

OptiMOS[™] 3 Power-Transistor

Features

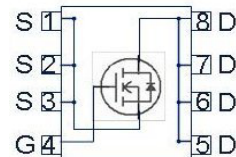
- Ideal for high frequency switching and sync. rec.
- Optimized technology for DC/DC converters
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Very low on-resistance $R_{DS(on)}$
- N-channel, logic level
- 100% avalanche tested
- Pb-free plating; RoHS compliant
- Qualified according to JEDEC¹⁾ for target applications

Product Summary

V_{DS}	60	V
$R_{DS(on),max}$	6.7	m Ω
I_D	20	A



Type	BSZ067N06LS3 G
	
Package	PG-TSDSON-8
Marking	067N06L



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$V_{GS}=10\text{ V}, T_C=25\text{ °C}$	20	A
		$V_{GS}=10\text{ V}, T_C=100\text{ °C}$	20	
		$V_{GS}=4.5\text{ V}, T_C=25\text{ °C}$	20	
		$V_{GS}=4.5\text{ V}, T_C=100\text{ °C}$	20	
		$V_{GS}=10\text{ V}, T_A=25\text{ °C}, R_{thJA}=60\text{ K/W}^{2)}$	14	
Pulsed drain current ³⁾	$I_{D,pulse}$	$T_C=25\text{ °C}$	80	
Avalanche energy, single pulse ⁴⁾	E_{AS}	$I_D=20\text{ A}, R_{GS}=25\text{ }\Omega$	118	mJ
Gate source voltage	V_{GS}		± 20	V

¹⁾ J-STD20 and JESD22

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

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

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	$T_C=25\text{ }^{\circ}\text{C}$	78	W
		$T_A=25\text{ }^{\circ}\text{C}$, $R_{\text{thJA}}=60\text{ K/W}^{2)}$	2.1	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	$^{\circ}\text{C}$
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}		-	-	1.6	K/W
Device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm ² cooling area ²⁾	-	-	60	

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

Static characteristics

Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{ V}, I_{\text{D}}=1\text{ mA}$	60	-	-	V
Gate threshold voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=35\text{ }\mu\text{A}$	1.2	1.7	2.2	
Zero gate voltage drain current	I_{DSS}	$V_{\text{DS}}=60\text{ V}, V_{\text{GS}}=0\text{ V}, T_j=25\text{ }^{\circ}\text{C}$	-	0.1	1	μA
		$V_{\text{DS}}=60\text{ V}, V_{\text{GS}}=0\text{ V}, T_j=125\text{ }^{\circ}\text{C}$	-	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	$R_{\text{DS(on)}}$	$V_{\text{GS}}=4.5\text{ V}, I_{\text{D}}=20\text{ A}$	-	8.1	12.1	m Ω
		$V_{\text{GS}}=10\text{ V}, I_{\text{D}}=20\text{ A}$	-	5.6	6.7	
Gate resistance	R_{G}		-	1.3	-	Ω
Transconductance	g_{fs}	$ V_{\text{DS}} >2 V_{\text{D}} , R_{\text{DS(on)max}}, I_{\text{D}}=20\text{ A}$	25	50	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=30\text{ V},$ $f=1\text{ MHz}$	-	3600	4800	pF
Output capacitance	C_{oss}		-	660	880	
Reverse transfer capacitance	C_{rss}		-	24	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30\text{ V}, V_{GS}=10\text{ V},$ $I_D=20\text{ A}, R_G=2\ \Omega$	-	15	-	ns
Rise time	t_r		-	26	-	
Turn-off delay time	$t_{d(off)}$		-	37	-	
Fall time	t_f		-	7	-	

Gate Charge Characteristics⁵⁾

Gate to source charge	Q_{gs}	$V_{DD}=30\text{ V}, I_D=20\text{ A},$ $V_{GS}=0\text{ to }4.5\text{ V}$	-	11	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	6	-	
Gate to drain charge	Q_{gd}		-	3	-	
Switching charge	Q_{sw}		-	8	-	
Gate charge total	Q_g		-	21	28	
Gate plateau voltage	$V_{plateau}$		-	3.1	-	V
Gate charge total	Q_g	$V_{DD}=30\text{ V}, I_D=20\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	47	62	nC
Output charge	Q_{oss}	$V_{DD}=30\text{ V}, V_{GS}=0\text{ V}$	-	30	40	

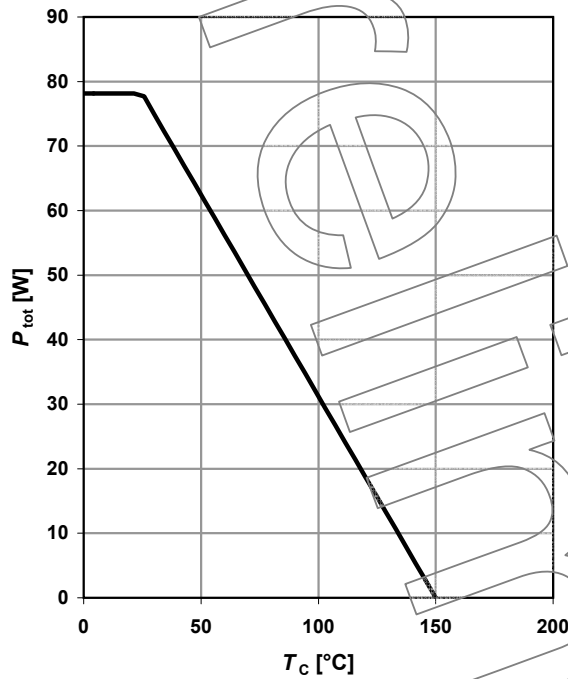
Reverse Diode

Diode continuous forward current	I_S	$T_C=25\text{ }^\circ\text{C}$	-	-	20	A
Diode pulse current	$I_{S,pulse}$		-	-	80	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=20\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	0.8	1.2	V
Reverse recovery time	t_{rr}	$V_R=30\text{ V}, I_F=20\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	40	-	ns
Reverse recovery charge	Q_{rr}		-	39	-	nC

⁵⁾ See figure 16 for gate charge parameter definition

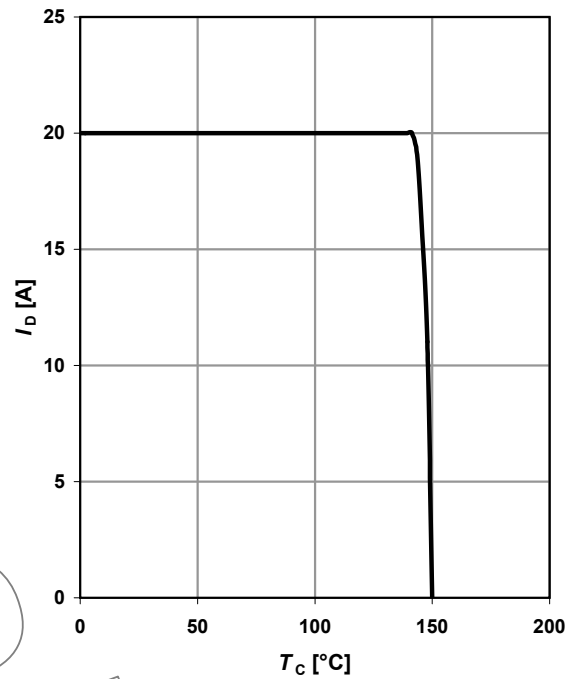
1 Power dissipation

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



2 Drain current

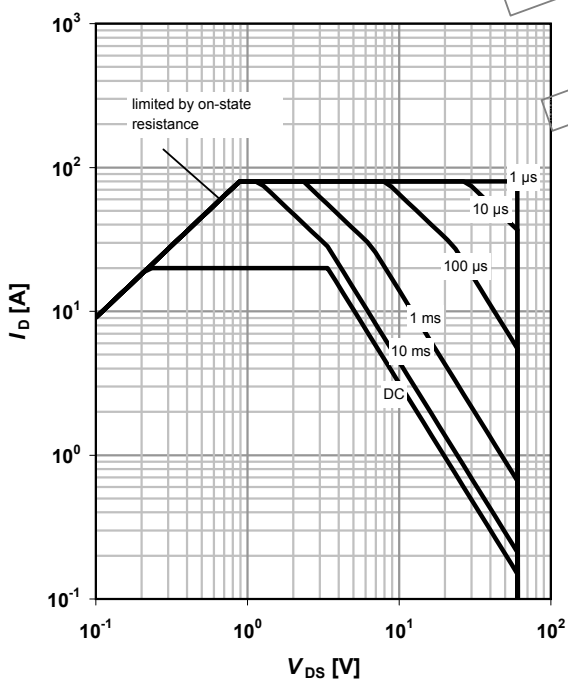
$$I_D = f(T_c); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

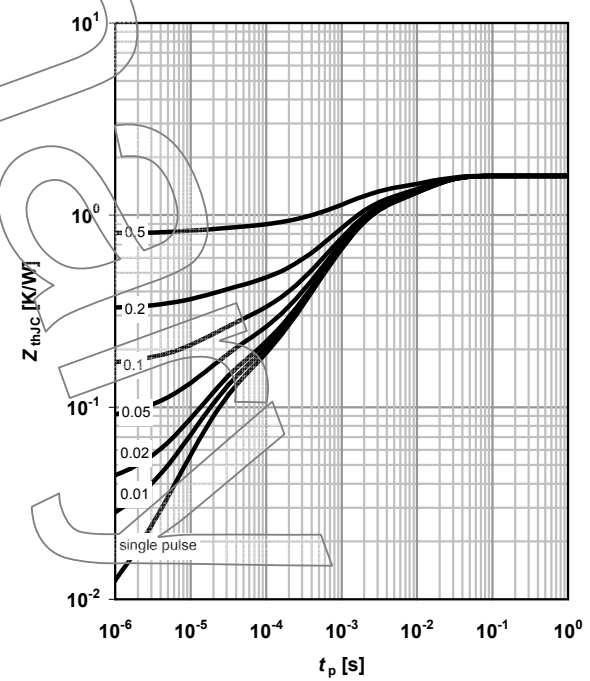
parameter: t_p



4 Max. transient thermal impedance

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

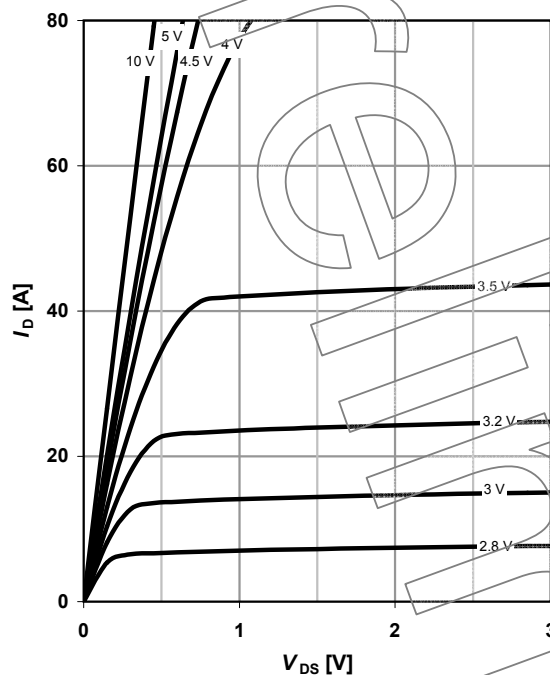
parameter: $D = t_p / T$



5 Typ. output characteristics

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

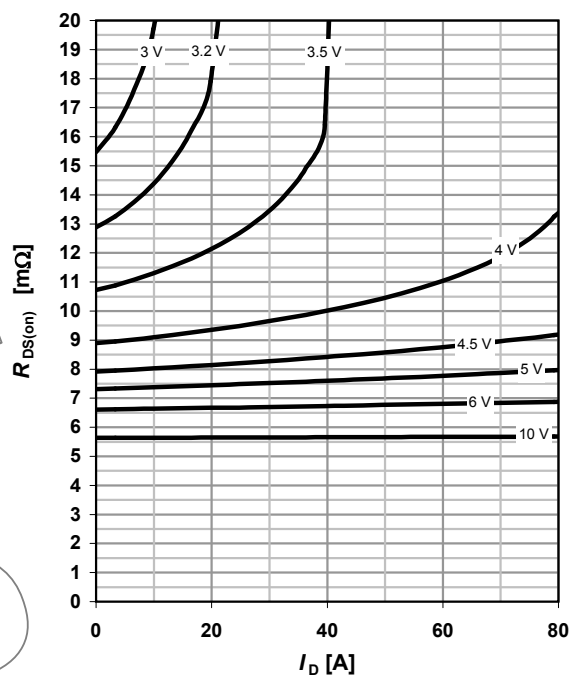
parameter: V_{GS}



6 Typ. drain-source on resistance

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

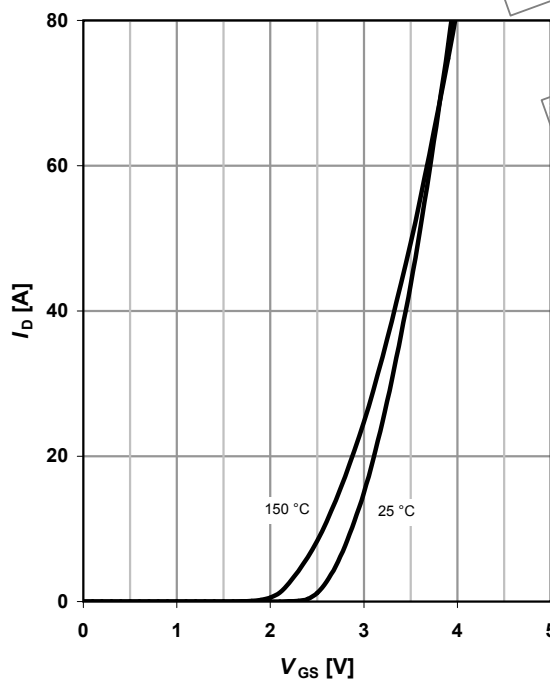
parameter: V_{GS}



7 Typ. transfer characteristics

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

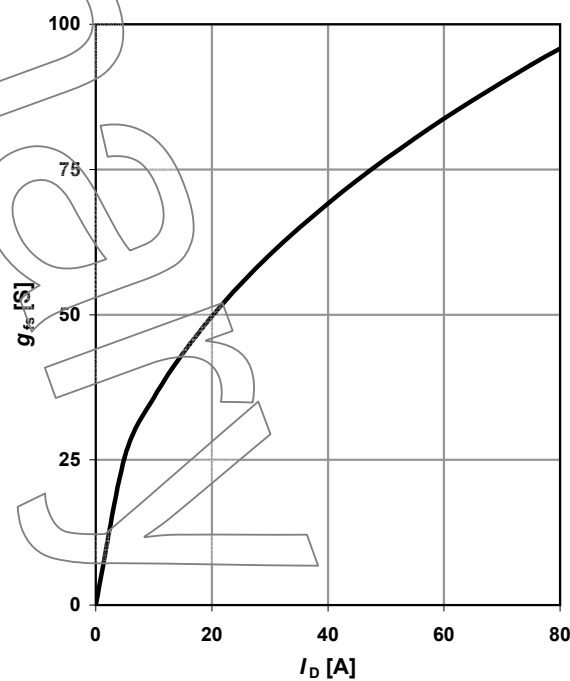
parameter: T_j



8 Typ. forward transconductance

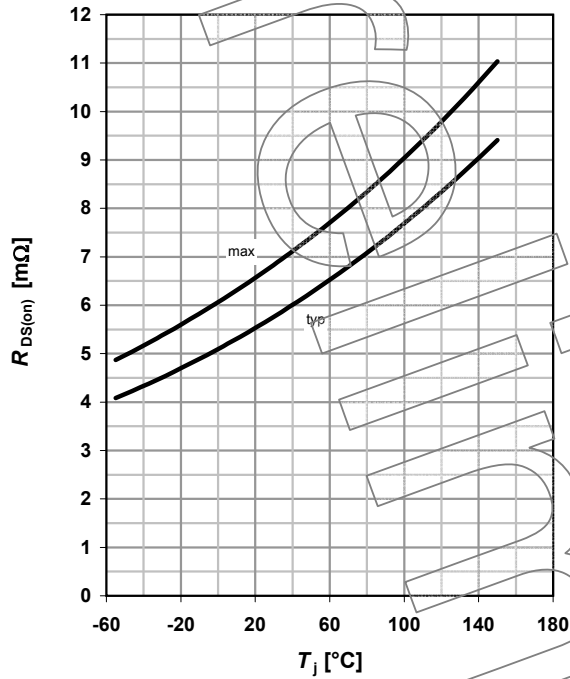
$$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$$

parameter: V_{GS}



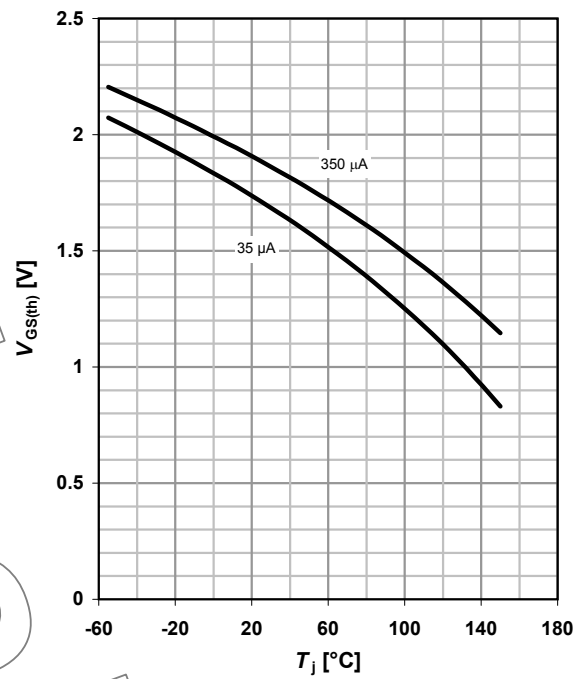
9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = 20 \text{ A}; V_{GS} = 10 \text{ V}$$



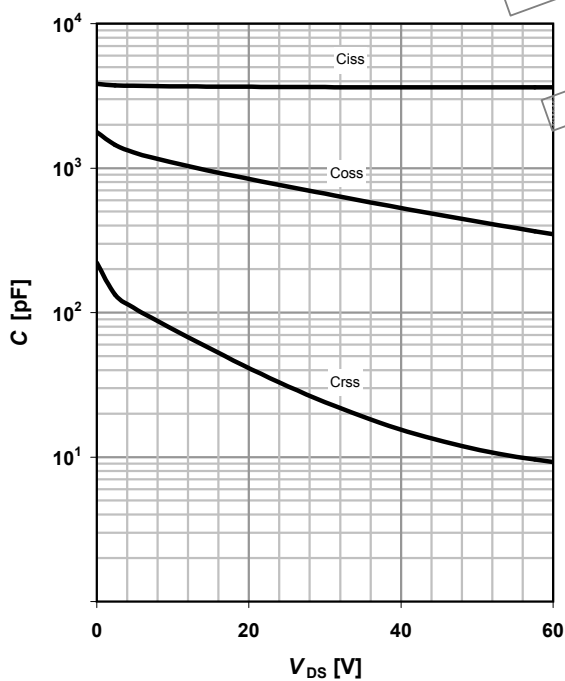
10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = 100 \mu\text{A}$$



11 Typ. capacitances

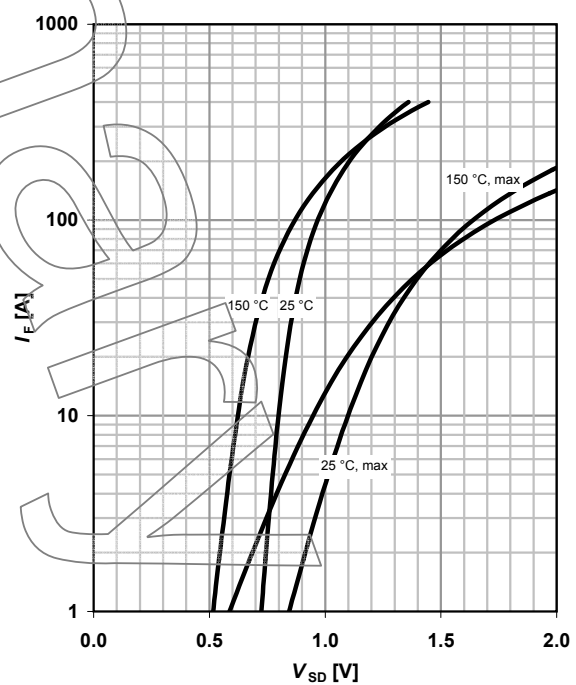
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

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

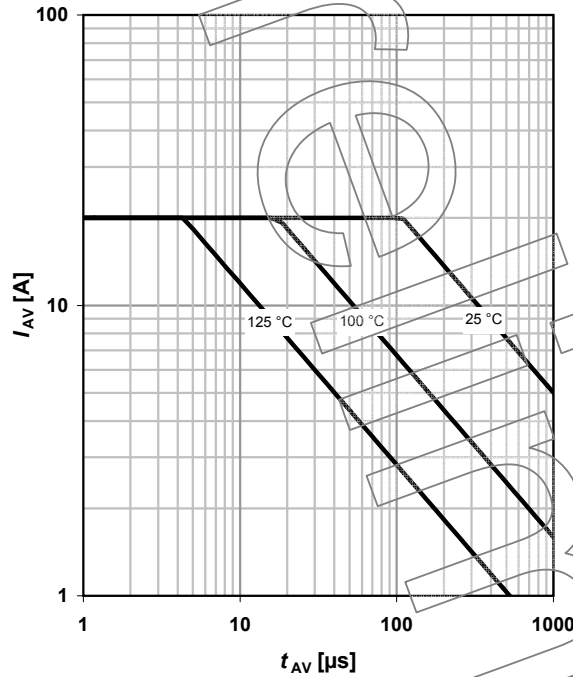
parameter: T_j



13 Avalanche characteristics

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

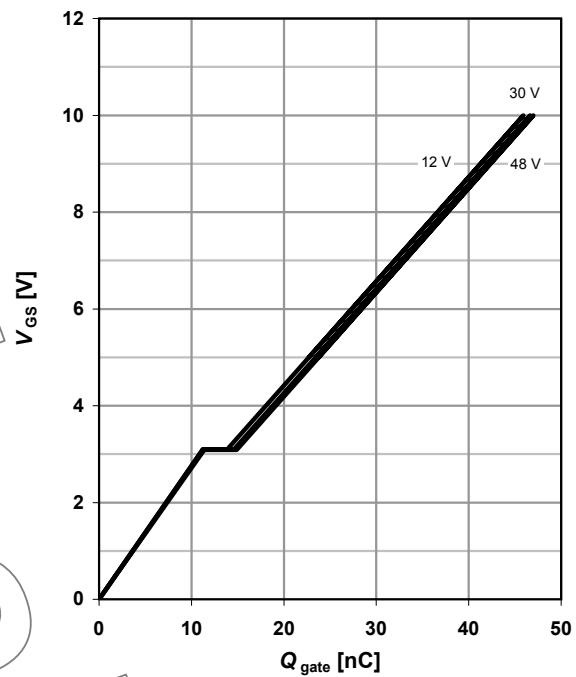
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

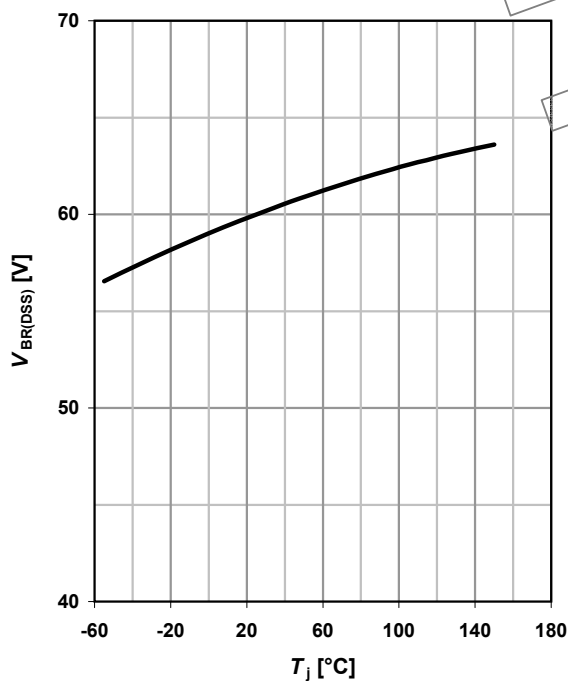
$$V_{GS}=f(Q_{\text{gate}}); I_D=20\ \text{A pulsed}$$

parameter: V_{DD}

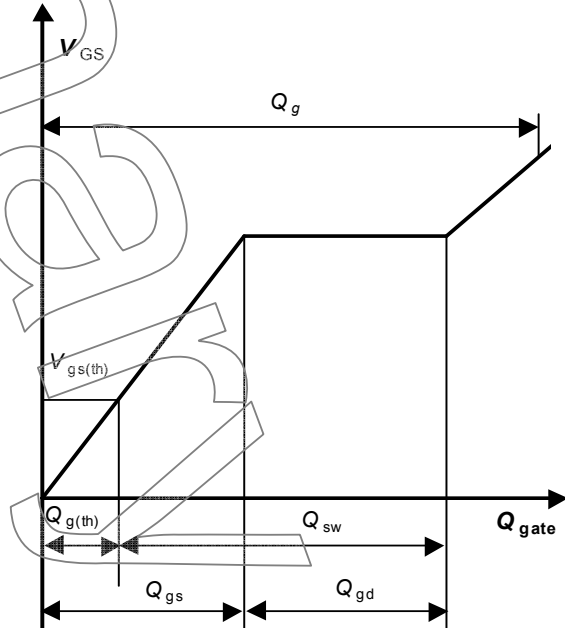


15 Drain-source breakdown voltage

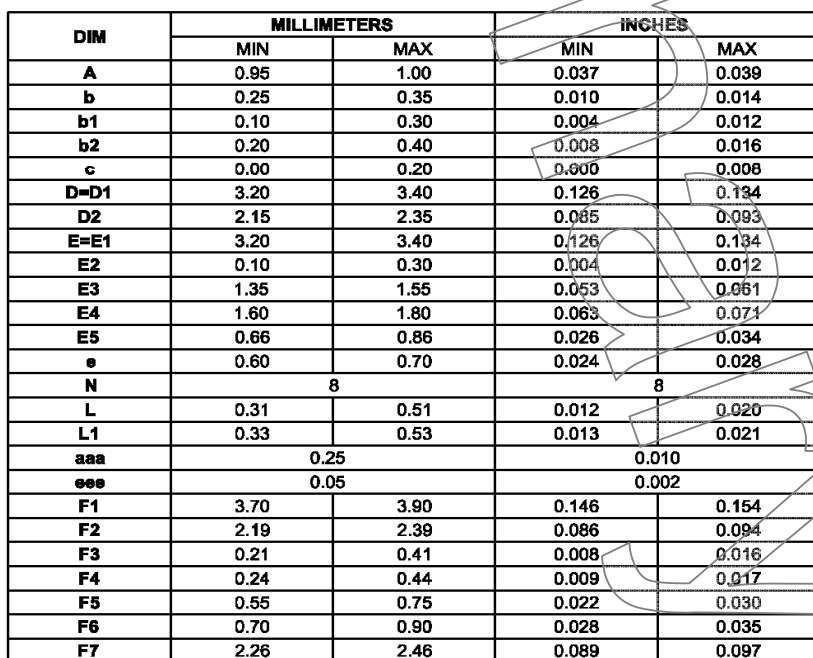
$$V_{BR(DSS)}=f(T_j); I_D=1\ \text{mA}$$



16 Gate charge waveforms



PG-TSDSON-8



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