

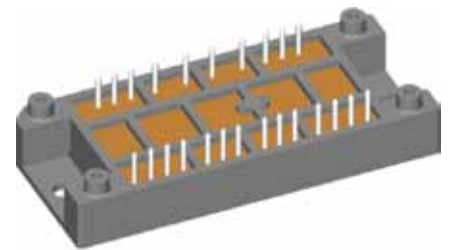
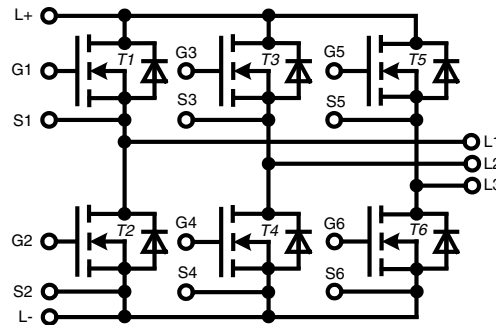
Three phase full bridge with Trench MOSFETs

$$V_{DSS} = 75 \text{ V}$$

$$I_{D25} = 270 \text{ A}$$

$$R_{DS(on)} = 2.1 \text{ m}\Omega$$

<https://www.digikey.dk/product-detail/en/ixys/VWM270-0075X2/VWM270-0075X2-ND/4321855>



MOSFET T1 - T6

Symbol	Conditions	Maximum Ratings	
V_{DSS}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	75	V
V_{GS}		± 20	V
I_{D25}	$T_C = 25^{\circ}\text{C}$	270	A
I_{D80}	$T_C = 80^{\circ}\text{C}$	215	A
I_{F25}	$T_C = 25^{\circ}\text{C (diode)}$	280	A
I_{F80}	$T_C = 80^{\circ}\text{C (diode)}$	180	A

Applications

AC drives

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

Features

- MOSFETs in trench technology:
 - low $R_{DS(on)}$
 - optimized intrinsic reverse diode
- package:
 - high level of integration
 - solder terminals for PCB mounting
 - isolated DCB ceramic base plate with optimized heat transfer

Symbol	Conditions	Characteristic Values			
		(T _{VJ} = 25°C, unless otherwise specified)			
		min.	typ.	max.	
$R_{DS(on)}^{1)}$	$V_{GS} = 10 \text{ V}; I_D = 100 \text{ A}; \text{on chip level}$			2.1	mΩ
$V_{GS(th)}$	$V_{DS} = 20 \text{ V}; I_D = 0.5 \text{ mA}$	2		4	V
I_{DSS}	$V_{DS} = 75 \text{ V}; V_{GS} = 0 \text{ V}$			10	μA
I_{GSS}	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			300	μA
Q_g	$V_{GS} = 10 \text{ V}; V_{DS} = \frac{1}{2}V_{DSS}; I_D = 230 \text{ A}$		360		nC
Q_{gs}			105		nC
Q_{gd}			80		nC
$t_{d(on)}$	inductive load $V_{GS} = 10 \text{ V}; V_{DS} = 37 \text{ V}$ $I_D = 230 \text{ A}; R_G = 10 \Omega$ $R_G = R_{G \text{ ext}} + R_{out \text{ driver}}$ $T_{VJ} = 25^{\circ}\text{C}$		140		ns
t_r			225		ns
$t_{d(off)}$			380		ns
t_f			265		ns
E_{on}			0.23		mJ
E_{off}			3.49		mJ
E_{rec}			0.04		mJ
$t_{d(on)}$	inductive load $V_{GS} = 10 \text{ V}; V_{DS} = 37 \text{ V}$ $I_D = 230 \text{ A}; R_G = 10 \Omega$ $R_G = R_{G \text{ ext}} + R_{out \text{ driver}}$ $T_{VJ} = 125^{\circ}\text{C}$		145		ns
t_r			240		ns
$t_{d(off)}$			410		ns
t_f			230		ns
E_{on}			0.3		mJ
E_{off}			2.95		mJ
E_{rec}			0.06		mJ
R_{thJC}	with heat transfer paste (IXYS test setup)			0.44	K/W
R_{thJH}			0.66		K/W

¹⁾ $V_{DS} = I_D \cdot (R_{DS(on)} + 2R_{Pin \text{ to Chip}})$

Source-Drain Diode

Symbol	Conditions	Characteristic Values			
		(T _{VJ} = 25°C, unless otherwise specified)			
		min.	typ.	max.	
V _{SD}	I _F = 100 A; V _{GS} = 0 V			1.1	V
t _{rr}	I _F = 230 A; V _R = 37 V -di _F /dt = 820 A/μs; R _G = 10 Ω		85		ns
Q _{RM}			2.2		μC
I _{RM}			38		A

Module

Symbol	Conditions	Maximum Ratings	
T _{VJ}		-40...+175	°C
T _{stg}		-40...+125	°C
V _{ISOL}	I _{ISOL} ≤ 1 mA, 50/60 Hz; t = 1 min	500	V~
M _d	Mounting torque (M5)	2 - 2.5	Nm

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
R _{pin to chip} ¹⁾				0.7	mΩ
Weight			80		g

¹⁾ V_{DS} = I_D · (R_{DS(on)} + 2R_{Pin to Chip})

Technical drawing of a 16-pin D-sub connector. The drawing includes a top view, a side view, and two detail views (Detail Y and Detail Z).

Top View: Shows the connector with 16 pins arranged in two rows of eight. Dimensions include overall width (93), pin pitch (2.54), and individual pin dimensions (e.g., 65, 13, 17±0.25). The connector is labeled with letters A through P for the top row and A through P for the bottom row.

Side View: Shows the profile of the connector. Dimensions include overall height (4.5±0.5), pin height (2), and housing width (40.4±0.3). The connector is labeled with letters A through P for the top row and A through P for the bottom row.

Detail Y (M 5:1): Shows a cross-section of the pin. Dimensions include pin diameter (Ø1.5 (DIN 46 431)), pin length (1.5±0.6-0.3), and pin width (0.5±0.2).

Detail Z (M 2:1): Shows a cross-section of the housing. Dimensions include housing diameter (Ø6.1), housing length (1.5), housing width (Ø2.1), and housing thickness (0.75).

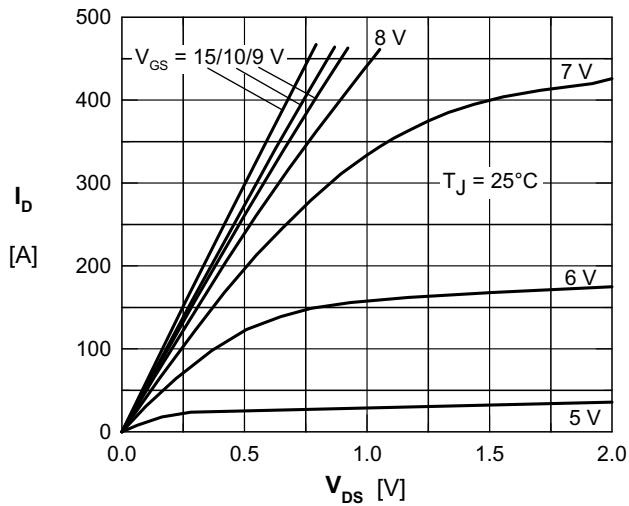


Fig. 1 Typ. Output Characteristics

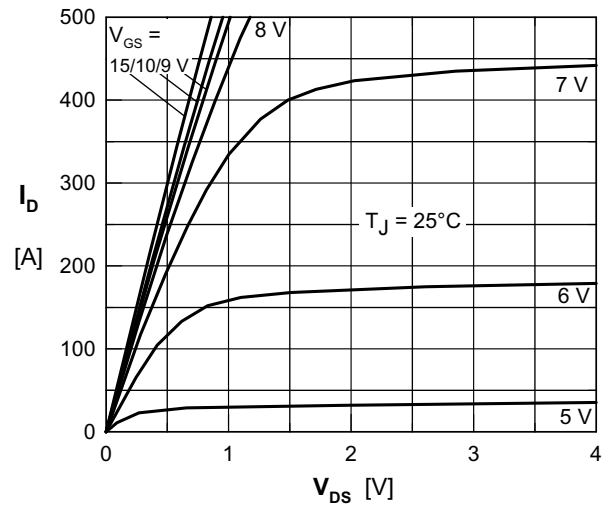


Fig. 2 Typ. Extended Output Characteristics

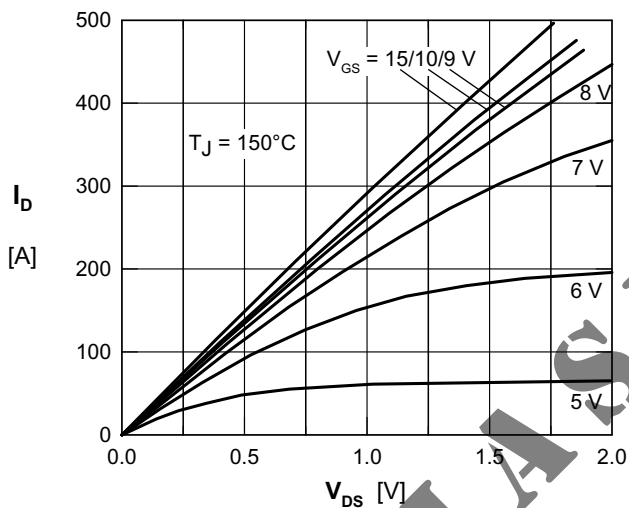


Fig. 3 Typ. Output Characteristics

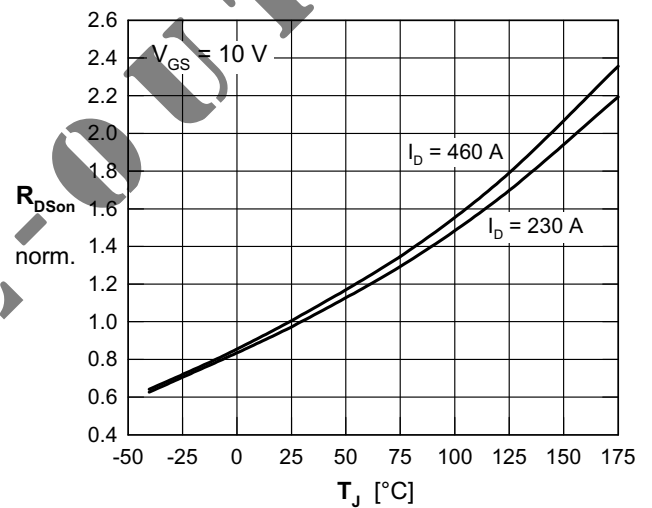


Fig. 4 $R_{DS(on)}$ Normalized to $I_D = 230$ A Value vs. Junction Temperature

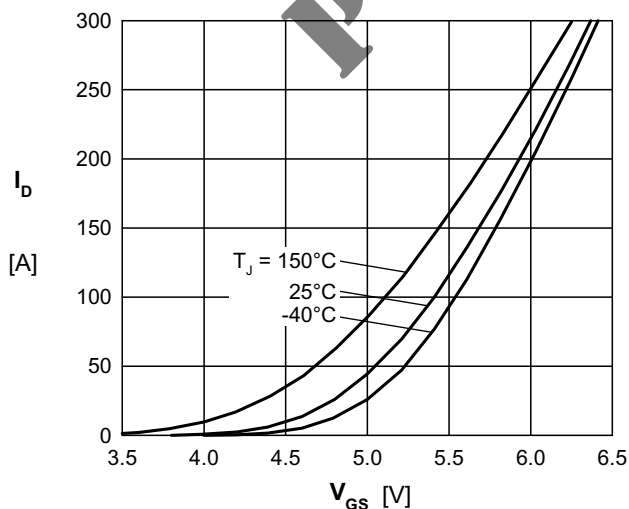


Fig. 5 Typ. Transfer Characteristics

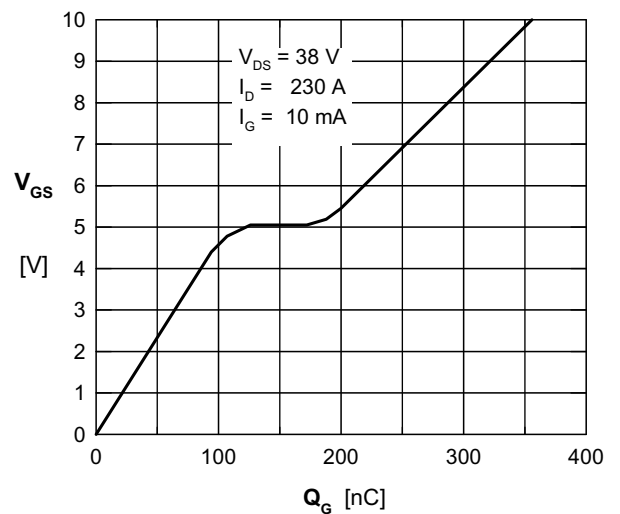


Fig. 6 Typ. Turn-on Gate Charge

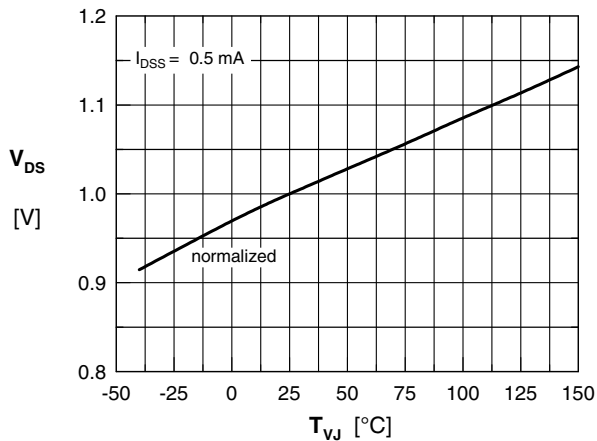


Fig. 7 Typ. Drain source breakdown voltage V_{DS} versus junction temperature

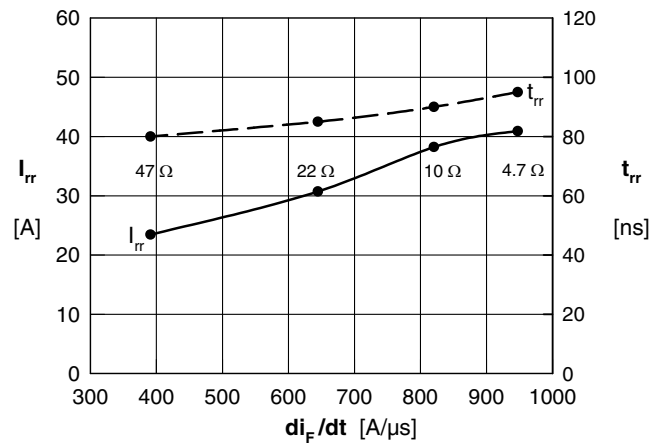


Fig. 8 Typ. Reverse recovery time and current of the body diode versus di_F/dt

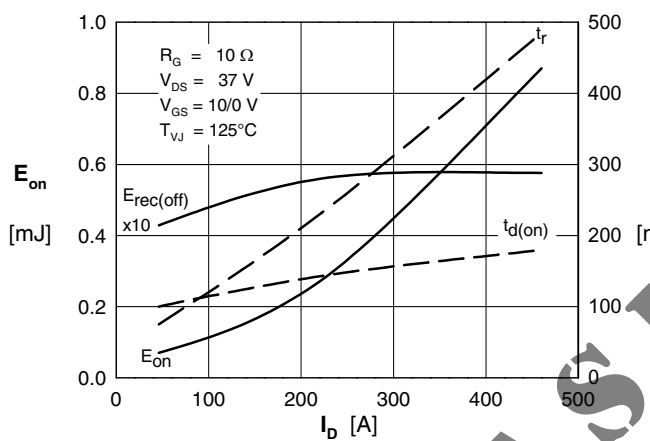


Fig. 9 Typ. turn-on energy & switching times vs. drain current, inductive switching

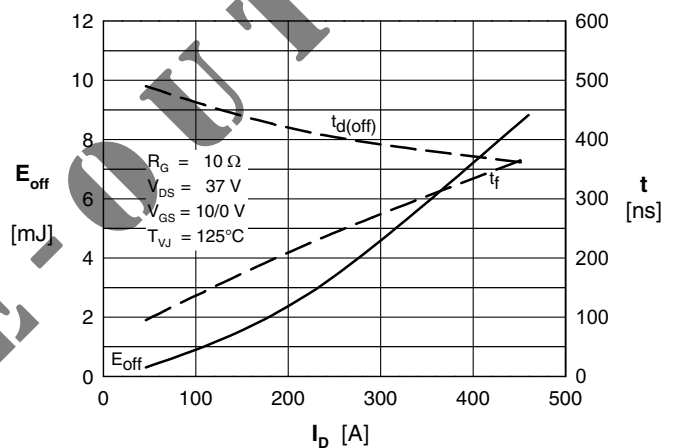


Fig. 10 Typ. turn-off energy & switching times vs. drain current, inductive switching

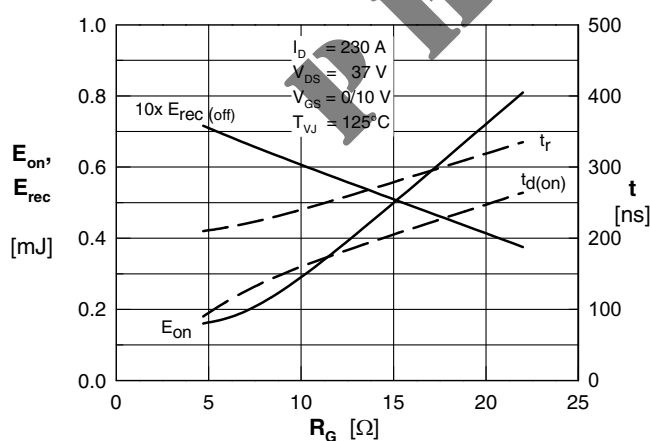


Fig. 11 Typ. turn-on energy & switching times vs. gate resistor, inductive switching

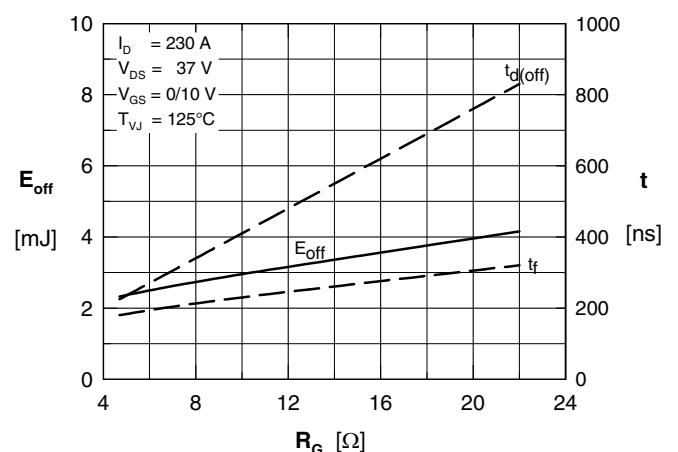


Fig. 12 Typ. turn-off energy & switching times vs. gate resistor, inductive switching

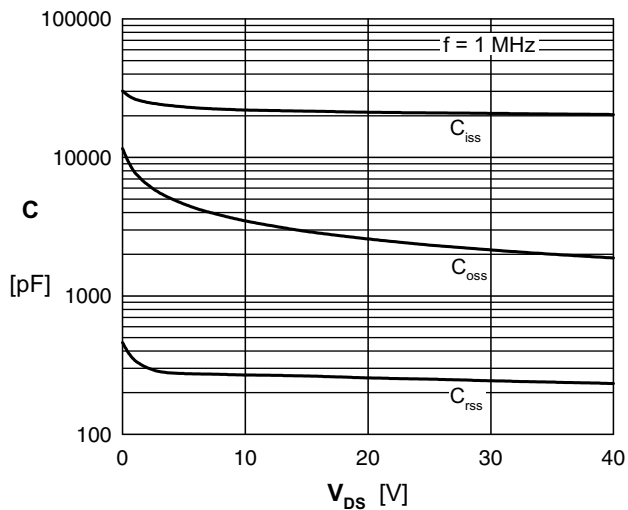


Fig. 13 Typ. Capacitances

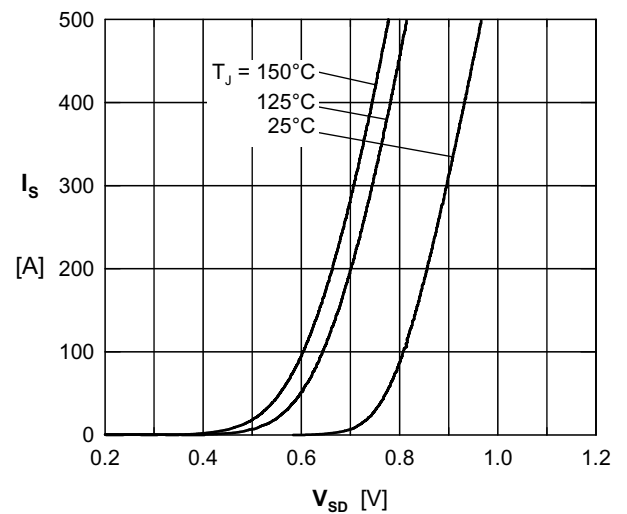


Fig. 14 Typ. Forward Voltage Drop of Intrinsic Diode

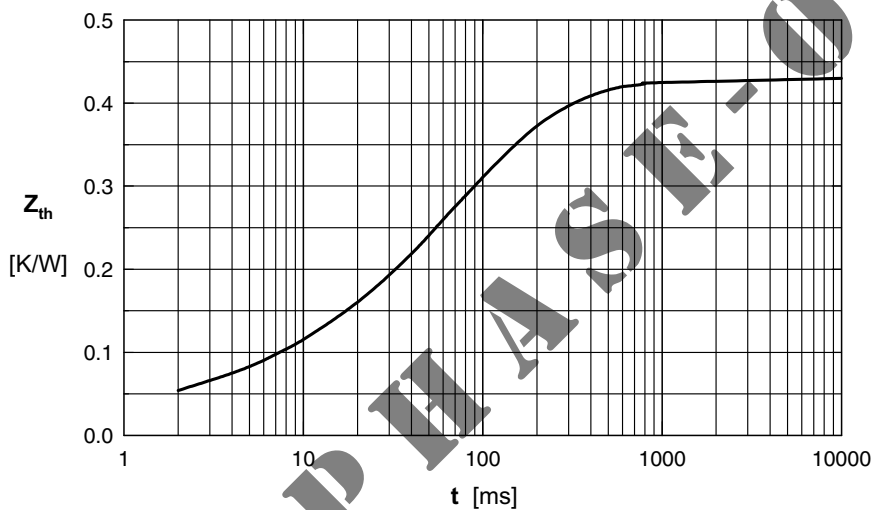


Fig. 15 Typ. Transient Thermal Resistance per MOSFET