Diotec Semiconductor

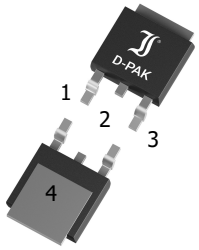
DI020N06D1

N-Channel Power MOSFET
N-Kanal Leistungs-MOSFET

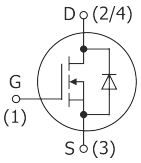
$I_{D25°C}$	= 20 A	V_{DSS}	= 60 V
$R_{DS(on)}$	~ 24 mΩ	P_D	= 45 W
T_{jmax}	= 175°C	E_{AS}	= 72 mJ

Version 2021-11-17

TO-252AA
D-PAK



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



Marking
Type / Typ

HS Code 85412100

Typical Applications
DC/DC Converters
Power Supplies
DC Drives
Synchronous Rectifiers
Commercial / industrial grade
Suffix -Q: AEC-Q101 compliant [1])
Suffix -AQ: in AEC-Q101 qualification [1])

Typische Anwendungen
Gleichstrom-Wandler
Stromversorgung
Gleichstrom-Antriebe
Synchron-Gleichrichter
Standardausführung
Suffix -Q: AEC-Q101 konform [1])
Suffix -AQ: in AEC-Q101 Qualifikation [1])

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

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

Mechanical Data [1])

Taped and reeled	2500 / 13"	Gegurtet auf Rolle
Weight approx.	0.32 g	Gewicht ca.
Case material	UL 94V-0	Gehäusematerial
Solder & assembly conditions	260°C/10s MSL 1	Löt- und Einbaubedingungen

Mechanische Daten [1])

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

			DI020N06D1	DI020N06D1-Q
Drain-Source voltage Drain-Source-Spannung	V_{GS} = 0 V (short)	V_{DSS}	60 V	
Gate-Source-voltage continuos – Gate-Source-Spannung dauernd		V_{GSS}	± 20 V	
Power dissipation – Verlustleistung	T_C = 25°C [3])	P_{tot}	45 W	25 W
Drain current continous Drainstrom dauernd	T_C = 25°C [3]) T_C = 100°C [3])	I_D	20 A 14 A	20 A 13 A
Peak Drain current – Drain-Spitzenstrom	[4])	I_{DM}	60 A	50 A
Source current continous Sourcestrom dauernd	T_C = 25°C [3])	I_S	15 A	20 A
Peak Source current – Source-Spitzenstrom	V_{GS} = 0 V, t_p = 10 s	I_{SM}	20 A	50 A
Single pulse avalanche energy (Fig. 1) Einzelpuls Avalanche-Energie	V_{DD} = 30 V, V_G = 10 V L = 0.5 mH, R_G = 25 Ω	E_{AS}	72 mJ	tbd
Junction temperature – Sperrschichttemperatur Storage temperature – Lagerungstemperatur		T_j T_S	-55…+175°C -55…+175°C	-55...+150°C -55...+150°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

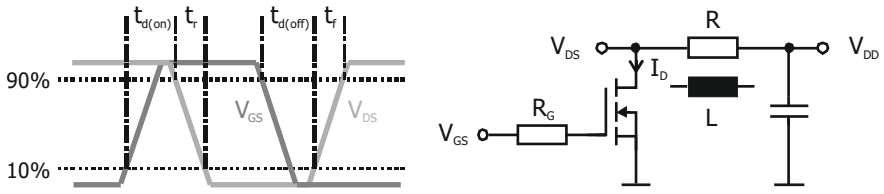
Characteristics (static) **Kennwerte (statisch)**

		T_j = 25°C	Min.	Typ.	Max.
Drain-Source breakdown voltage – Drain-Source-Durchbruchspannung					
I_D = 250 µA V_{GS} = 0 V (short)		$V_{(BR)DSS}$	60 V	–	–
Drain-Source leakage current – Drain-Source Leckstrom					
V_{DS} = 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	1.6 V	2.5 V
Drain-Source on-state resistance – Drain-Source Einschaltwiderstand					
V_{GS} = 10 V I_D = 20 A	DI020N06D1	$R_{DS(on)}$	–	24 mΩ	35 mΩ
V_{GS} = 4.5 V I_D = 20 A	DI020N06D1	$R_{DS(on)}$	–	30 mΩ	40 mΩ
V_{GS} = 10 V I_D = 15 A	DI020N06D1-Q	$R_{DS(on)}$	–	26 mΩ	34 mΩ
V_{GS} = 4.5 V I_D = 10 A	DI020N06D1-Q	$R_{DS(on)}$	–	–	38 mΩ

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

			T_j = 25°C	Min.	Typ.	Max.
Forward Transconductance – Übertragungssteilheit						
V_{DS} = 5 V I_D = 5 A		DI020N06D1	g_{FS}	11 S	–	–
V_{DS} = 5 V I_D = 15 A		DI020N06D1-Q	g_{FS}	–	18 S	–
Input Capacitance – Eingangskapazität						
V_{DS} = 15 V V_{GS} = 0 V f = 1 MHz		DI020N06D1	C_{iss}	–	590 pF	–
V_{DS} = 30 V V_{GS} = 0 V f = 1 MHz		DI020N06D1-Q	C_{iss}	–	1260 pF	–
Output Capacitance – Ausgangskapazität						
V_{DS} = 15 V V_{GS} = 0 V f = 1 MHz		DI020N06D1	C_{oss}	–	70 pF	–
V_{DS} = 30 V V_{GS} = 0 V f = 1 MHz		DI020N06D1-Q	C_{oss}	–	47 pF	–
Reverse Transfer Capacitance – Rückwirkungskapazität						
V_{DS} = 15 V V_{GS} = 0 V f = 1 MHz		DI020N06D1	C_{rss}	–	64 pF	–
V_{DS} = 30 V V_{GS} = 0 V f = 1 MHz		DI020N06D1-Q	C_{rss}	–	43 pF	–
Turn-On Delay & Rise Time – Einschaltverzögerung und Anstiegszeit						
V_{DD} = 30 V I_D = 2 A V_{GS} = 10 V R_G = 3 Ω	(Fig. 1)	DI020N06D1	$t_{d(on)}$ t_r	–	6 ns 6 ns	–
V_{DD} = 30 V I_D = 15 A V_{GS} = 10 V R_G = 3.3 Ω	(Fig. 1)	DI020N06D1-Q	$t_{d(on)}$ t_r	–	11 ns 27 ns	–
Turn-Off Delay Time & Fall Time – Ausschaltverzögerung und Abfallzeit						
V_{DD} = 30 VA I_D = 2 V_{GS} = 0 V R_G = 3 Ω	(Fig. 1)	DI020N06D1	$t_{d(off)}$ t_f	–	17 ns 3 ns	–
V_{DD} = 30 VA I_D = 15 A V_{GS} = 0 V R_G = 3.3 Ω	(Fig. 1)	DI020N06D1-Q	$t_{d(off)}$ t_f	–	10 ns 2 ns	–
Total Gate Charge – Gesamte Gate-Ladung						
V_{DD} = 30 V I_D = 10 A V_{GS} = 10 V		DI020N06D1	Q_g	–	25.3 nC	–
V_{DD} = 30 V I_D = 15 A V_{GS} = 10 V V_{DD} = 30 V I_D = 15 A V_{GS} = 4.5 V		DI020N06D1-Q	Q_g	– –	19 nC 8.7 nC	– –
Gate-Source Charge – Gate-Source-Ladung						
V_{DD} = 30 V I_D = 10 A V_{GS} = 10 V		DI020N06D1	Q_{gs}	–	4.7 nC	–
V_{DD} = 30 V I_D = 15 A V_{GS} = 10 V		DI020N06D1-Q	Q_{gs}	–	4.3 nC	–
Gate-Drain Charge – Gate-Drain-Ladung						
V_{DD} = 30 V I_D = 10 A V_{GS} = 10 V		DI020N06D1	Q_{gd}	–	6.1 nC	–
V_{DD} = 30 V I_D = 15 A V_{GS} = 10 V		DI020N06D1-Q	Q_{gd}	–	2.6 nC	–
Intrinsic Gate resistance – Innerer Gatewiderstand						
f = 1 Mhz D open			R_{Gi}	–	tbd 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)



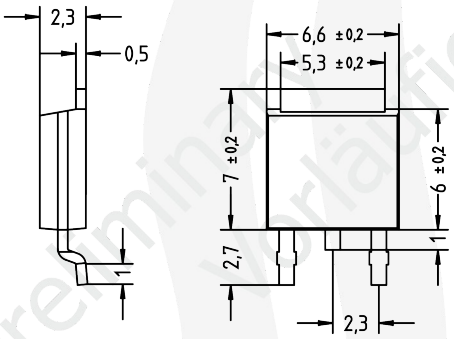
Characteristics (diode) **Kennwerte (Diode)**

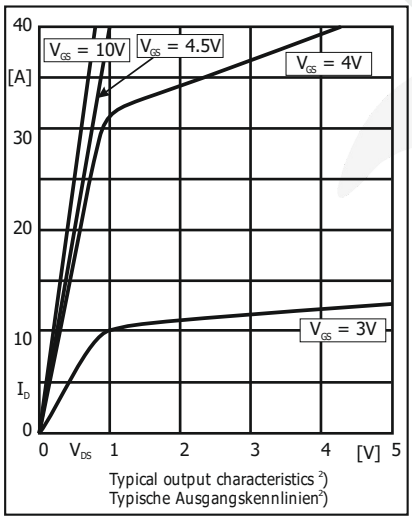
				T_j = 25°C	Min.	Typ.	Max.
Forward voltage – Durchlass-Spannung							
V_{GS} = 0 V	I_S = 20 A	DI020N06D1	V_{SD}		–	–	1.2 V
V_{GS} = 0 V	I_S = 1 A	DI020N06D1-Q	V_{SD}		–	–	1.3 V
Reverse recovery time – Sperrverzugszeit							
I_S = 20 A,	di/dt = -100 A/µs	DI020N06D1	t_{rr}		–	30 ns	–
I_S = 15 A,	di/dt = -100 A/µs	DI020N06D1-Q	t_{rr}		–	7.2 ns	–
Reverse recovery charge – Sperrverzugsladung							
I_S = 20 A,	di/dt = -100 A/µs	DI020N06D1	Q_{rr}		–	50 nC	–
I_S = 15 A,	di/dt = -100 A/µs	DI020N06D1-Q	Q_{rr}		–	4.5 nC	–

Characteristics (thermal) **Kennwerte (thermisch)**

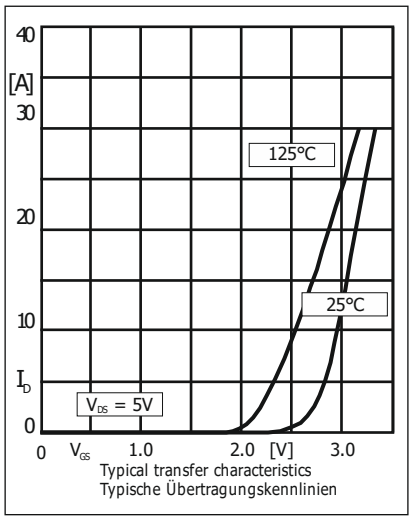
		Min.	Typ.	Max.
Thermal resistance junction to case Wärmewiderstand Sperrschicht – Gehäuse	R_{thC}	–	3.3 K/W [1])	–

Dimensions – Maße [mm]





Typical output characteristics [2])
Typische Ausgangskennlinien[2])



Typical transfer characteristics
Typische Übertragungskennlinien

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

1 Measured at heat flange – Gemessen an der Kühlfahne

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Diotec Semiconductor:

DI020N06D1