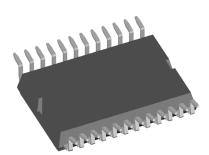


# Three phase full Bridge

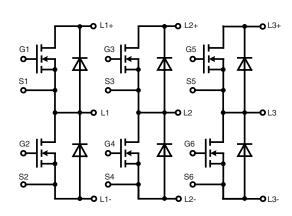
with Trench MOSFETs in DCB-isolated high-current package

$V_{DSS}$	=100 V	
I <sub>D25</sub>	= 190 A	
R <sub>DSon typ.</sub>	<b>= 1.7 m</b> Ω	)

## Part number MTI145WX100GD



Surface Mount Device



### Features / Advantages:

- MOSFETs in trench technology:
  - Iow R<sub>DSon</sub>
  - optimized intrinsic reverse diode
- Package:
  - high level of integration
  - high current capability
  - aux. terminals for MOSFET control
  - terminals for soldering or welding connections
  - isolated DCB ceramic base plate with optimized heat transfer
- · Space and weight savings

## **Applications:**

AC drives

- · in automobiles - electric power steering
- starter generator
- · in industrial vehicles propulsion drives
- fork lift drives
- · in battery supplied equipment

#### Package: ISOPLUS-DIL®

- · High level of integration
- **RoHS** compliant
- High current capability
- · Aux. Terminals for MOSFET control
- · Terminals for soldering or welding connections
- · Space and weight savings

Terms & Conditions of usage

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

to perform joint risk and quality assessments;
the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures

IXYS reserves the right to change limits, test conditions and dimensions.

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The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of The data contained in this product data sheet is exclusively interfaced on technicary trained stati. The deer will have to evaluate the suitability of the product for the interfaced application. The specification and the completeness of the product data with respect to his application. The specification be considered as an assurance of component characteristics. The information in the valid application and the completeness of the product data with respect to his application. The specification are assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office

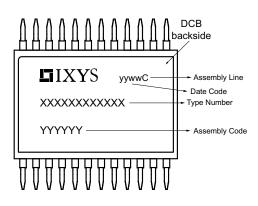


MOSFET	s				Ratir	ngs	
Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V <sub>DSS</sub>	drain source breakdown voltage	T <sub>vJ</sub> = 2	25°C to 150°C			100	V
V <sub>GS</sub> V <sub>GSM</sub>	gate source voltage max. transient gate source voltage					±15 ±20	V V
<sub>D25</sub>   <sub>D90</sub>	continuous drain current		$\begin{array}{rcl} T_{\rm C} &=& 25^{\circ}{\rm C} \\ T_{\rm C} &=& 90^{\circ}{\rm C} \end{array}$			190 145	A A
R <sub>DS(on)</sub> <sup>1)</sup>	static drain source on resistance	on chip level at $I_D = 100 \text{ A}; V_{GS} = 10 \text{ V}$	$\begin{array}{l} T_{\rm VJ} = ~25^{\circ}{\rm C} \\ T_{\rm VJ} = 125^{\circ}{\rm C} \end{array}$		1.7 2.9	2.2	mΩ mΩ
V <sub>GS(th)</sub>	gate threshold voltage	$I_{\text{D}} = 275 \ \mu\text{A}; \ V_{\text{DS}} = V_{\text{GS}}$	$T_{VJ} = 25^{\circ}C$	2.0	2.7	3.5	V
I <sub>DSS</sub>	drain source leakage current	$V_{\rm DS} = V_{\rm DSS}; V_{\rm GS} = 0 \ V$	$T_{VJ} = 25^{\circ}C$ $T_{VJ} = 125^{\circ}C$		10	1 100	μA μA
I <sub>GSS</sub>	gate source leakage current	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$				500	nA
R <sub>G</sub>	gate resistance	on chip level			1.9		Ω
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	input capacitance output capacitance reverse transfer capacitance	$ \  \  \  \  \  \  \  \  \  \  \  \  \ $			11.1 1.94 70		nF nF pF
Q <sub>g</sub> Q <sub>gs</sub> Q <sub>gd</sub>	total gate charge gate source charge gate drain (Miller) charge	$\int V_{GS} = 10 \text{ V};  \text{V}_{DS} = 50 \text{ V};  \text{I}_{D} = 100 \text{ A}$			155 48 27		nC nC nC
$\begin{array}{c} t_{d(on)} \\ t_r \\ t_{d(off)} \\ t_f \\ E_{on} \\ E_{off} \\ E_{rec(off)} \end{array}$	turn-on delay time current rise time turn-off delay time current fall time turn-on energy per pulse turn-off energy per pulse turn-off reverse recovery losses	$\label{eq:VGS} \left. \begin{array}{l} \mbox{inductive load} \\ V_{GS} = 10 \mbox{ V}; V_{DS} = 50 \mbox{ V} \\ I_D = 100 \mbox{ A}; \mbox{ R}_G = 27 \ \Omega \end{array} \right.$	T <sub>vj</sub> = 125°C		135 75 600 40 200 600 36		ns ns ns μJ μJ
R <sub>thJC</sub>	thermal resistance junction to case					0.85	K/W
R <sub>thJH</sub>	thermal resistance junction to heatsin	k with heat transfer paste (IXYS test	st setup)		1.1	1.4	K/W
		${}^{1)}V_{\text{DS}} = I_{\text{D}} \cdot (R_{\text{DS(on)}} + 2 \cdot R_{\text{Pin to Chip}})$					
Source-	Drain Diode					1	
<sub>F25</sub>   <sub>F90</sub>	forward current		$T_{c} = 25^{\circ}C$ $T_{c} = 90^{\circ}C$			180 105	A A
$V_{\text{SD}}$	source drain voltage	$I_F = 100 \text{ A}; V_{GS} = 0 \text{ V}$	$T_{VJ} = 25^{\circ}C$		0.9	1.2	V
Q <sub>RM</sub> I <sub>RM</sub> t <sub>rr</sub>	reverse recovery charge max. reverse recovery current reverse recovery time	$\label{eq:V_R} \left. \begin{array}{c} V_{\text{R}} = 50 \; \text{V;} \; \text{I}_{\text{F}} = 100 \; \text{A} \\ R_{\text{G}} = 27 \; \Omega \; \; (\text{di/dt} = 1700 \; \text{A/}\mu\text{s}) \end{array} \right.$	$T_{VJ} = 125^{\circ}C$		2 54 60		μC A ns



# MTI145WX100GD

Package ISOPLUS-DIL®					Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	Unit	
I <sub>RMS</sub>	RMS current	(L1+L3+, L1 may be additiona (PCB tracks)	per pin in main current paths (L1+L3+, L1L3-, L1L3) may be additionally limited by external connections (PCB tracks) 2 pins for output L1, L2, L3			75	A	
T <sub>stg</sub>	storage temperature			-55		125	°C	
T <sub>op</sub>	operation temperature			-55		150	°C	
$T_{VJ}$	virtual junction temperature			-55		175	°C	
Weight					13	1	g	
Fc	mounting force with clip			50		250	Ν	
VISOL	isolation voltage	t = 1 second		1200		1	V	
		t = 1 minute	50/60 Hz, RMS, $I_{ISOL} \le 1 \text{ mA}$	1000		1	V	
$\mathbf{R}_{pin-chip}$	resistance terminal to chip	$V_{DS} = I_{D} \cdot (R_{DS(on)})$	$V_{DS} = I_{D} \cdot (R_{DS(on)} + 2 \cdot R_{pin \text{ to chip}})$		0.5	1	mΩ	
C <sub>P</sub>	coupling capacity	between shorted pins and back side metallization			160	1	pF	



#### Part number

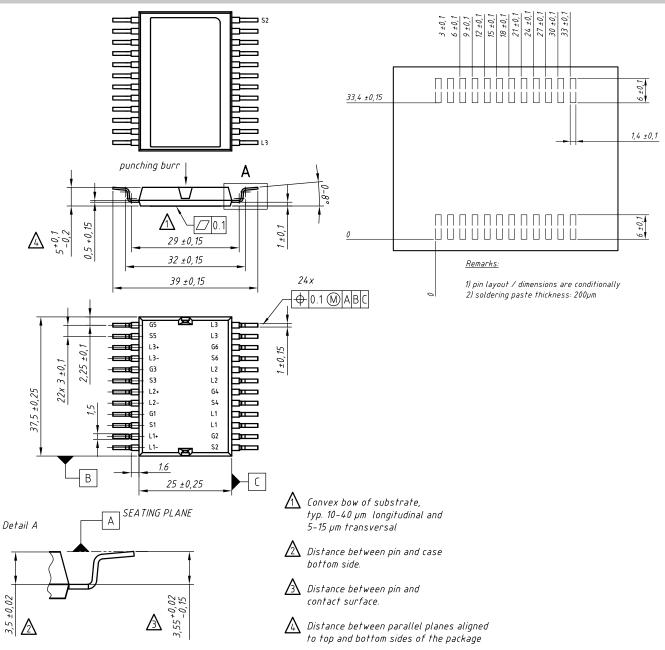
- M = MOSFET
- T = Trench
- I = Infineon Trench
- 145 = Current Rating [A] WX = 6-Pack with separated Phase Legs 100 = Reverse Voltage [V] GD = ISOPLUS-DIL

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MTI145WX100GD-SMD	MTI145WX100GD	Tube	13	518023

# **L**IXYS

## MTI145WX100GD

#### Outlines ISOPLUS-DIL®

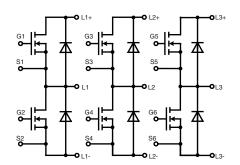


contact pin:

- galv. tin plating, per pin side: Sn 10...25 μm, undercoating Ni 0,2...1 μm

- stamping edges may be free of tin

- puching burr: ≤ 0,05mm



IXYS reserves the right to change limits, test conditions and dimensions.



5

5.5 V

1.5

5.5 V

`15 V

20 V

300

6 V 6.5 V

7 \

10 \

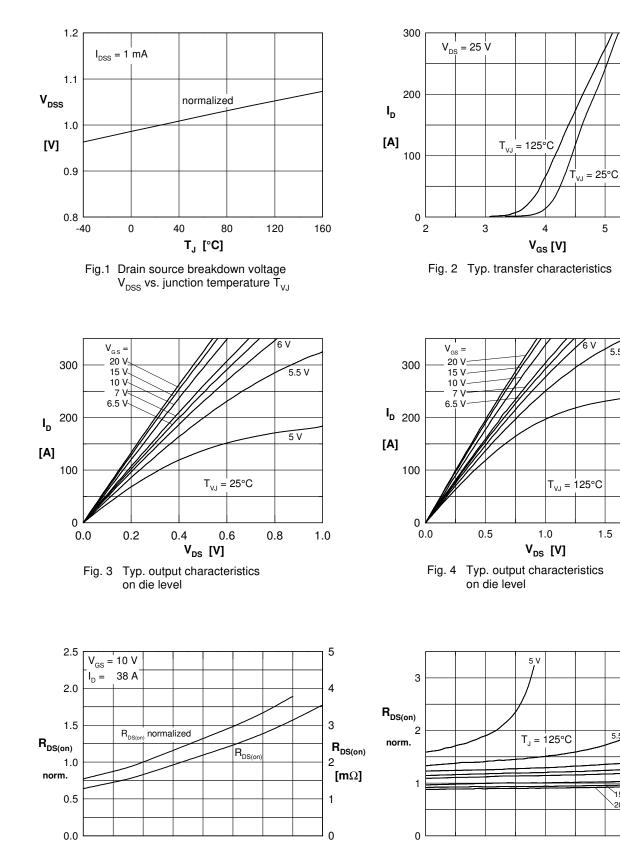
400

5 V

2.0

6





25

50

75

T\_ [°C]

Fig.5 Drain source on-state resistance  $R_{DS(on)}$ 

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100

vs. junction temperature  $T_{VJ}$ , on die level

125

150

175

0

100

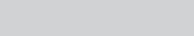
200

Fig. 6 Drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$ , on die level

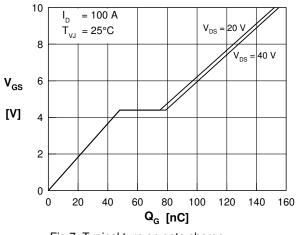
I<sub>D</sub> [A]

0

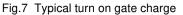
-25

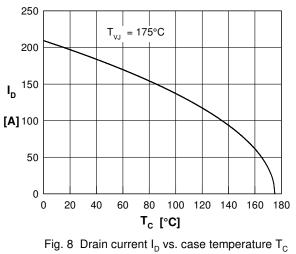


## MTI145WX100GD



LIXYS





(Chip capability)

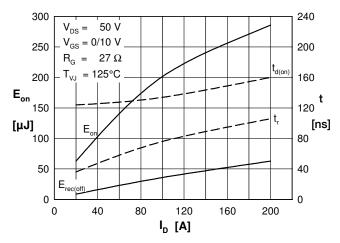


Fig. 9 Typ. turn-on energy and switching times versus drain current, inductive switching

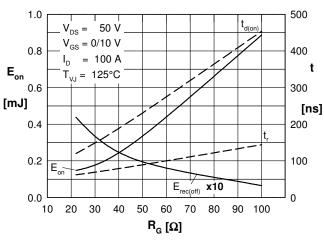


Fig. 11 Typ. turn-on energy and switching times versus gate resistor, inductive switching

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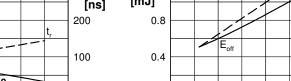


Fig. 12 Typ. turn-off energy and switching times

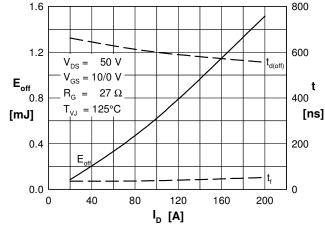


Fig. 10 Typ. turn-off energy and switching times versus drain-current, inductive switching

