

Three phase full bridge

with Trench MOSFETs

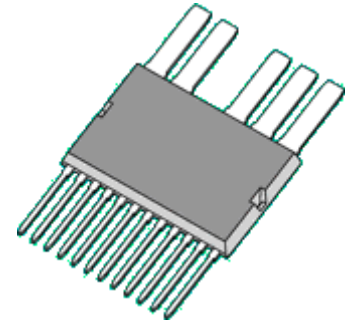
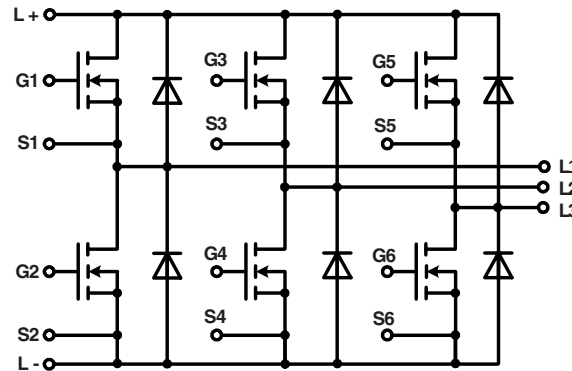
in DCB isolated high current package

$$V_{DSS} = 55 \text{ V}$$

$$I_{D25} = 160 \text{ A}$$

$$R_{DSon \text{ typ.}} = 2.3 \text{ m}\Omega$$

Preliminary data



MOSFETs

Symbol	Conditions	Maximum Ratings	
V_{DSS}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	55	V
V_{GS}		± 20	V
I_{D25}	$T_C = 25^{\circ}\text{C}$	160	A
I_{D90}	$T_C = 90^{\circ}\text{C}$	120	A
I_{F25}	$T_C = 25^{\circ}\text{C (diode)}$	135	A
I_{F90}	$T_C = 90^{\circ}\text{C (diode)}$	90	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_{DSon}
 - optimized intrinsic reverse diode
- package:
 - high level of integration
 - high current capability
 - auxiliary terminals for MOSFET control
 - terminals for soldering or welding connections
 - isolated DCB ceramic base plate with optimized heat transfer

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
R_{DSon}	on chip level at $\left. \begin{array}{l} T_{VJ} = 25^{\circ}\text{C} \\ V_{GS} = 10 \text{ V} \end{array} \right\} T_{VJ} = 125^{\circ}\text{C}$		2.3 3.8	2.9 mΩ mΩ
V_{GSth}	$V_{DS} = 20 \text{ V}; I_D = 1 \text{ mA}$	2		4 V
I_{DSS}	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		0.1	1 μA mA
I_{GSS}	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$			0.2 μA
Q_g Q_{gs} Q_{gd}	$V_{GS} = 10 \text{ V}; V_{DS} = 44 \text{ V}; I_D = 25 \text{ A}$		86 18 25	nC nC nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	$\left. \begin{array}{l} V_{GS} = 10 \text{ V}; V_{DS} = 30 \text{ V}; \\ I_D = 25 \text{ A}; R_G = 10 \Omega \end{array} \right\}$		25 50 70 40	ns ns ns ns
V_F	(diode) $I_F = 80 \text{ A}; V_{GS} = 0 \text{ V}$		0.9	1.4 V
t_{rr}	(diode) $I_F = 20 \text{ A}; -di/dt = 100 \text{ A}/\mu\text{s}; V_{DS} = 30 \text{ V}$		100	ns
R_{thJC} R_{thJH}	with heat transfer paste		1.7	0.85 K/W K/W

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

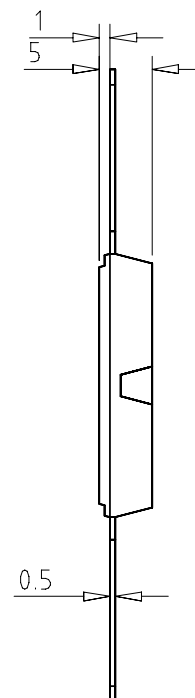
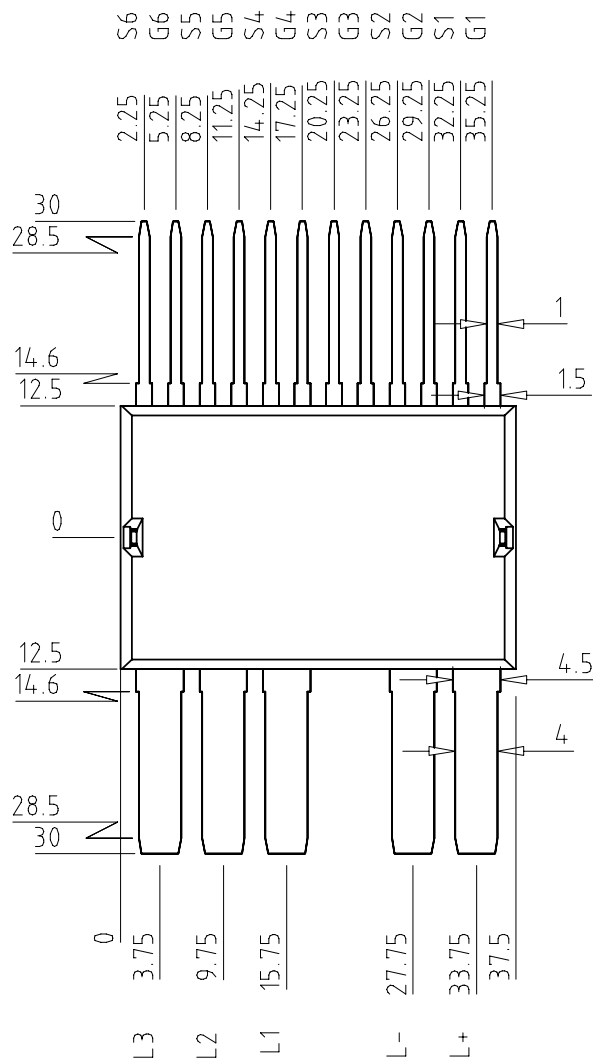
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Component

Symbol	Conditions	Maximum Ratings
I_{RMS}	per pin in main current paths (P+, N-, L ₁ , L ₂ , L ₃) may be additionally limited by external connections	300 A
T_{VJ}		-40...+175 °C
T_{stg}		-55...+125 °C
V_{ISOL}	$I_{ISOL} \leq 1$ mA; 50/60 Hz; t = 1 min	1000 V~
F_c	Mounting force with clip	50 - 250 N

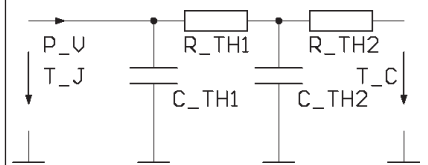
Symbol	Conditions	Characteristic Values
		($T_{VJ} = 25^\circ\text{C}$, unless otherwise specified)
		min. typ. max.
$R_{pin\ to\ chip}$		0.6 mΩ
C_p	coupling capacity between shorted pins and mounting tab in the case	160 pF
Weight	typ.	25 g

Dimensions in mm (1 mm = 0.0394")



Equivalent Circuits for Simulation

Thermal Response



junction - case (typ.)

$$C_{th1} = 0.039 \text{ J/K}; R_{th1} = 0.28 \text{ K/W}$$

$$C_{th2} = 0.069 \text{ J/K}; R_{th2} = 0.57 \text{ K/W}$$

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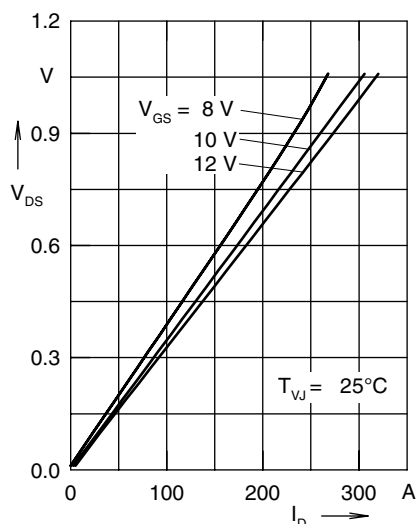


Fig. 1: typ. output characteristics
[$V_{DS} = I_D (R_{DSon} + 2x R_{pin\ to\ chip})$]

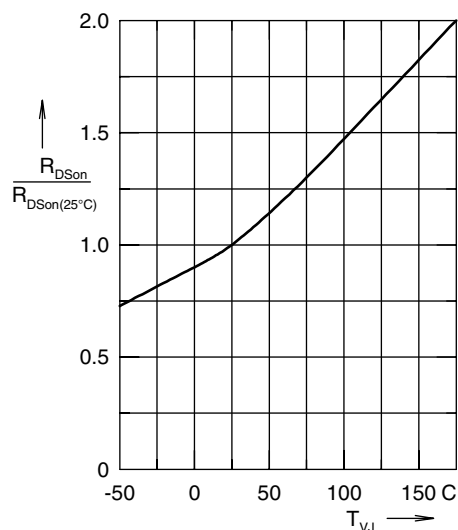


Fig. 2: typ. dependence of R_{DSon} on temperature

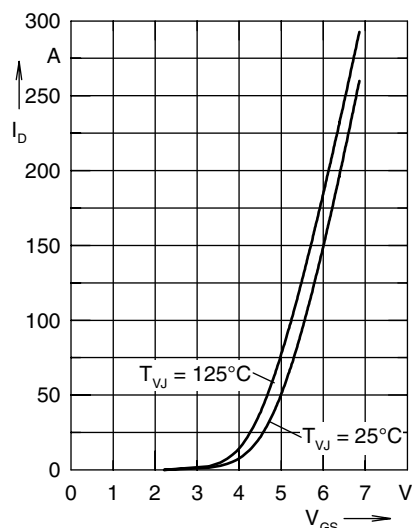


Fig. 3: typ. transfer characteristics

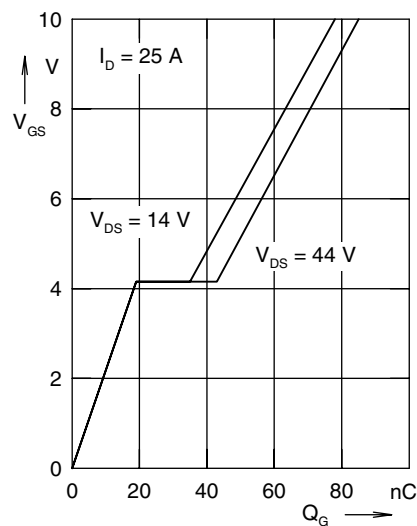


Fig. 4: typ. gate charge characteristics

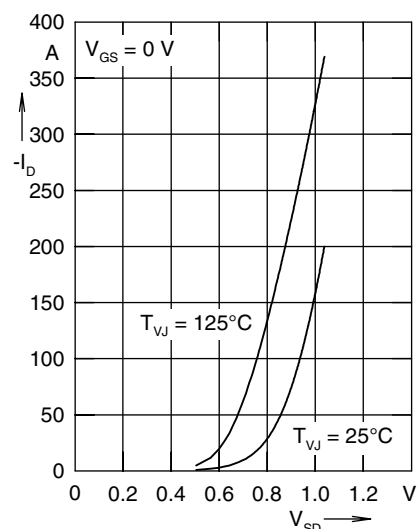


Fig. 5: typ. conduction characteristics
of body diode

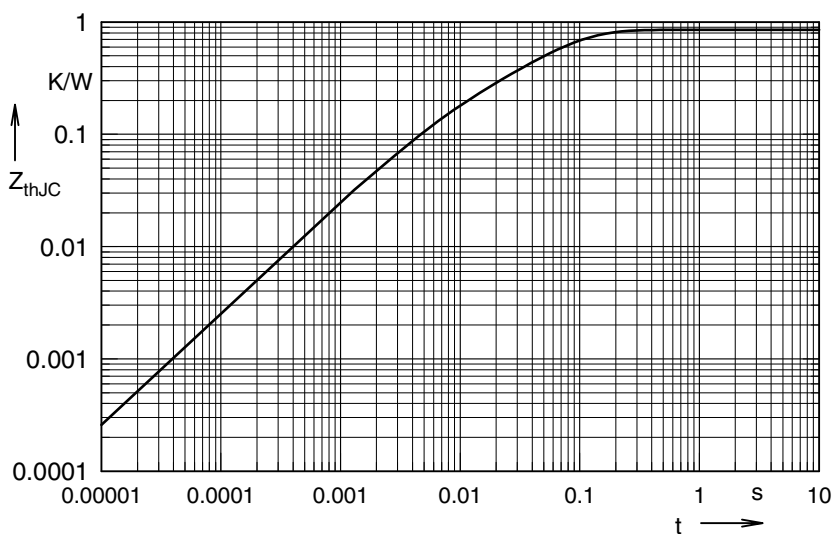


Fig. 6: typ. transient thermal impedance