

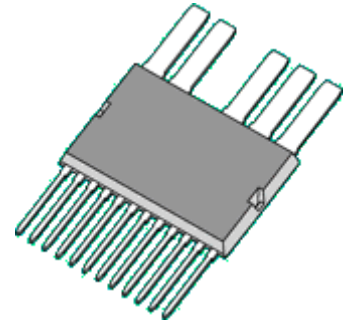
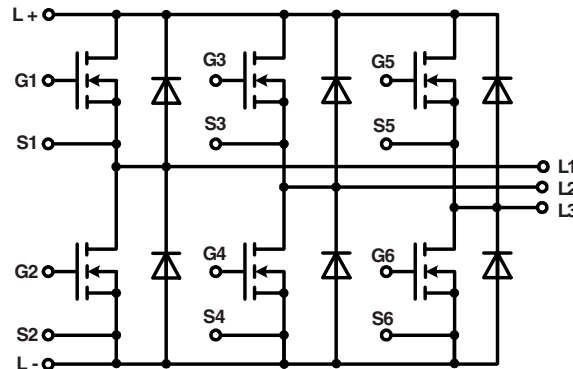
## Three phase full bridge with Trench MOSFETs in DCB isolated high current package

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

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

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

Preliminary data



### MOSFETs

Symbol	Conditions	Maximum Ratings	
$V_{DSS}$	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	55	V
$V_{GS}$		$\pm 20$	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

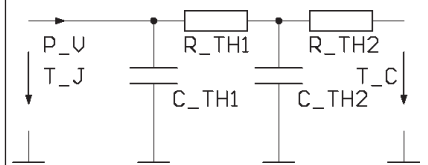
Symbol	Conditions	Characteristic Values ( $T_{VJ} = 25^{\circ}\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$R_{DSon}$	on chip level at $\left. \begin{array}{l} T_{VJ} = 25^{\circ}\text{C} \\ V_{GS} = 10 \text{ V} \end{array} \right\} T_{VJ} = 125^{\circ}\text{C}$		2.3 3.8	2.9 mΩ
$V_{GSth}$	$V_{DS} = 20 \text{ V}; I_D = 1 \text{ mA}$	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.

**Component**

Symbol	Conditions	Maximum Ratings	
$I_{RMS}$	per pin in main current paths (P+, N-, L <sub>1</sub> , L <sub>2</sub> , L <sub>3</sub> ) 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

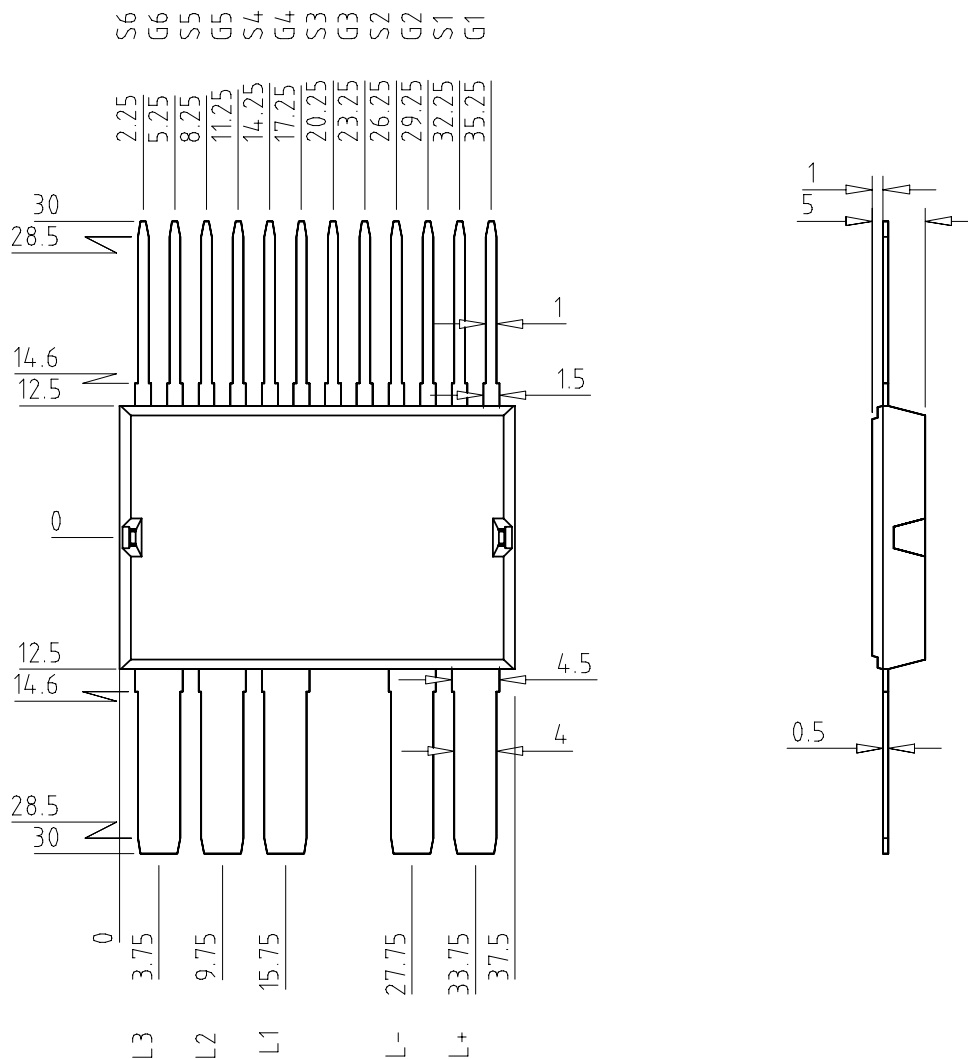
Symbol	Conditions	Characteristic Values		
		(T <sub>VJ</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
$R_{pin\ to\ chip}$			0.6	mΩ
$C_p$	coupling capacity between shorted pins and mounting tab in the case		160	pF
Weight	typ.		25	g

**Equivalent Circuits for Simulation**
**Thermal Response**


junction - case (typ.)

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

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

**Dimensions in mm (1 mm = 0.0394")**


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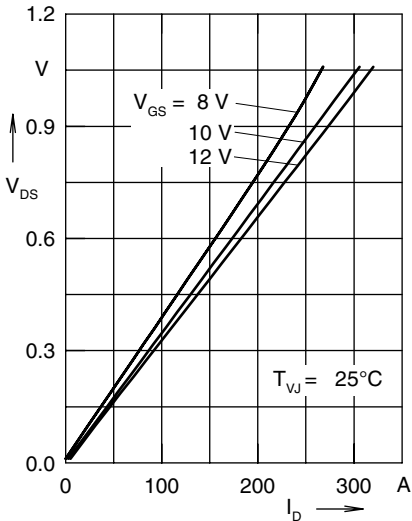


Fig. 1: typ. output characteristics  
 $[V_{DS} = I_D (R_{DSon} + 2x R_{pin\ to\ chip})]$

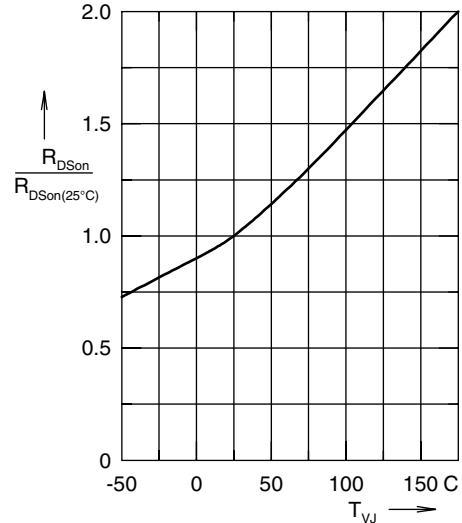


Fig. 2: typ. dependence of  $R_{DSon}$  on temperature

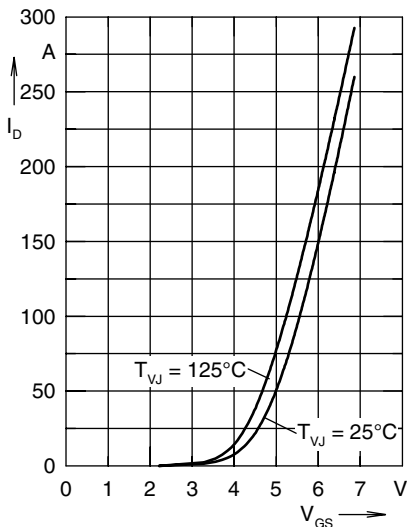


Fig. 3: typ. transfer characteristics

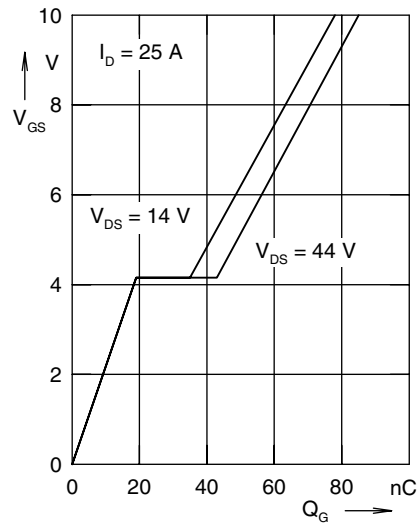


Fig. 4: typ. gate charge characteristics

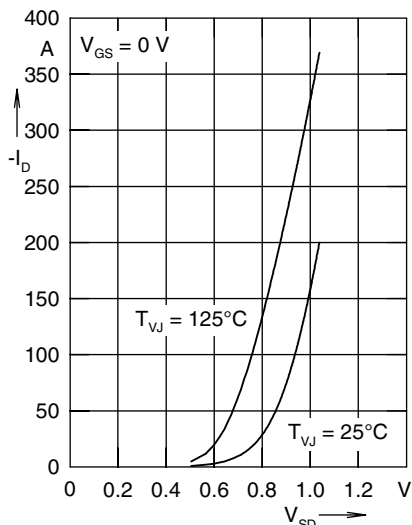


Fig. 5: typ. conduction characteristics of body diode

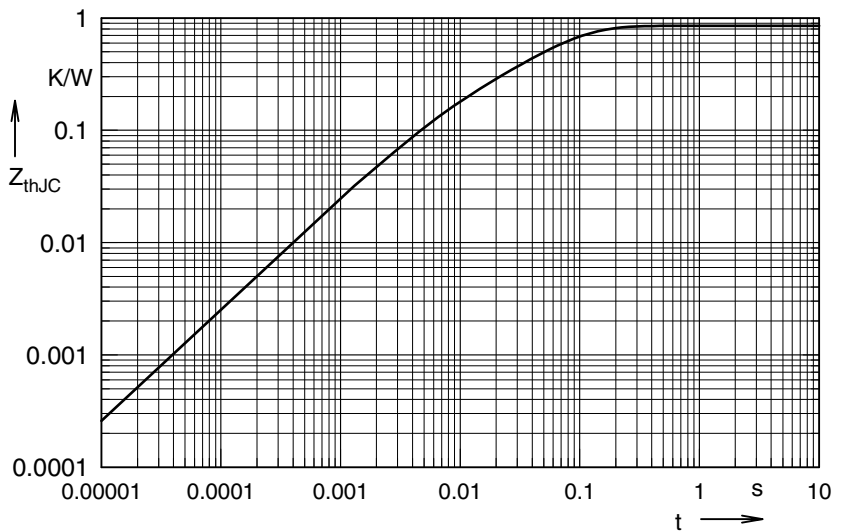


Fig. 6: typ. transient thermal impedance