Data Sheet No. PD-5.013B

International
IOR Rectifier

T-39-27

HEXFET® Power Module

CPY100 Series
Power Half-Bridges

Description/Features

The CPY100 series of HEXFET power modules are intended for use in power supply and motor control applications. These modules are offered in voltages of 250 and 500V, with current ratings up to 19.0 amperes.

The CPY100 series simplifies circuit design and construction by replacing four discrete devices with a single, electrically-isolated and tested part. Zener diodes included across the gate of each HEXFET greatly reduce the risk of electrostatic discharge damage.

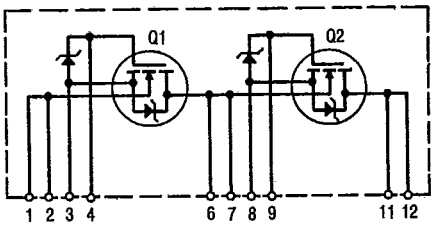
These modules minimize the space requirements of your power components while also serving to simplify thermal management and reduce assembly time and cost.

Typical Applications:

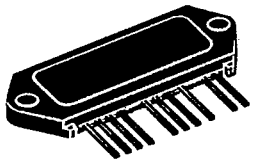
- Switching power supplies
- UPS systems
- AC or DC motor control
- High voltage amplifiers

Product Summary

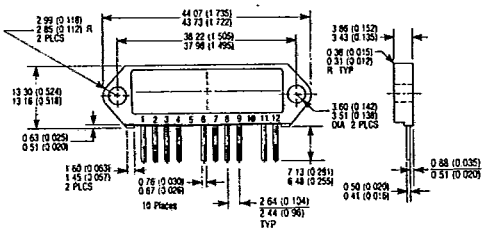
Part Number	V_{DS}	R_{DS} (on)	I_D
CPY135P	250V	0.14Ω	19.0A
CPY155P	500V	0.40Ω	12.0A



Circuit Schematic



Powerline 1



Dimensions in millimeters and (inches)

Absolute Maximum Ratings

Parameter	CPY135P	CPY155P	Units	Conditions/Notes
Breakdown Voltage	250	500	V	
Gate-to-Source Voltage	±20			
Continuous Current	19.0	12.0	A	Any two complementary devices, T_C = 25°C
	17.5	10.7		Any two complementary devices, T_C = 45°C
	12.0	7.4		Any two complementary devices, T_C = 100°C
Operating & Storage Temperature	−40 to +150		°C	
Lead Temperature	300			1.6mm (0.063") from case for 10 sec
Mounting Torque	2.5 to 3.5		in • lb	For mounting & assy recommendations, see page 73
RMS Isolation Voltage	2500		V	Any pin to case

HEXFET Electrical Characteristics @ T_C = 25°C (Unless otherwise specified)

Parameter		Type	CPY135P	CPY155P	Units	Conditions/Note
BV_{DSS}	Min. Drain Source Breakdown	N-Channel	250	500	V	V_{GS} = 0, I_D = 250 μA, T_J = 25°C to 150°C
$V_{GS(th)}$	Gate Threshold Voltage	N-Channel	2.0 to 4.0			V_{DS} = V_{GS}, I_D = 250 μA
I_{GSS}	Max. Gate Source Leakage, Forward Voltage	N-Channel	500		nA	V_{GS} = 20V
	Max. Gate Source Leakage, Reverse Voltage	N-Channel	−500			V_{GS} = −20V
I_{DSS}	Max. Zero Gate Voltage Drain Current	N-Channel	250		μA	V_{DS} = Max. Rating, V_{GS} = 0V
		N-Channel	1000			V_{DS} = Max. Rating x 80%, V_{GS} = 0V, T_J = 125°C
$R_{DS(on)}$	Max. Static Drain-Source On-State Resistance of Die	N-Channel	0.14	0.40	Ω	V_{GS} = 10V, Pulse Test: Pulse Width ≤ 300 μs, duty cycle ≤ 2%
R_P	Max. Resistance Contribution of Package		—			
g_{fs}	Min. Forward Transconductance	N-Channel	11.0	8.7	S(℧)	V_{DS} = 2 x V_{GS}, I_{DS} = Max. I_D Rating @ 100°C

HEXFET Dynamic Characteristics @ T_C = 25°C (Unless otherwise specified)

Parameter		Type	CPY135P	CPY155P	Units	Conditions/Note
C_{iss}	Typical Input Capacitance	N-Channel	2700	2700	pF	V_{GS} = 0V, V_{DS} = 25V, f = 1.0 MHz
C_{oss}	Typical Output Capacitance	N-Channel	580	350		
C_{rss}	Typical Reverse Transfer Capacitance	N-Channel	130	75		
$t_{d(on)}$	Max. Turn-on Delay Time	N-Channel	29	27	nS	V_{DD} = 50% of Rated Value, I_D = Max. Cont. Rating (MOSFET switching times are essentially independent of operating temperature).
t_r	Max. Rise Time	N-Channel	130	66		
$t_{d(off)}$	Max. Turn-off Delay Time	N-Channel	110	100		
t_f	Max. Fall Time	N-Channel	98	60		
Q_g	Max. Total Gate Charge	N-Channel	130	130	nC	V_{GS} = 10V, I_D = Max. Cont. Rating, V_{DS} = Max. Rating x 80%. (Gate charge is essentially independent of operating temperature).
Q_{gs}	Typical Gate-to-Source Charge	N-Channel	14	11		
Q_{gd}	Typical Gate-to-Drain ("Miller") Charge	N-Channel	73	43		

Source-Drain Diode Electrical Characteristics @ T_C = 25°C (Unless otherwise specified)

Parameter		Type	CPY135P	CPY155P	Units	Conditions/Note
I_S	Max. Continuous Source Current (Body Diode)		19.0	12.0	A	
V_{SD}	Max. Diode Forward Voltage	N-Channel	1.8	1.4	V	V_{GS} = 0V, I_S = Max. Rating, T_J = 25°C
t_{rr}	Max. Reverse Recovery Time	N-Channel	650	1200	nS	I_F = I_S Max. Rating, dI_F/dt = 100 A/μS, T_J = 25°C
Q_{RR}	Max. Reverse Recovery Charge	N-Channel	8.4	14.0	μC	

Thermal Characteristics

Parameter		CPY135P	CPY155P	Units	Conditions/Notes
R_{thJC}	Max. Thermal Resistance Junction-to-Case	1.0	1.0	°C/W	Any one device
R_{thJA}	Typical Thermal Resistance Junction-to-Ambient	50	50		
P_D	Max. Power Dissipation	100	100	W	Any one device, T_C = 25°C

For additional HEXFET charateristics, the electrical characteristic curves located from pages 37 to 72 can be referenced. This data represents the typical performance of each of the HEXFET die included in these power modules.

Parameter	Type	CPY135P	CPY155P	Units	Conditions/Notes
HEXFET Electrical Characteristic Curves	N-Channel	IRFC254 See page 53	IRFC450 See page 59	—	

These power modules can be manufactured in a variety of voltages and on-resistances along with substituted or additional components. For additional information on these semi-custom possibilities, refer to the Custom Capabilities section on page ix.