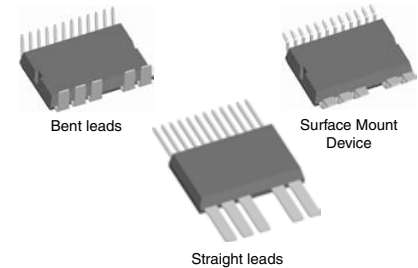
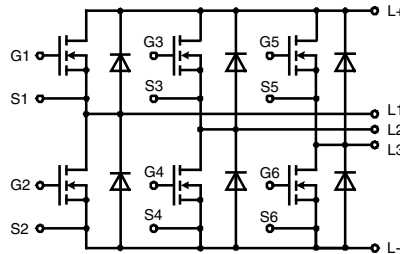


# Three phase full Bridge

with Trench MOSFETs  
in DCB isolated high current package

$V_{DSS} = 40\text{ V}$   
 $I_{D25} = 180\text{ A}$   
 $R_{DSon\ typ.} = 2.0\text{ m}\Omega$

Preliminary data



MOSFETs			
Symbol	Conditions	Maximum Ratings	
$V_{DSS}$	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	40	V
$V_{GS}$		$\pm 20$	V
$I_{D25}$	$T_C = 25^{\circ}\text{C}$	180	A
$I_{D90}$	$T_C = 90^{\circ}\text{C}$	138	A
$I_{F25}$	$T_C = 25^{\circ}\text{C}$ (diode)	115	A
$I_{F90}$	$T_C = 90^{\circ}\text{C}$ (diode)	75	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 300 A max.
  - aux. terminals for MOSFET control
  - terminals for soldering or welding connections
  - isolated DCB ceramic base plate with optimized heat transfer
- Space and weight savings

### Package options

- 3 lead forms available
  - straight leads (SL)
  - SMD lead version (SMD)
  - bent leads (BL)

Symbol	Conditions	Characteristic Values				
		$(T_{VJ} = 25^{\circ}\text{C}, \text{ unless otherwise specified})$				
		min.	typ.	max.		
$R_{DSon}$	on chip level at $V_{GS} = 10\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		2.0	2.6	$\text{m}\Omega$
		$T_{VJ} = 125^{\circ}\text{C}$		3.2		$\text{m}\Omega$
$V_{GS(th)}$	$V_{DS} = 20\text{ V}; I_D = 1\text{ mA}$	2		4	V	
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0\text{ V}$			1	$\mu\text{A}$	
			0.1		$\text{mA}$	
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}; V_{DS} = 0\text{ V}$			0.2	$\mu\text{A}$	
$Q_g$	$V_{GS} = 10\text{ V}; V_{DS} = 14\text{ V}; I_D = 25\text{ A}$		94		nC	
$Q_{gs}$			18		nC	
$Q_{gd}$			29		nC	
$t_{d(on)}$	$V_{GS} = 10\text{ V}; V_{DS} = 30\text{ V}$ $I_D = 25\text{ A}; R_G = 10\ \Omega$ inductive load		40		ns	
$t_r$			85		ns	
$t_{d(off)}$			140		ns	
$t_f$			90		ns	
$E_{on}$			tbd		mJ	
$E_{off}$		tbd		mJ		
$E_{recoff}$		tbd		mJ		
$R_{thJC}$	with heat transfer paste (IXYS test setup)			1.0	K/W	
$R_{thJH}$			1.3	1.6	K/W	

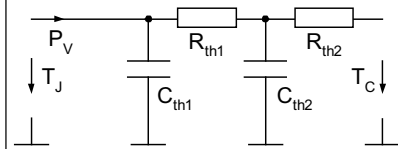
**Source-Drain Diode**

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
( $T_J = 25^\circ\text{C}$ , unless otherwise specified)					
$V_{SD}$	(diode) $I_F = 110\text{ A}$ ; $V_{GS} = 0\text{ V}$		1.0	1.6	V
$t_{rr}$	$I_F = 20\text{ A}$ ; $-di_F/dt = 100\text{ A}/\mu\text{s}$ ; $V_R = 20\text{ V}$		70		ns
$Q_{RM}$			tbd		$\mu\text{C}$
$I_{RM}$				tbd	

**Component**

Symbol	Conditions	Maximum Ratings	
$I_{RMS}$	per pin in main current paths (P+, N-, L1, L2, L3) may be additionally limited by external connections	300	A
$T_{VJ}$		-55...+175	$^\circ\text{C}$
$T_{stg}$		-55...+125	$^\circ\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}$ , 50/60 Hz, $f = 1\text{ minute}$	1000	V~
$F_C$	mounting force with clip	50 - 250	N

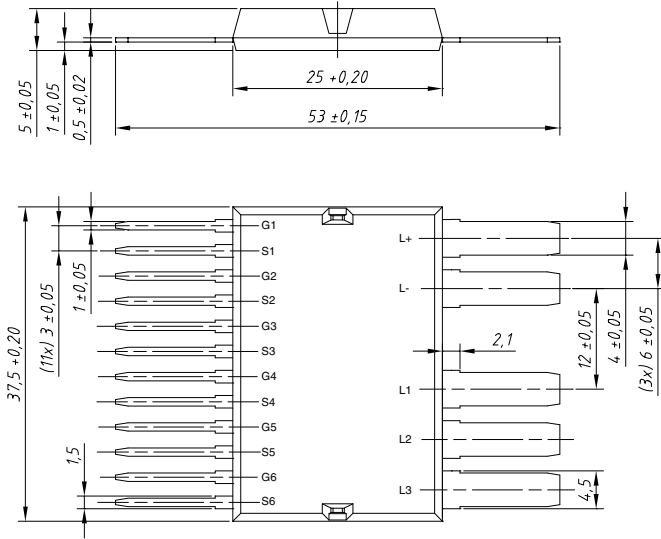
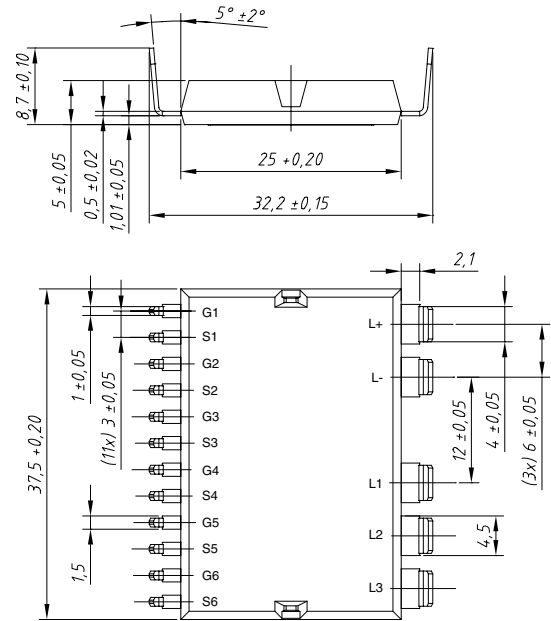
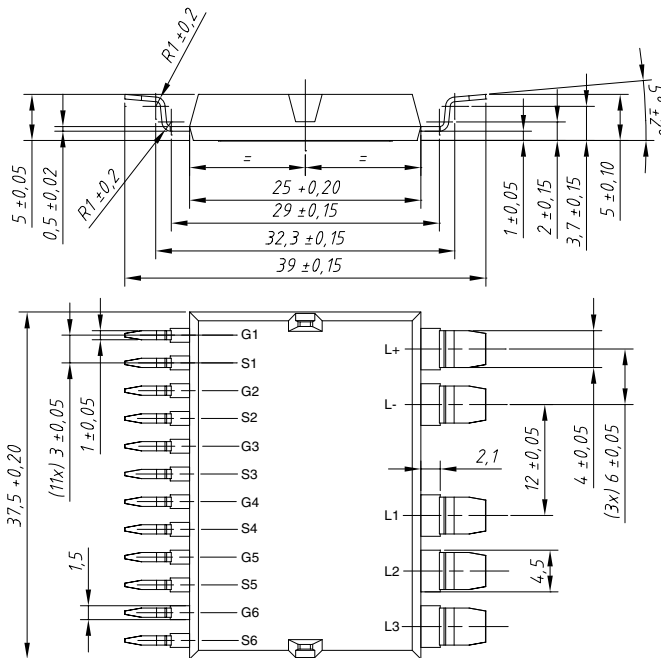
Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{pin\ to\ chip}$	with heatsink compound		0.6		$\text{m}\Omega$
$C_P$	coupling capacity between shorted pins and mounting tab in the case		160		pF
<b>Weight</b>	typ.		25		g

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


junction - case (typ.)

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

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

**Straight Leads GWM 220-003P3-SL**

**Bent Leads GWM 220-003P3-BL**

**Surface Mount Device GWM 220-003P3-SMD**


Leads	Ordering	Part Name & Packing Unit Marking	Part Marking	Delivering Mode	Base Qty.	Ordering Code
Straight	Standard	GWM 220-004P3 - SL	GWM 220-004P3	Blister	36	503 169
SMD	Standard	GWM 220-004P3 - SMD	GWM 220-004P3	Blister	36	503 176
Bent	Standard	GWM 220-004P3 - BL	GWM 220-004P3	Blister	36	contact factory

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

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