

T-39-27

Data Sheet No. PD-5.017C

International
Rectifier

HEXFET® Power Module

CPX200 Series
Power H-Bridges

Description/Features

The CPX200 series of HEXFET power modules are intended for use in power supply and motor control applications. Connected in an H-bridge configuration, these modules are offered in voltages of 250 and 500V, with current ratings up to 10.4 amperes.

The CPX200 series simplifies circuit design and construction by replacing four discrete devices with a single, electrically-isolated and tested part.

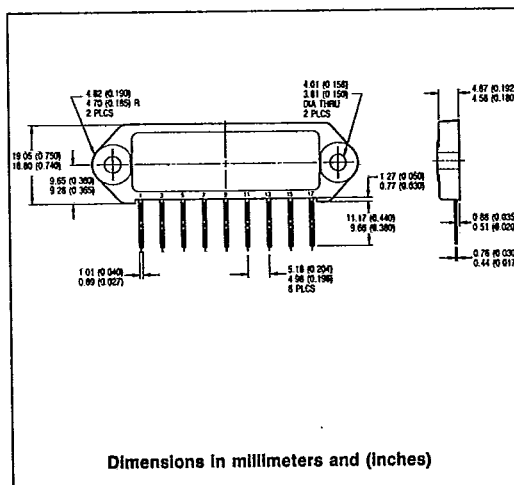
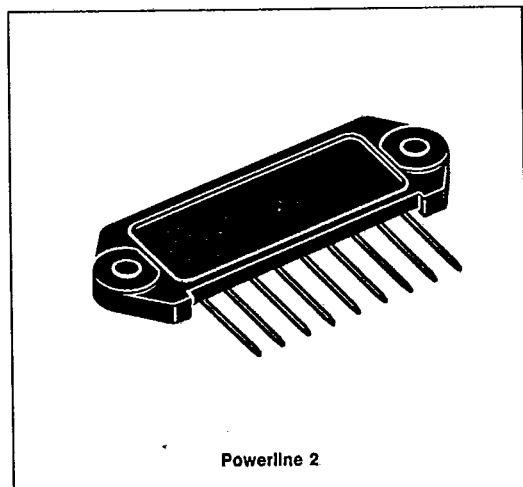
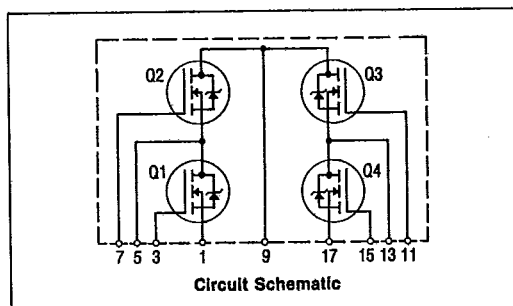
These modules minimize the space requirements of your power components while also serving to simplify thermal management and reduce assembly time and cost.

Typical Applications:

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

Product Summary

Part Number	VDS	RDS (on)	ID
CPX233A	250V	0.45Ω	6.5A
CPX234A	250V	0.28Ω	10.4A
CPX253A	500V	1.5Ω	3.7A
CPX254A	500V	0.85Ω	5.8A



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Absolute Maximum Ratings

Parameter	CPX233A	CPX234A	CPX253A	CPX254A	Units	Conditions/Notes
Breakdown Voltage	250	250	500	500	V	
Gate-to-Source Voltage	±20					
Continuous Current	6.5	10.4	3.7	5.8	A	Any two complementary devices, T _C = 25°C
	5.9	9.5	3.3	5.3		Any two complementary devices, T _C = 45°C
	4.0	6.6	2.3	3.7		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	5.0 to 7.0				in • lb	For mounting & assy recommendations, see page 73
RMS Isolation Voltage	2500				V	Any pin to case

HEXFET Electrical Characteristics @ $T_C = 25^\circ\text{C}$ (Unless otherwise specified)

Parameter	Type	CPX233A	CPX234A	CPX253A	CPX254A	Units	Conditions/Note
BV_{DSS} Min. Drain Source Breakdown	N-Channel	250	250	500	500	V	$V_{GS} = 0, I_D = 250 \mu A, T_J = 25^{\circ}C \text{ to } 150^{\circ}C$
$V_{GS(th)}$ Gate Threshold Voltage	N-Channel	2.0 to 4.0					$V_{DS} = V_{GS}, I_D = 250 \mu A$
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	$V_{DS} = \text{Max. Rating}, V_{GS} = 0V$
	N-Channel	1000					$V_{DS} = \text{Max. Rating} \times 80\%, V_{GS} = V, T_J = 125^{\circ}C$
$R_{DS(on)}$ Max. Static Drain-Source On-State Resistance of Die	N-Channel	0.45	0.28	1.5	0.85	Ω	$V_{GS} = 10V, \text{Pulse Test: Pulse Width} \leq 300 \mu s, \text{duty cycle} \leq 2\%$
R_p Max. Resistance Contribution of Package		—					
g_{fs} Min. Forward Transconductance	N-Channel	2.9	6.7	2.7	4.9	S(10)	$V_{DS} = 2 \times V_{GS}, I_{DS} = \text{Max. } I_D \text{ Rating @ } 100^{\circ}C$

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HEXFET Dynamic Characteristics @ $T_C = 25^\circ\text{C}$ (Unless otherwise specified)

Parameter	Type	CPX233A	CPX234A	CPX253A	CPX254A	Units	Conditions/Note
C_{iss} Typical Input Capacitance	N-Channel	600	1300	610	1300	pF	$V_{GS} = 0V, V_{DS} = 25V, f = 1.0 \text{ MHz}$
C_{oss} Typical Output Capacitance	N-Channel	180	320	91	180		
C_{rss} Typical Reverse Transfer Capacitance	N-Channel	52	69	18	45		
$t_{d(on)}$ Max. Turn-on Delay Time	N-Channel	14	24	17	21	nS	$V_{DD} = 50\%$ of Rated Value, $I_D = \text{Max. Cont. Rating}$ (MOSFET switching times are essentially independent of operating temperature).
t_r Max. Rise Time	N-Channel	35	100	23	35		
$t_{d(off)}$ Max. Turn-off Delay Time	N-Channel	47	80	53	74		
t_f Max. Fall Time	N-Channel	29	74	23	30		
Q_g Max. Total Gate Charge	N-Channel	35	59	32	63	nC	$V_{GS} = 10V, I_D = \text{Max. Cont. Rating},$ $V_{DS} = \text{Max. Rating} \times 80\%.$ (Gate charge is essentially independent of operating temperature).
Q_{gs} Typical Gate-to-Source Charge	N-Channel	5.1	6.6	3.2	6.2		
Q_{gd} Typical Gate-to-Drain ("Miller") Charge	N-Channel	12	20	11	22		

Source-Drain Diode Electrical Characteristics @ $T_C = 25^\circ\text{C}$ (Unless otherwise specified)

Parameter		CPX233A	CPX234A	CPX253A	CPX254A	Units	Conditions/Note
I_S Max. Continuous Source Current (Body Diode)		6.5	10.4	3.7	5.8	A	
V_{SD} Max. Diode Forward Voltage		2.0	1.8	1.6	2.0	V	$V_{GS} = 0V, I_S = \text{Max. Rating}, T_J = 25^\circ\text{C}$
t_{rr} Max. Reverse Recovery Time		390	640	760	970	nS	$I_F = I_S \text{ Max. Rating}, dI_F/dt = 100 \text{ A}/\mu\text{S},$ $T_J = 25^\circ\text{C}$
Q_{RR} Max. Reverse Recovery Charge		2.7	7.2	4.3	8.9	μC	

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Thermal Characteristics

Parameter	CPX233A	CPX234A	CPX253A	CPX254A	Units	Conditions/Notes
R_{thJC} Max. Thermal Resistance Junction-to-Case	2.6	1.8	2.6	1.8	°C/W	Any one device
R_{thJA} Typical Thermal Resistance Junction-to-Ambient	40	40	40	40		
P_D Max. Power Dissipation	48	69	48	69	W	Any one device, $T_C = 25^\circ\text{C}$

For additional HEXFET characteristics, 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	CPX233A	CPX234A	CPX253A	CPX254A	Conditions/Notes
HEXFET Electrical Characteristic Curves	IRFC234 See page 49	IRFC244 See page 51	IRFC430 See page 55	IRFC440 See page 57	

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.