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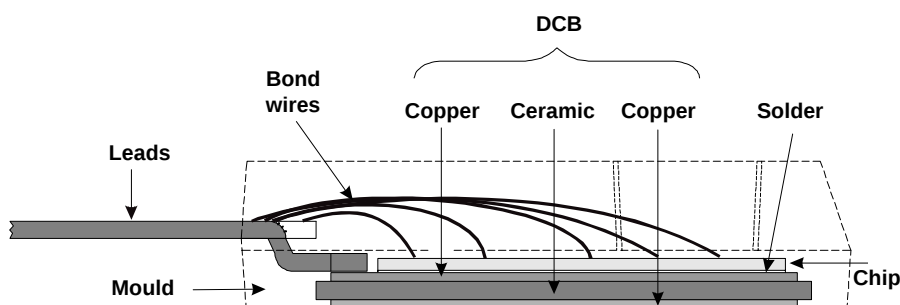
ISOPLUS247™ – ISOPLUS i4-PAC™ Isolated Discrete Packages

ISOPLUS247™ is the DCB isolated version of the PLUS247™-package (TO-247 without a mounting hole). The design of this new package (patent pending) is revolutionary: the silicon chip is soft soldered onto a Direct Copper Bond (DCB) substrate instead of the usual

copper lead frame. The DCB ceramic, the same substrate material used in the high power modules, not only provides high isolation capability ($2500 V_{RMS}$) but also unbeatable low thermal resistance compared to conventional, external mounted isolation materials.

While the junction-to-case thermal resistance is higher than an equivalent, non-isolated device, what really matter is the total thermal resistance from junction-to-heatsink (R_{thJH}). Comparing a device in ISOPLUS247™ to its companion in the non-isolated package with an external isolation foil, one can see that the overall R_{th} is now lower for the part in the already isolated package (see example).

Package cross section



Advantages:

- Isolation capability from leads to backside $2500 V_{RMS}$ – no external isolation foil needed
- Thermal resistance from Junction to Case only slightly higher as for non-isolated version
- Increased power- and temperature cycling capability
- DCB could be patterned like printed circuit boards – allowing special functions to be realized

Due to the matched thermal expansion coefficients of silicon and DCB ceramic, mechanical stress to the die and solder caused by power- and temperature cycling is reduced so that reliability is improved. Mounting is done with clips, which not only saves time but also guarantees constant pressure force over the whole lifetime of the assembly.

Parts in the ISOPLUS247™ housing can be identified by the letter “R” in the IXYS part number. Potentially all devices now encapsulated in TO-247, TO-264 and PLUS247™ housings can be molded in the ISOPLUS247™. There are already more than 50 different ISOPLUS247™ types available (see page A4-2).

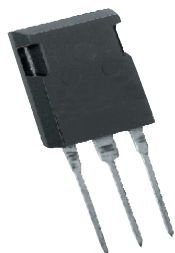
Another interesting feature is the capability to pattern the DCB substrate like a printed circuit board. Now additional special functions can be realized, e.g. the **series connection of single diode** chips within one package (see section D3: “HiPerDynFRED™”).

Example: ISOPLUS247™ compared to conventional isolated device

Type	Package	Isolation	R_{thJC} K/W	R_{thCK} K/W	Total K/W	Factor
IXFR 180N10	ISOPLUS247™	internal DCB	0.30	0.15	0.45	1.0
IXFX 180N10	PLUS247™	external foil	0.22	1.02	1.24	2.8

A larger version of this packaging technology named **ISOPLUS i4-PAC™** is also available. It will have up to five terminal pins, making it possible to build up full diode bridges, phase-leg transistor configurations, buck and boost converters and much more within one isolated discrete package. (see section A4-3)

- UL Recognized
- Patent Pending



FETs, IGBTs,
FREDs, SCHOTTKYS,
RECTIFIERS!!! The Works...

Isolating TO-247 power devices has never been easier when you use our new **ISOPLUS247™** products. They're internally isolated for you with our proprietary "integrated leadframe" using our DCB ceramic substrate as part of the package!

The result —

- **Excellent thermal transfer** (R_{thJS}),
- **High Isolation Voltage** ($V_{ISOL} > 2500V$)
- **Increased Temperature & Power Cycling capability**
- **Reduced EMI/RFI emissions** due to lower stray capacitance (junction to heatsink).

PRODUCT	PART NUMBER	V	I	R _{on}	PRODUCT	PART NUMBER	V	I	V _{CE(SAT)}	t _{fi}
MOSFET	IXFR 180N07	70V	180A	0.006	IGBT	IXGR 12N60C	600V	15A	2.1V	55ns
	IXFR 180N085	85V	180A	0.007		IXGR 24N60B	600V	48A	2.5V	80ns
	IXFR 75N10Q	100V	75A	0.02		IXGR 24N60C	600V	42A	2.5V	60ns
	IXFR 80N10Q	100V	80A	0.015		IXGR 32N60C	600V	45A	2.5V	55ns
	IXFR 180N10	100V	165A	0.008		IXGR 50N60B	600V	75A*	2.5V	150ns
	IXFR 70N15	150V	68A	0.028		IXGR 80N60B	600V	75A*	2.5V	150ns
	IXFR 150N15	150V	105A	0.0125		IXGR 35N120B	1200V	70A	3.3V	160ns
	IXFR 58N20Q	250V	56A	0.04		IXGR 35N120C	1200V	70A	4.0V	105ns
	IXFR 80N20Q	200V	71A	0.028		IXGR 45N120	1200V	75A	2.5V	390ns
	IXFR 90N20Q	200V	90A	0.022	IGBT + FRED	IXGR 60N60U1	600V	75A	1.7V	500ns
	IXFR 120N20	200V	105A	0.017		IXGR 24N60CD1	600V	42A	2.5V	55ns
	IXFR 100N25	250V	83A	0.027		IXGR32N60CD1	600V	45A	2.5V	55ns
	IXFR 52N30Q	300V	48A	0.06		IXSR 40N60BD1	600V	70A	2.2V	120ns
	IXFR 90N30	300V	75A	0.033		IXSR 40N60CD1	600V	70A	2.5V	70ns
	IXFR 13N50	500V	13A	0.4		IXSR35N120B01	1200V	70A	3.5V	180ns
	IXFR 26N50Q	500V	24A	0.2		IXDR 30N120D1	1200V	38A	2.4V	50ns
	IXFR 32N50Q	500V	30A	0.15						
	IXFR 50N50	500V	43A	0.1						
	IXFR 55N50	500V	48A	0.08						
	IXFR 26N60Q	600V	24A	0.25						
	IXFR 44N60	600V	37A	0.13						
	IXFR 9N80Q	800V	7.5A	1.1						
	IXFR 15N80Q	800V	13A	0.6						
	IXFR 27N80Q	800V	21A	0.31						
	IXFR 34N80	800V	28A	0.24						
	IXFR 24N90Q	900V	24A	0.4						
	IXFR 25N90	900V	20A	0.33						
	IXFR 10N100Q	1000V	9A	1.2						
IXFR 12N100Q	1000V	10A	1.05							
IXFR 21N100Q	1000V	19A	0.5							
IXFR 24N100	1000V	28A	0.39							

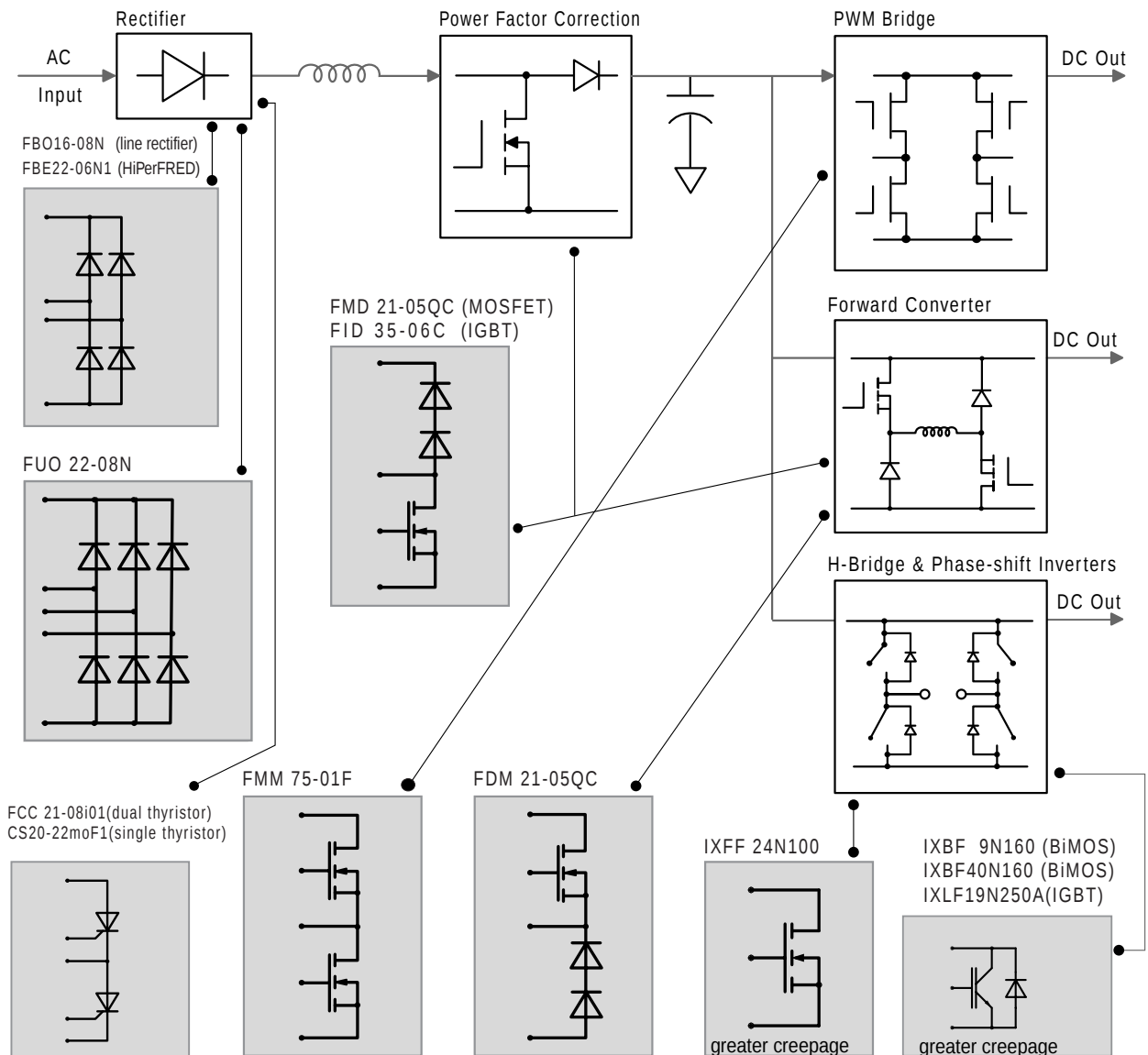
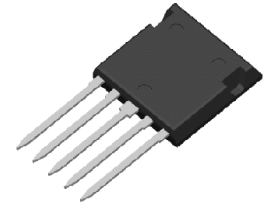
PRODUCT	PART NUMBER	V	I	V _{CE(SAT)}	t _{fi}	
IGBT + FRED	IXGR 60N60U1	600V	75A	1.7V	500ns	
	IXGR 24N60CD1	600V	42A	2.5V	55ns	
	IXGR32N60CD1	600V	45A	2.5V	55ns	
	IXSR 40N60BD1	600V	70A	2.2V	120ns	
	IXSR 40N60CD1	600V	70A	2.5V	70ns	
	IXSR35N120B01	1200V	70A	3.5V	180ns	
	IXDR 30N120D1	1200V	38A	2.4V	50ns	
PRODUCT	PART NUMBER	V	I	V _F	trr	
UltraFast RECTIFIERS	DSEK 60-02AR	200V	2x34A	0.85V	35ns	
	DSEC 60-03AR	300V	2x30A	0.91V	30ns	
	DSEP 9-06CR	600V	9A	2.9V	15ns	
	DSS 17-06CR	600V	17A	2.8V	15ns	
	DSEP 30-06BR	600V	30A	1.56V	30ns	
	DSEI 30-10AR	1000V	30A	2.0V	35ns	
	DSEP 15-12CR	1200V	15A	2.7V	20ns	
	DSEP 30-12CR	1200V	30A	2.5V	20ns	
	DSEP 30-12AR	1200V	30A	1.79V	40ns	
	DSEP 60-12AR	1200V	60A	1.74V	40ns	
SCHOTTKY	DSSK 60-015AR	150V	2x30A	0.69V		
RECTIFIERS	DSP25-16AR	1600V	2x28A	1.6V		
	DSI 45-16AR	1600V	48A	1.1V		

Note: "Q" - low gate charge FETs.
IGBT: "C" - light speed IGBT's
U1, D1 suffix - FRED or HiPerFRED™

Coming Soon... ISOPLUS220™!!!

- See Application note : "Combining the features of modules and discretes in a new Power Semiconductor packages" in section M for general description of the packaging technologies.
- See Alphanumeric index A1 for the page number of the particular product.

- 3,4 and 5 leaded packages for various circuit topologies
- DCB base plate : - 2500V electrical isolation
 - low thermal resistance
 - saves space
 - replaces multiple discretes
 - reduces parasitic inductance and capacitance



- See Application note : "Combining the features of modules and discretes in a new Power Semiconductor packages" in section M for general description of the packaging technologies.
- See Alphanumeric index A1 for the page number of the particular product.