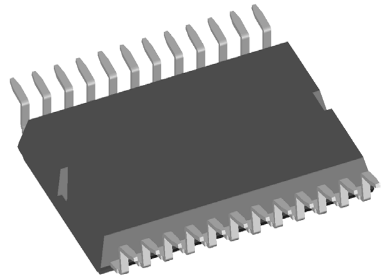
Three phase full Bridge

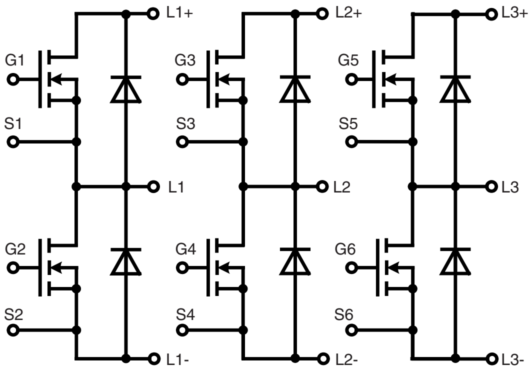
with Trench MOSFETs
in DCB-isolated high-current package

V_{DSS} = 100 V
I_{D25} = 190 A
$R_{DSon\ typ.}$ = 1.7 mΩ

Part number
MTI145WX100GD



Surface Mount Device



Features / Advantages:

- MOSFETs in trench technology:
  - low R_{DSon}
  - 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:

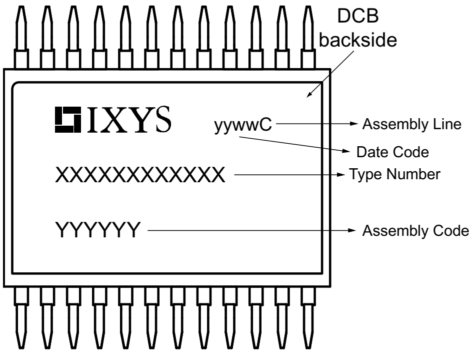
AC drives
- in automobiles
  - electric power steering
  - starter generator
- in industrial vehicles
  - propulsion drives
  - fork lift drives
- in battery supplied equipment

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

MOSFETs			Ratings			
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
V_{DSS}	*drain source breakdown voltage*	T_{VJ} = 25°C to 150°C			100	V
V_{GS} V_{GSM}	*gate source voltage* *max. transient gate source voltage*				±15 ±20	V V
I_{D25} I_{D90}	*continuous drain current*	T_C = 25°C T_C = 90°C			190 145	A A
$R_{DS(on)}$ [1]	*static drain source on resistance*	on chip level at T_{VJ} = 25°C I_D = 100 A; V_{GS} = 10 V T_{VJ} = 125°C		1.7 2.9	2.2	mΩ mΩ
$V_{GS(th)}$	*gate threshold voltage*	I_D = 275 µA; V_{DS} = V_{GS} T_{VJ} = 25°C	2.0	2.7	3.5	V
I_{DSS}	*drain source leakage current*	V_{DS} = V_{DSS}; V_{GS} = 0 V T_{VJ} = 25°C T_{VJ} = 125°C		 10	1 100	µA µA
I_{GSS}	*gate source leakage current*	V_{GS} = ±20 V; V_{DS} = 0 V			500	nA
R_G	*gate resistance*	on chip level		1.9		Ω
C_{iss} C_{oss} C_{rss}	*input capacitance* *output capacitance* *reverse transfer capacitance*	V_{GS} = 0 V; V_{DS} = 50 V; f = 1 Mhz		11.1 1.94 70		nF nF pF
Q_g Q_{gs} Q_{gd}	*total gate charge* *gate source charge* *gate drain (Miller) charge*	V_{GS} = 10 V; V_{DS} = 50 V; I_D = 100 A		155 48 27		nC nC nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off} $E_{rec(off)}$	*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*	inductive load T_{VJ} = 125°C V_{GS} = 10 V; V_{DS} = 50 V I_D = 100 A; R_G = 27 Ω		135 75 600 40 200 600 36		ns ns ns ns µJ µJ µJ
R_{thJC}	*thermal resistance junction to case*				0.85	K/W
R_{thJH}	*thermal resistance junction to heatsink*	with heat transfer paste (IXYS test setup)		1.1	1.4	K/W
		[1] $V_{DS} = I_D \cdot (R_{DS(on)} + 2 \cdot R_{Pin\ to\ Chip})$				
Source-Drain Diode						
I_{F25} I_{F90}	*forward current*	T_C = 25°C T_C = 90°C			180 105	A A
V_{SD}	*source drain voltage*	I_F = 100 A; V_{GS} = 0 V T_{VJ} = 25°C		0.9	1.2	V
Q_{RM} I_{RM} t_{rr}	*reverse recovery charge* *max. reverse recovery current* *reverse recovery time*	V_R = 50 V; I_F = 100 A T_{VJ} = 125°C R_G = 27 Ω (di/dt = 1700 A/µs)		2 54 60		µC A ns

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

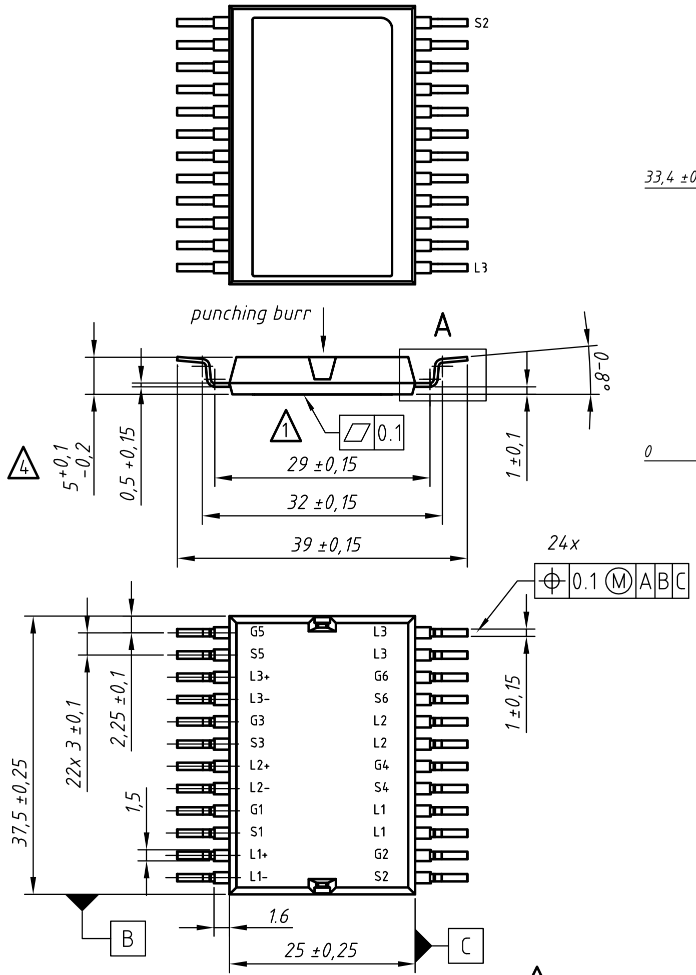


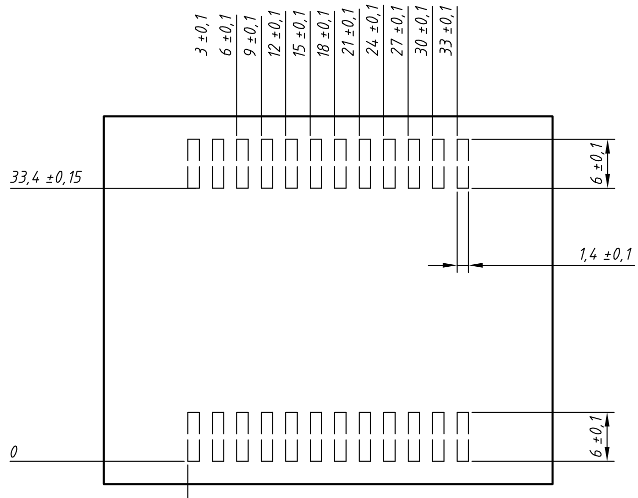
Part number

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

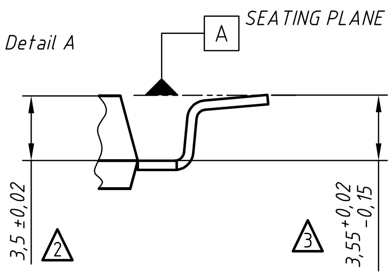
Outlines ISOPLUS-DIL®





Remarks:

1) pin layout / dimensions are conditionally
2) soldering paste thickness: 200µm



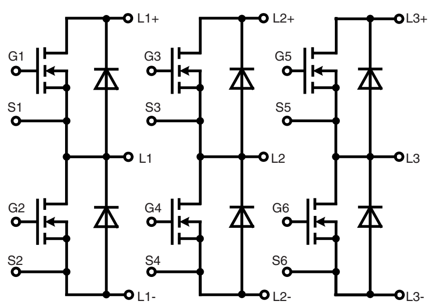
1 Convex bow of substrate, typ. 10-40 µm longitudinal and 5-15 µm transversal

2 Distance between pin and case bottom side.

3 Distance between pin and contact surface.

4 Distance between parallel planes aligned to top and bottom sides of the package

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.

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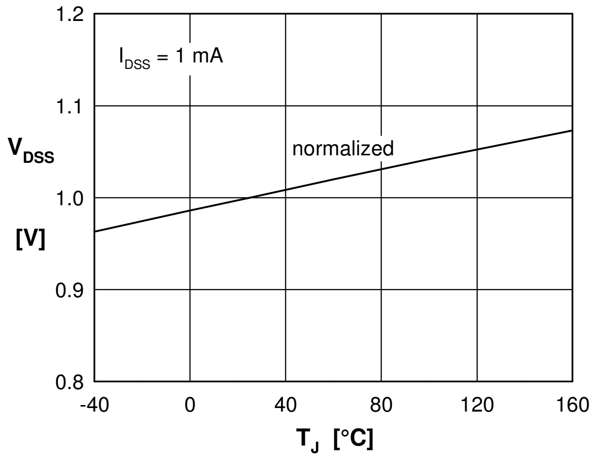

Fig.1 Drain source breakdown voltage V_{DSS} vs. junction temperature T_{VJ}

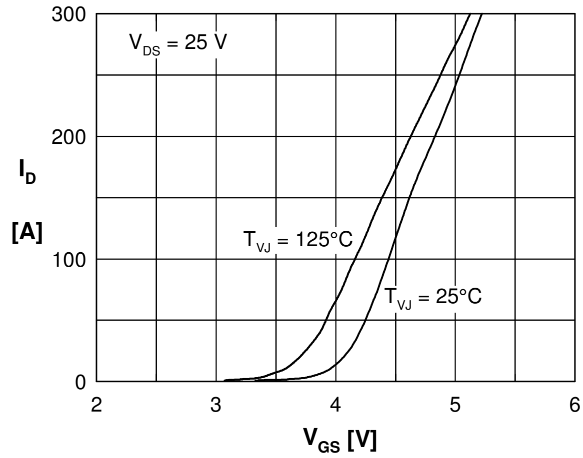

Fig. 2 Typ. transfer characteristics

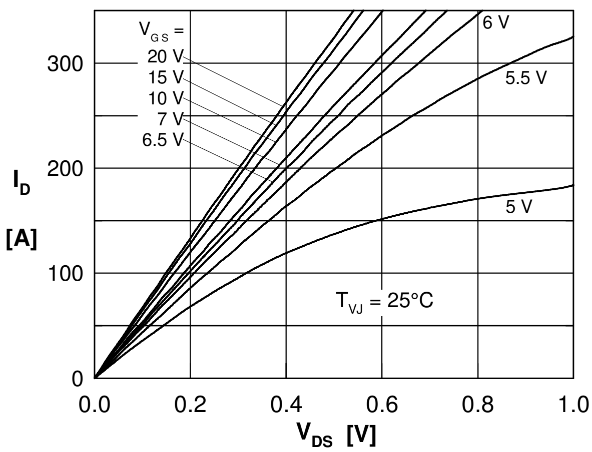

Fig. 3 Typ. output characteristics on die level

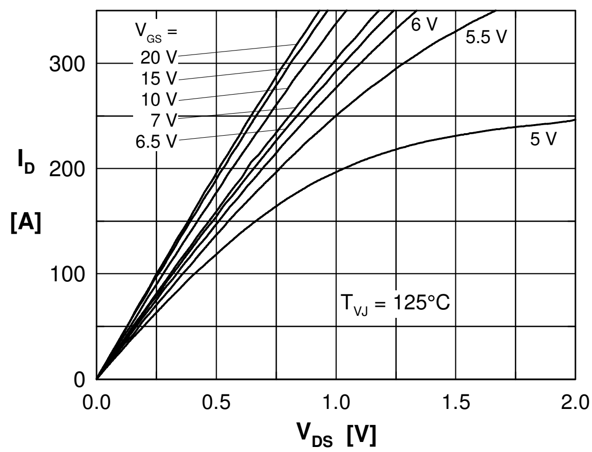

Fig. 4 Typ. output characteristics on die level

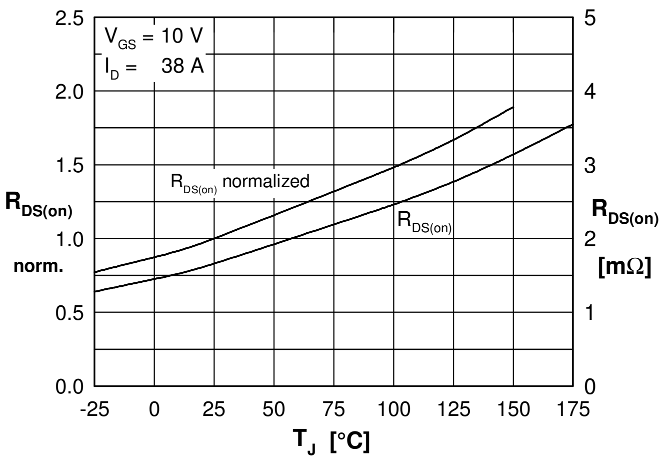

Fig.5 Drain source on-state resistance $R_{DS(on)}$ vs. junction temperature T_{VJ}, on die level

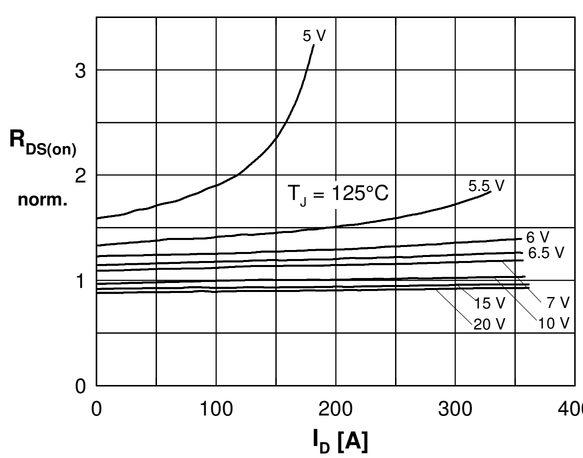

Fig. 6 Drain source on-state resistance $R_{DS(on)}$ versus I_D, on die level

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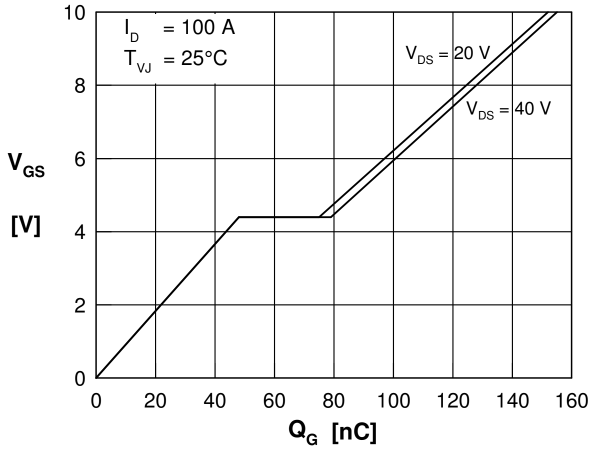

Fig.7 Typical turn on gate charge

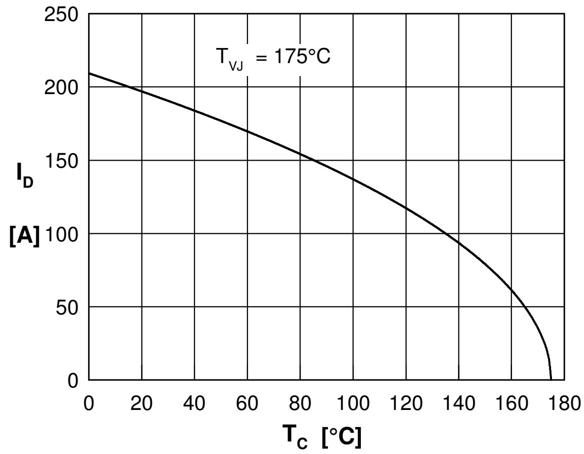

Fig. 8 Drain current I_D vs. case temperature T_C (Chip capability)

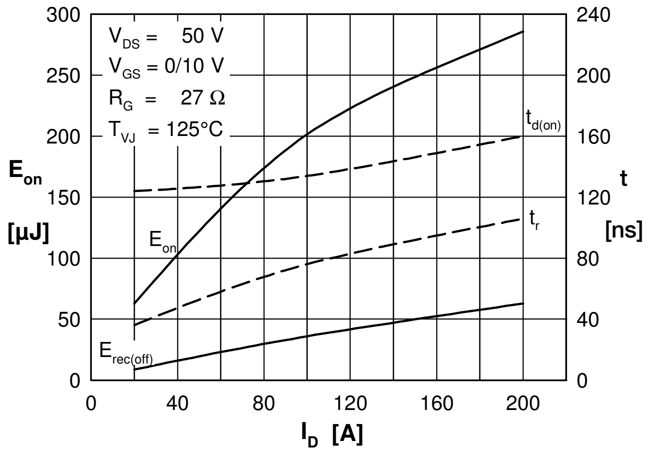

Fig. 9 Typ. turn-on energy and switching times versus drain current, inductive switching

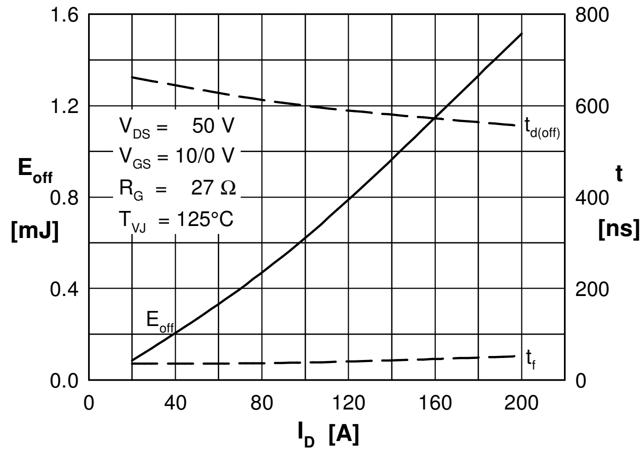

Fig. 10 Typ. turn-off energy and switching times versus drain-current, inductive switching

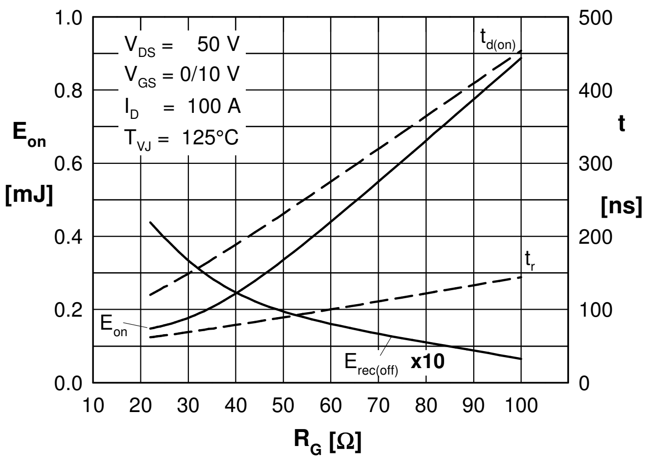

Fig. 11 Typ. turn-on energy and switching times versus gate resistor, inductive switching

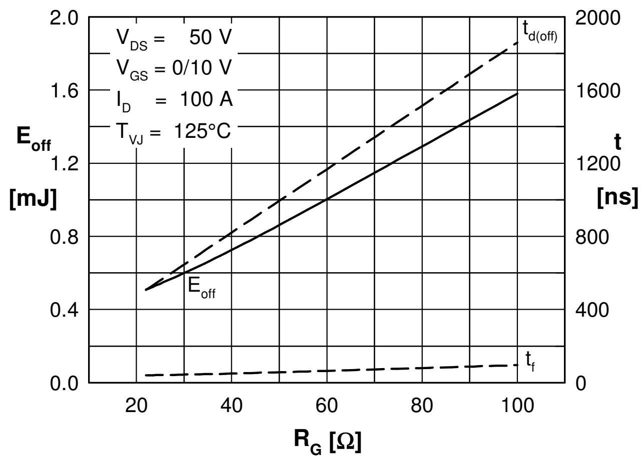

Fig. 12 Typ. turn-off energy and switching times versus gate resistor, inductive switching