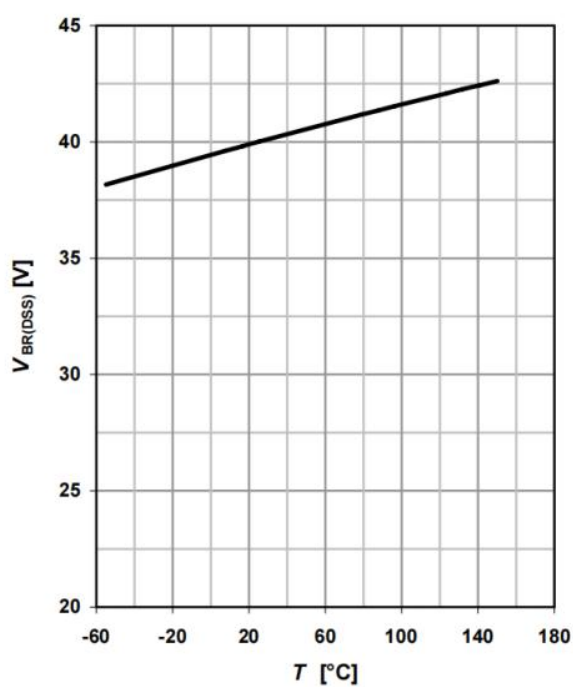
$$V_{GS}=f(Q_{\text{gate}}); I_D=30\ \text{A pulsed}$$

parameter: V_{DD}

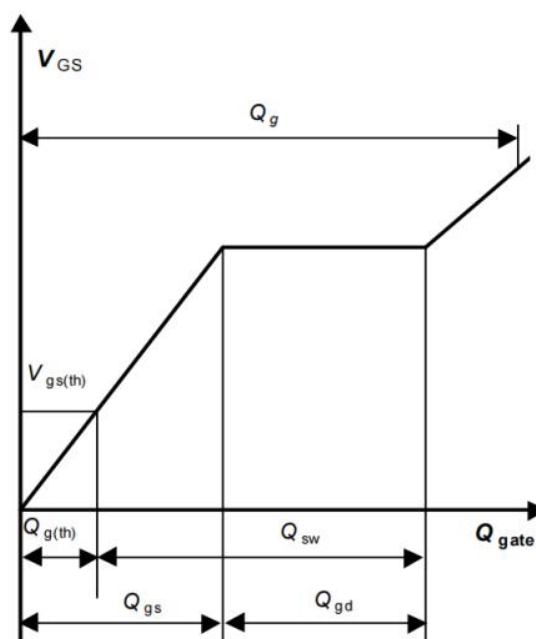


15 Drain-source breakdown voltage

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

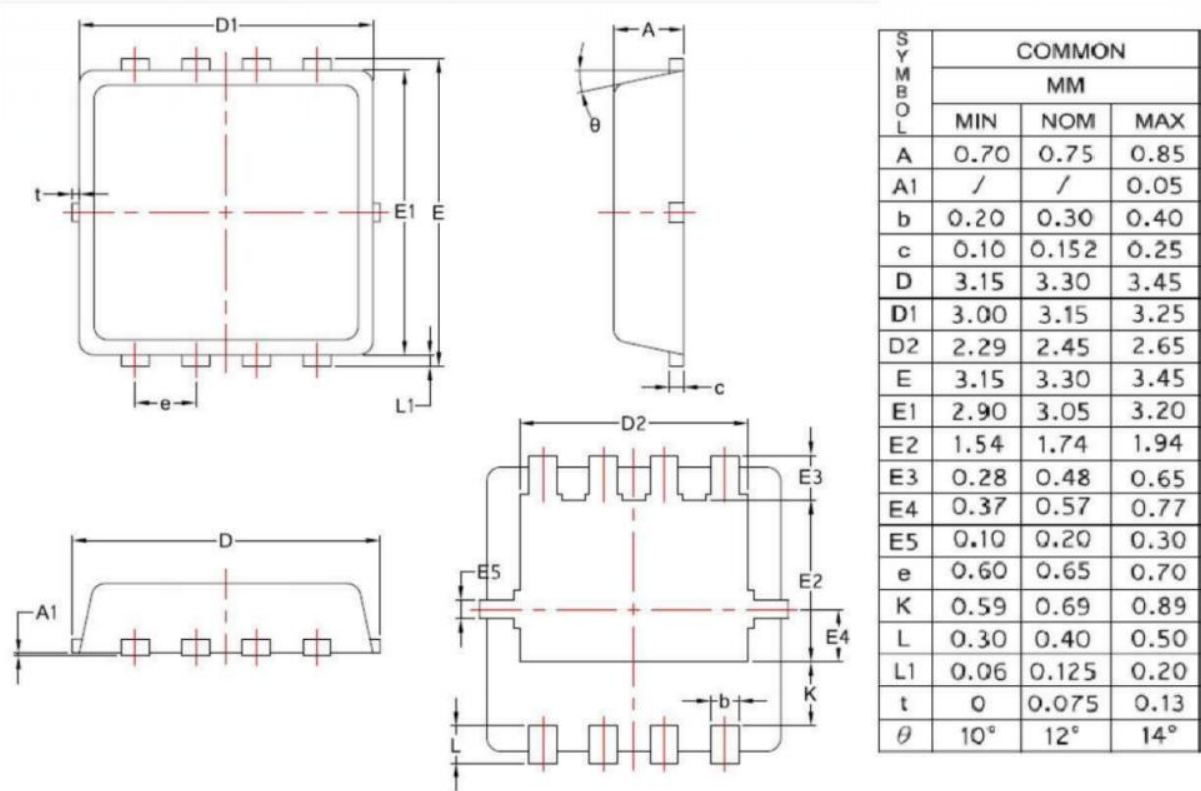


16 Gate charge waveforms



30V N-Channel Enhancement Mode MOSFET

Package Mechanical DataPDFN3*3-8L



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