

General Description

The MY016DNE5E uses Fast switching MOSFET for SMPS Very low on-resistance $R_{DS(on)}$ and Optimized technology for DC/DC converters.

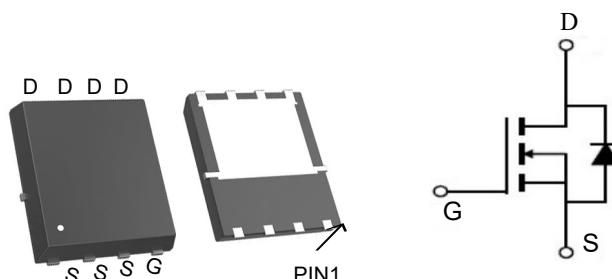


Features

V_{DSS}	30	V
I_D	150	A
$R_{DS(ON)}(at V_{GS}=10V)$	1.3	$m\Omega$
$R_{DS(ON)}(at V_{GS}=4.5V)$	1.8	$m\Omega$

Application

- logic level
- Superior thermal resistance
- 100 valanche tested
- P-free plating



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY016DNE5E	PDFN5*6-8L	MY016DNE5E	5000

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise noted)

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

Electrical Characteristics ($T_J=25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	$T_C=25\text{ }^{\circ}\text{C}$	139	W
		$T_A=25\text{ }^{\circ}\text{C}$, $R_{\text{thJA}}=50\text{ K/W}^2)$	2.5	
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}	bottom	-	-	0.9	K/W
		top			20	
Device on PCB	R_{thJA}	6 cm ² cooling area ²⁾	-	-	50	

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

Static characteristics

Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}}=0\text{ V}, I_{\text{D}}=1\text{ mA}$	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}	$V_{\text{DS}}=40\text{ V}, V_{\text{GS}}=0\text{ V}, T_J=25\text{ }^{\circ}\text{C}$	-	0.1	1	μA
		$V_{\text{DS}}=40\text{ V}, V_{\text{GS}}=0\text{ V}, T_J=125\text{ }^{\circ}\text{C}$	-	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	$R_{\text{DS(on)}}$	$V_{\text{GS}}=4.5\text{ V}, I_{\text{D}}=50\text{ A}$	-	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

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 Characteristics⁵⁾

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	-	

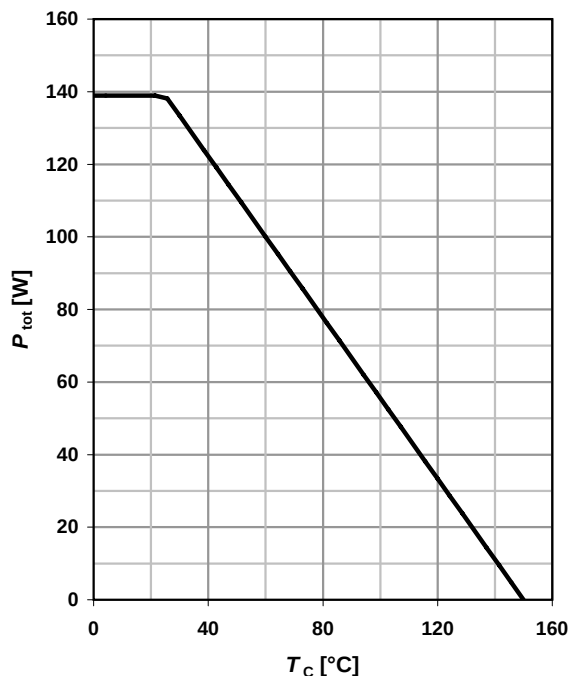
Reverse Diode

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

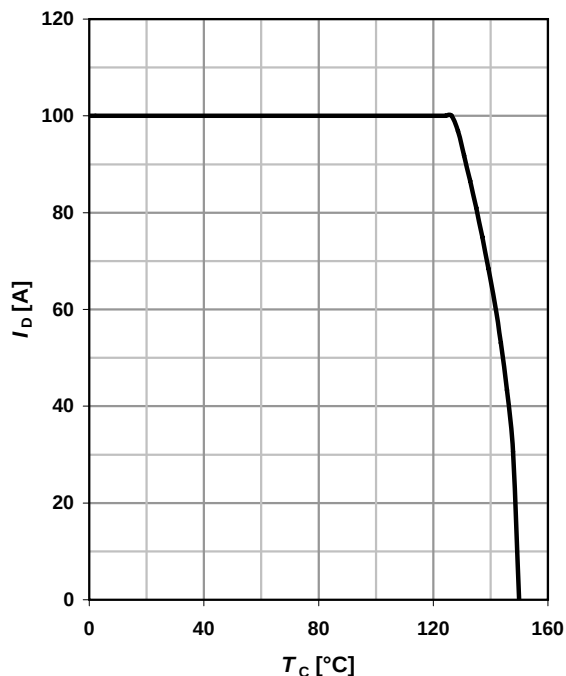
1 Power dissipation

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



2 Drain current

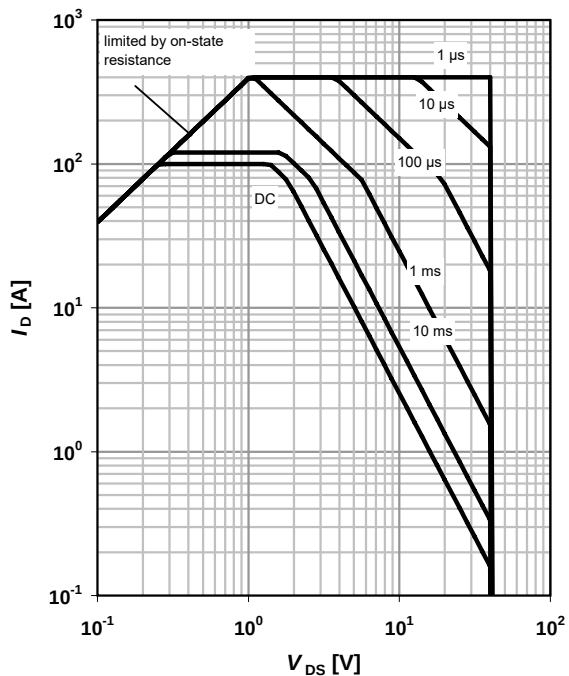
$$I_D = f(T_c); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

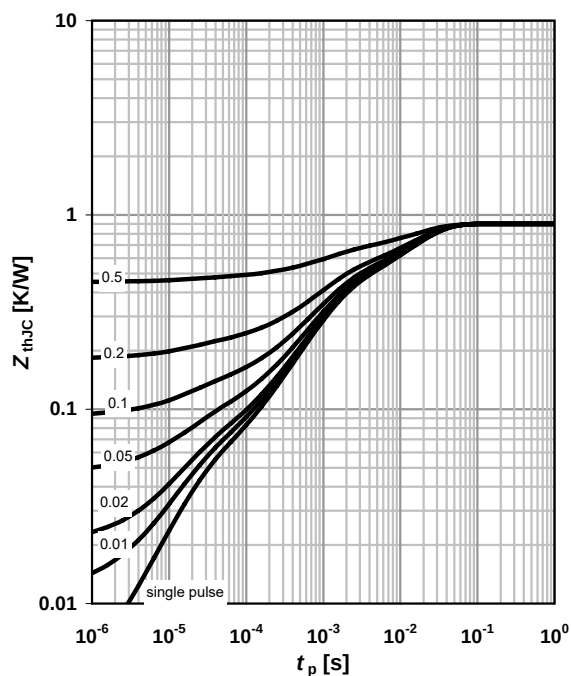
parameter: t_p



4 Max. transient thermal impedance

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

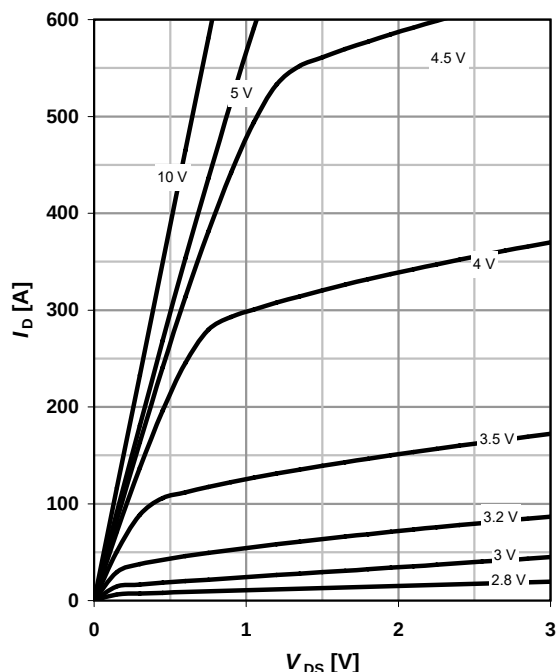
parameter: $D = t_p/T$



5 Typ. output characteristics

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

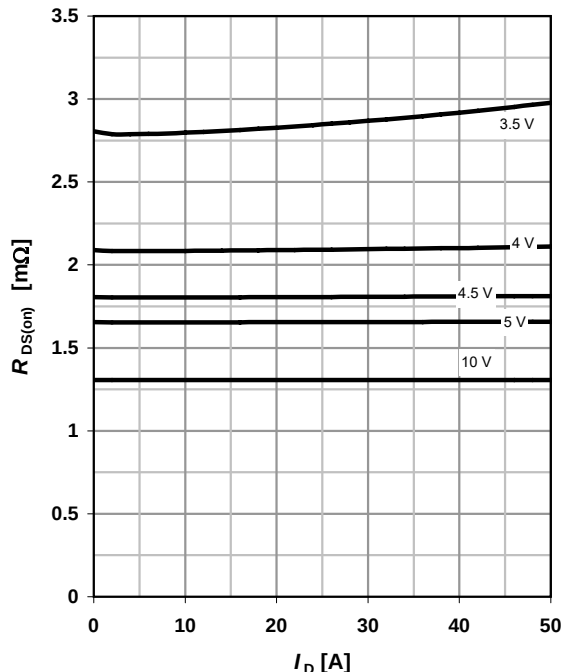
parameter: V_{GS}



6 Typ. drain-source on resistance

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

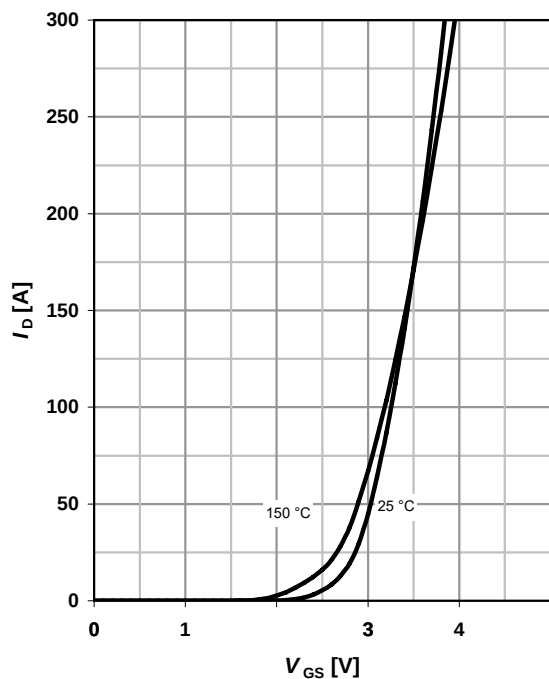
parameter: V_{GS}



7 Typ. transfer characteristics

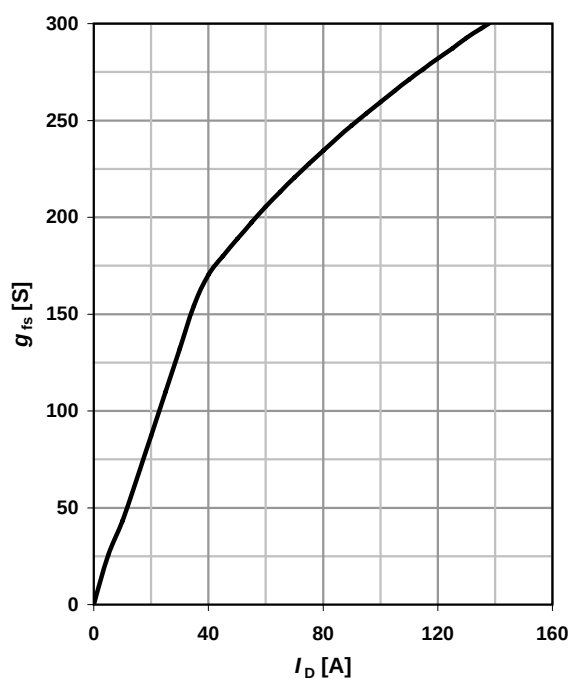
$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$$

parameter: T_j



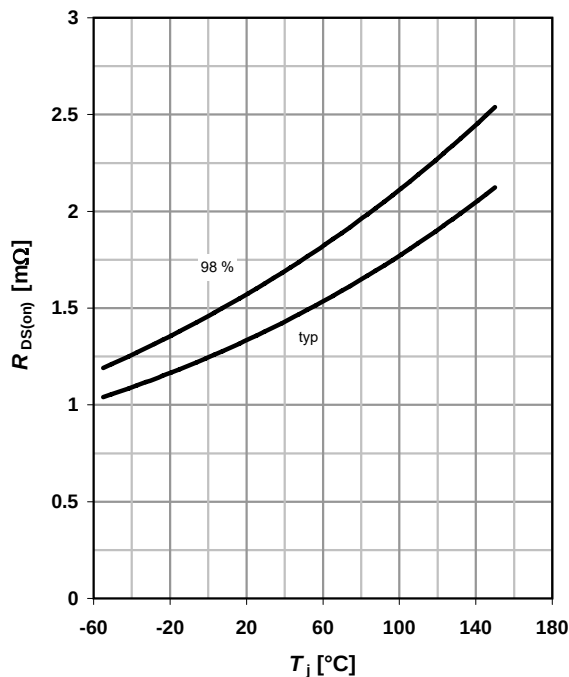
8 Typ. forward transconductance

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



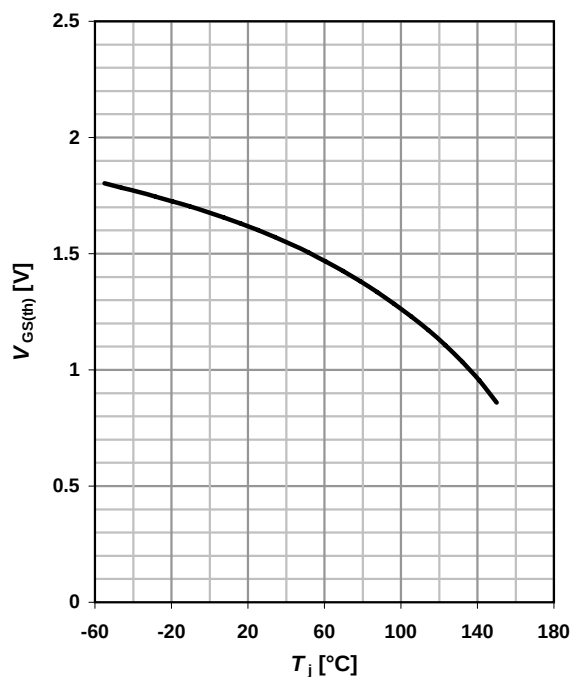
9 Drain-source on-state resistance

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



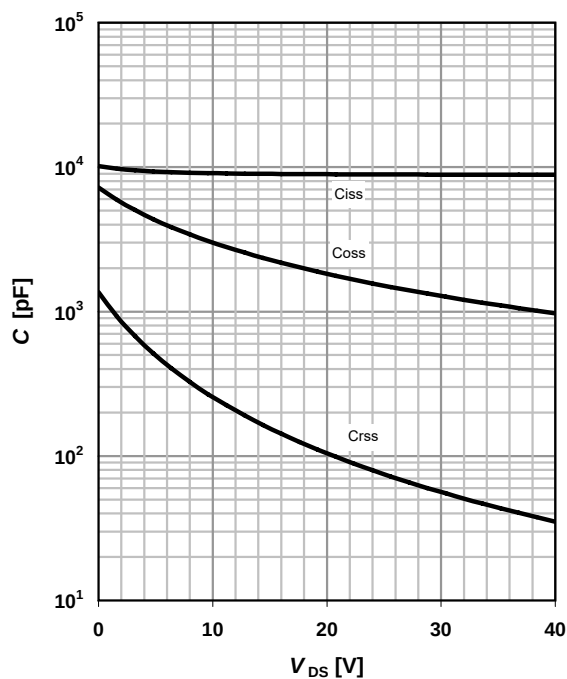
10 Typ. gate threshold voltage

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



11 Typ. capacitances

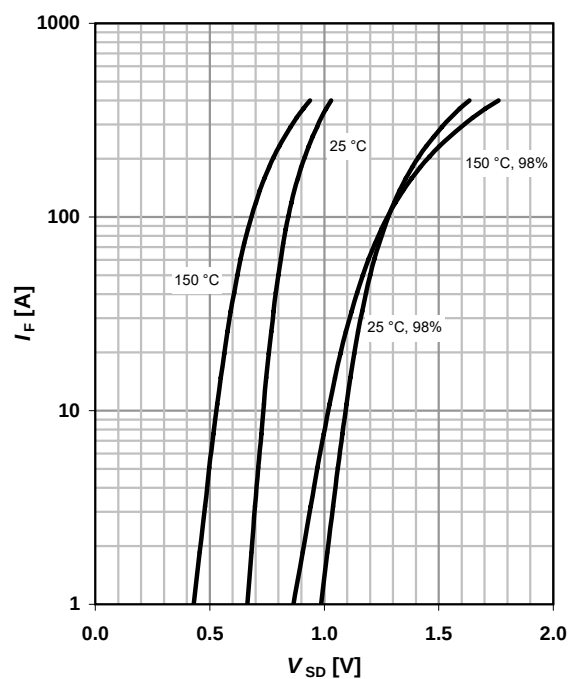
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

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

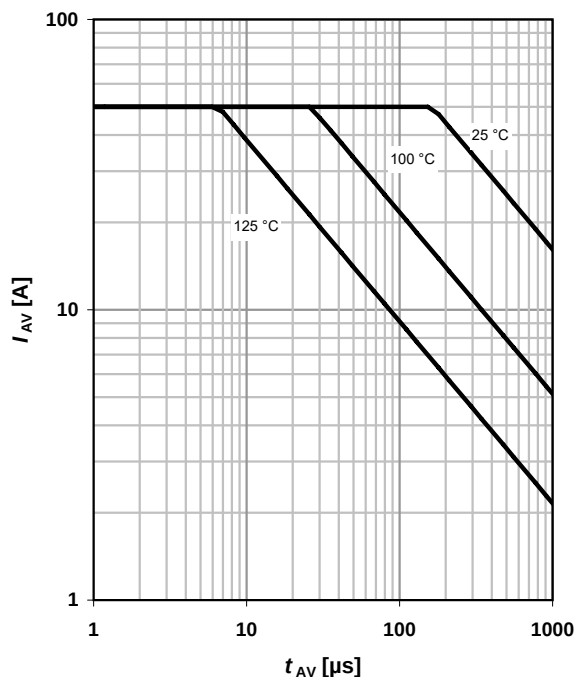
parameter: T_j



13 Avalanche characteristics

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

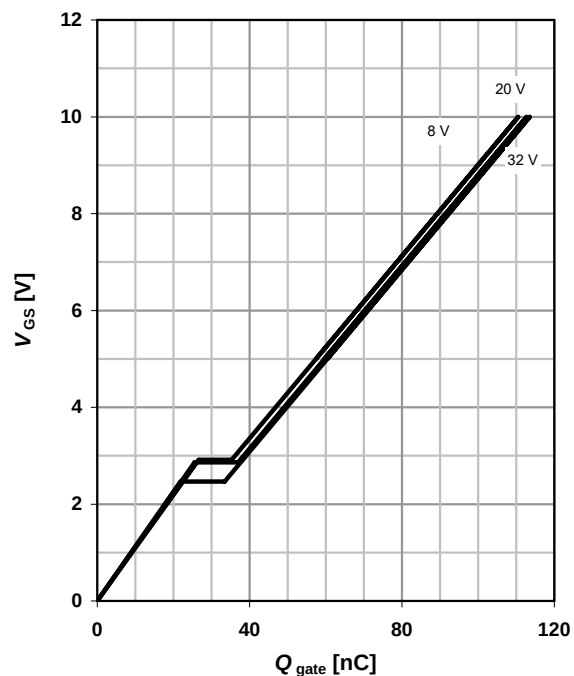
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

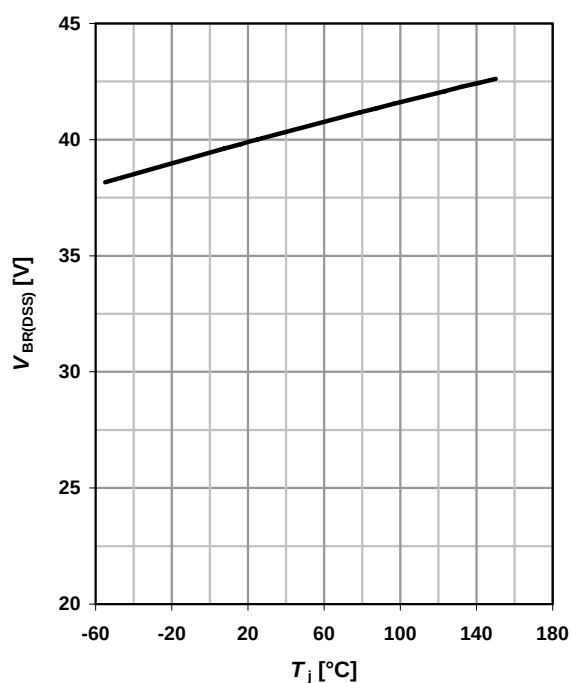
$$V_{GS}=f(Q_{\text{gate}}); I_D=30\ \text{A pulsed}$$

parameter: V_{DD}

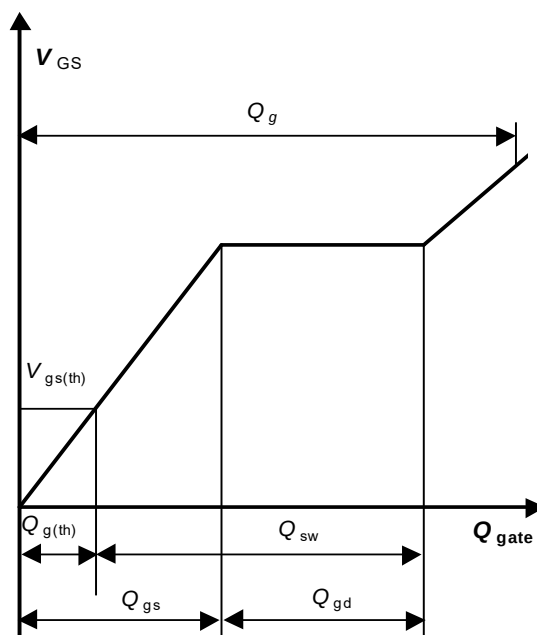


15 Drain-source breakdown voltage

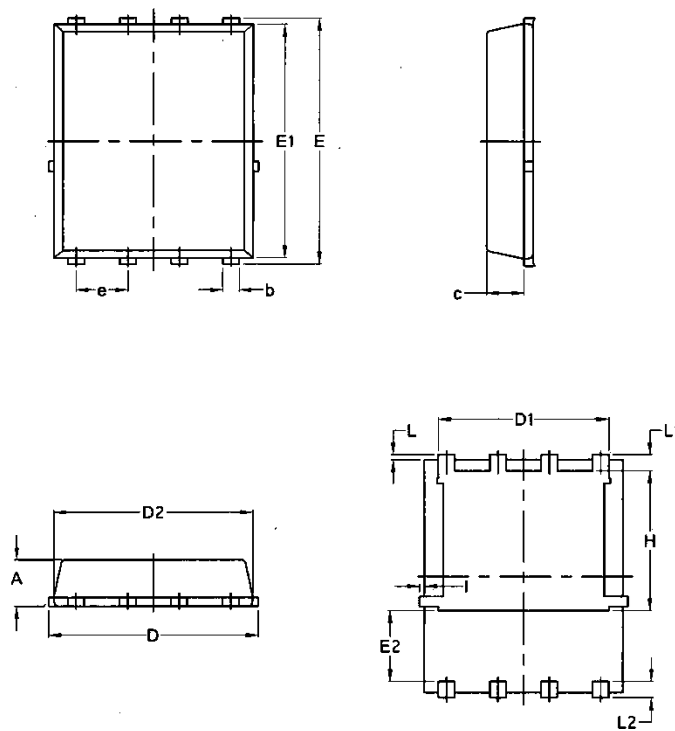
$$V_{BR(DSS)}=f(T_j); I_D=1\ \text{mA}$$



16 Gate charge waveforms



Package Mechanical Data-DFN5*6-8L-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070