Diotec Semiconductor

DI100N10PQ

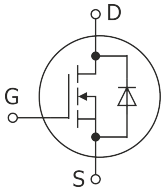
N-Channel Power MOSFET
N-Kanal Leistungs-MOSFET

$I_{D25°C}$	= 100 A	V_{DSS}	= 100 V
$R_{DS(on)}$	< 4.5 mΩ	P_D	= 250 W
T_{jmax}	= 175°C	E_{AS}	= 270 mJ

Version 2021-12-01

QFN5x6
~TDSON-8 / DFN5060

SPICE Model & **STEP** File [1])



Marking Code
510N040

HS Code 85412100

Typical Applications
DC/DC Converters
Power Supplies
DC Drives
Power Tools
Synchronous Rectifiers
Commercial and industrial grade [1])

Typische Anwendungen
Gleichstrom-Wandler
Stromversorgungen
Gleichstrom-Antriebe
Elektrowerkzeuge
Synchrongleichrichter
Standardausführung [1])

Features
Low profile, space saving package
Low on state resistance
Fast switching times
Low gate charge
Avalanche rated
Compliant to RoHS (exemp. 7a), REACH, Conflict Minerals [1])

Besonderheiten
Flache, platzsparende Bauform
Niedriger Einschaltwiderstand
Schnelle Schaltzeiten
Niedrige Gate-Ladung
Avalanche-Charakteristik
Konform zu RoHS (Ausn. 7a), REACH, Konfliktmineralien [1])

Mechanical Data [1]) **Mechanische Daten [1])**

Taped and reeled	5000 / 13"	Gegurtet auf Rolle
Weight approx.	0.1 g	Gewicht ca.
Case material	UL 94V-0	Gehäusematerial
Solder & assembly conditions	260°C/10s	Löt- und Einbaubedingungen
	MSL = 1	

Maximum ratings [2]) **Grenzwerte [2])**

			DI100N10PQ
Drain-Source voltage Drain-Source-Spannung	V_{GS} = 0 V (short)	V_{DSS}	100 V
Gate-Source-voltage continuos – Gate-Source-Spannung dauernd		V_{GSS}	± 20 V
Power dissipation Verlustleistung	T_C = 25°C [3])	P_{tot}	250 W
Drain current continous Drainstrom dauernd	T_C = 25°C [3])	I_D	100 A
Drain current continous Drainstrom dauernd	T_C = 100°C [3])	I_D	95 A
Peak Drain current – Drain-Spitzenstrom	[4])	I_{DM}	400 A
Source current continous Sourcestrom dauernd	T_C = 25°C [3])	I_S	40 A
Peak Source current – Source-Spitzenstrom	V_{GS} = 0 V, t_p = 10 s	I_{SM}	57 A
Single pulse avalanche energy (Fig. 1) Einzelpuls Avalanche-Energie	V_{DD} = 50 V, V_G = 10 V L = 0.5 mH, R_G = 25 Ω	E_{AS}	270 mJ
Junction temperature – Sperrschichttemperatur Storage temperature – Lagerungstemperatur		T_j T_S	-55...+175°C -55...+175°C

1 Please note the detailed information on our website or at the beginning of the data book
Bitte beachten Sie die detaillierten Hinweise auf unserer Internetseite bzw. am Anfang des Datenbuches
2 T_A = 25°C, unless otherwise specified – T_A = 25°C, wenn nicht anders angegeben
3 Measured at heat flange – Gemessen an der Kühlfahne
4 Pulse width refer to SOA diagram – Pulsbreite siehe SOA-Diagramm

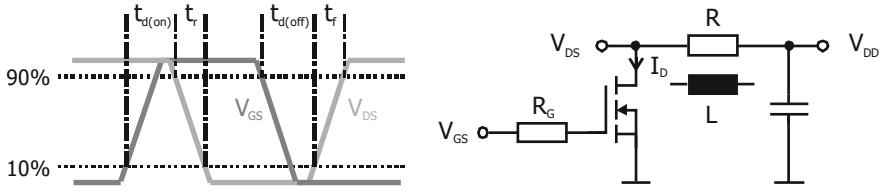
Characteristics (static) **Kennwerte (statisch)**

		T_j = 25°C	Min.	Typ.	Max.
Drain-Source breakdown voltage – Drain-Source-Durchbruchspannung					
I_D = 250 µA V_{GS} = 0 V (short)	$V_{(BR)DSS}$		100 V	–	–
Drain-Source leakage current – Drain-Source Leckstrom					
V_{DS} = 0.8*V_{DSS} V_{GS} = 0 V (short)	I_{DSS}		–	–	1 µA
Gate-Body leakage current – Gate-Substrat Leckstrom					
V_{GS} = ±20 V V_{DS} = 0 V (short)	I_{GSS}		–	–	± 100 nA
Gate-Source threshold voltage – Gate-Source Schwellspannung					
V_{GS} = V_{DS} I_D = 250 µA	$V_{GS(th)}$		1.2 V	–	2.4 V
Drain-Source on-state resistance – Drain-Source Einschaltwiderstand					
V_{GS} = 10 V I_D = 50 A	$R_{DS(on)}$		–	3.5 mΩ	4.5 mΩ
V_{GS} = 4.5 V I_D = 20 A			–	5.5 mΩ	6.6 mΩ

Characteristics (dynamic) **Kennwerte (dynamisch)**

		T_j = 25°C	Min.	Typ.	Max.
Forward Transconductance – Übertragungssteilheit					
V_{DS} = 30 V I_D = 40 A	g_{FS}		100 S	–	–
Input Capacitance – Eingangskapazität					
V_{DS} = 30 V V_{GS} = 0 V f = 1 MHz	C_{iss}		–	3400 pF	–
Output Capacitance – Ausgangskapazität					
V_{DS} = 30 V V_{GS} = 0 V f = 1 MHz	C_{oss}		–	1100 pF	–
Reverse Transfer Capacitance – Rückwirkungskapazität					
V_{DS} = 30 V V_{GS} = 0 V f = 1 MHz	C_{rss}		–	70 pF	–
Turn-On Delay & Rise Time – Einschaltverzögerung und Anstiegszeit					
V_{DD} = 30 V I_D = 40 A V_{GS} = 10 V R_G = 2.5 Ω (Fig. 1)	$t_{d(on)}$		–	24 ns	–
	t_r			12 ns	
Turn-Off Delay & Fall Time – Ausschaltverzögerung und Abfallzeit					
V_{DD} = 50 V I_D = 40 A V_{GS} = 0 V R_G = 2.5 Ω (Fig. 1)	$t_{d(off)}$		–	75 ns	–
	t_f			95 ns	
Total Gate Charge – Gesamte Gate-Ladung					
V_{DD} = 80 V I_D = 40 A V_{GS} = 10 V	Q_g		–	64 nC	–
Gate-Source Charge – Gate-Source-Ladung					
V_{DD} = 30 V I_D = 30 A V_{GS} = 10 V	Q_{gs}		–	12 nC	–
Gate-Drain Charge – Gate-Drain-Ladung					
V_{DD} = 30 V I_D = 30 A V_{GS} = 10 V	Q_{gd}		–	13 nC	–
Intrinsic Gate resistance – Innerer Gatewiderstand					
f = 1 Mhz D open	R_{Gi}		–	1 Ω	–

Fig. 1
Test circuit for switching times (R) and avalanche energy (L)
("rise" and "fall" refer to I_D)
Testaufbau für Schaltzeiten (R) und Avalanche-Energie (L)
("rise" und "fall" beziehen sich auf I_D)



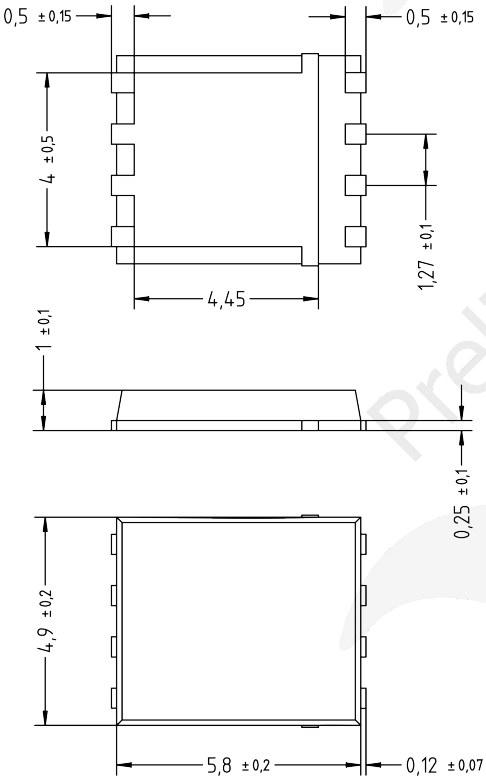
Characteristics (diode) — Kennwerte (Diode)

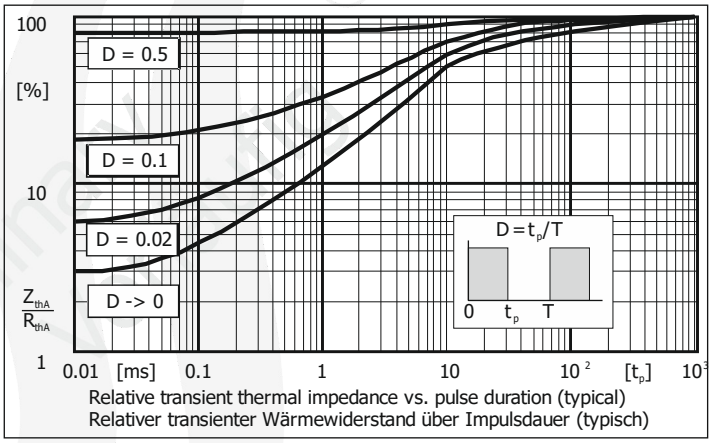
		T_j = 25°C	Min.	Typ.	Max.
Forward voltage – Durchlass-Spannung V_{GS} = 0 V I_S = 30 A		V_{SD}	–	–	1.3 V
Reverse recovery time – Sperrverzugszeit I_S = 40 A, di/dt = -100 A/µs		t_{rr}	–	61 ns	–
Reverse recovery charge – Sperrverzugsladung I_S = 40 A, di/dt = -100 A/µs		Q_{rr}	–	1253 nC	–

Characteristics (thermal) — Kennwerte (thermisch)

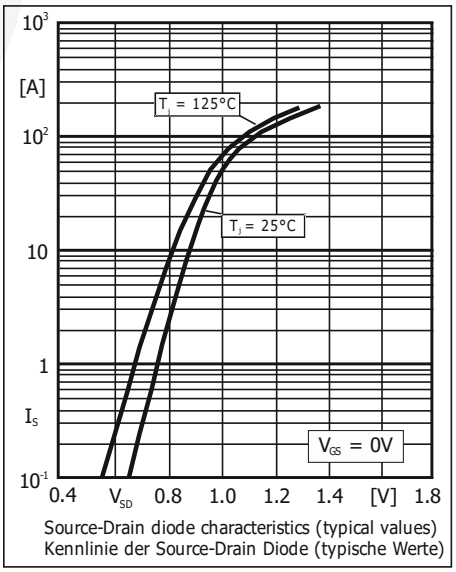
		Min.	Typ.	Max.
Thermal resistance junction to case Wärmewiderstand Sperrschicht – Gehäuse	R_{thC}	–	2 K/W [1])	–

Dimensions - Maße [mm]





Relative transient thermal impedance vs. pulse duration (typical)
Relativer transienter Wärmewiderstand über Impulsdauer (typisch)



Source-Drain diode characteristics (typical values)
Kennlinie der Source-Drain Diode (typische Werte)

Disclaimer: See data book page 2 or website
Haftungssauschluss: Siehe Datenbuch Seite 2 oder Internet

1 Measured towards heat sink area (Drain) – Gemessen zur Kühlfläche (Drain)

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