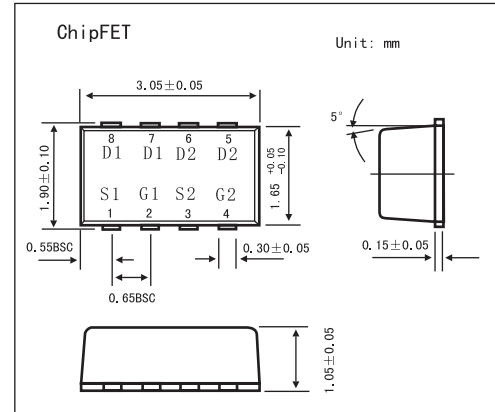


Silicon P, N Channel MOS Type Transistor

KPCF8402

■ Features

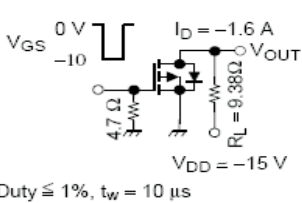
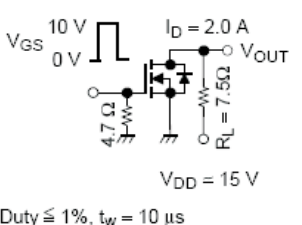
- Low drain-source ON resistance
 - : P Channel $R_{DS(ON)} = 60 \text{ m}\Omega$ (typ.)
 - N Channel $R_{DS(ON)} = 38 \text{ m}\Omega$ (typ.)
- High forward transfer admittance
 - : P Channel $|Y_{fs}| = 5.9 \text{ S}$ (typ.)
 - N Channel $|Y_{fs}| = 6.8 \text{ S}$ (typ.)
- Low leakage current
 - : P Channel $I_{DSS} = -10 \mu\text{A}$ ($V_{DS} = -30 \text{ V}$)
 - N Channel $I_{DSS} = 10 \mu\text{A}$ ($V_{DS} = 30 \text{ V}$)
- Enhancement-mode
 - : P Channel $V_{th} = -0.8 \text{ to } -2.0 \text{ V}$ ($V_{DS} = -10 \text{ V}$, $I_D = -1\text{mA}$)
 - N Channel $V_{th} = 1.3 \text{ to } 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1\text{mA}$)

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter		Symbol	P-Channel	N-Channel	Unit
Drain-source voltage		V_{DSS}	-30	30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	-30	30	V
Gate-source voltage		V_{GSS}	± 20	± 20	V
Drain current	DC (Note 1)	I_D	-3.2	4	A
	Pulse (Note 1)	I_{DP}	-12.8	16	A
Drain power dissipation ($t = 5 \text{ s}$)	Single-device operation (Note 3a)	$P_D(1)$	1.35	1.35	W
	Single-device value at dual operation (Note 3b)	$P_D(2)$	1.12	1.12	
Drain power dissipation ($t = 5 \text{ s}$) (Note 2b)	Single-device operation (Note 3a)	$P_D(1)$	0.53	0.53	
	Single-device value at dual operation (Note 3b)	$P_D(2)$	0.33	0.33	
Single pulse avalanche energy (Note 4)		E_{AS}	0.67	2.6	mJ
Avalanche current		I_{AR}	-1.6	2	A
Repetitive avalanche energy Single-device value at dual operation (Note 2a, 3b, 5)		E_{AR}	0.11		mJ
Channel temperature		T_{ch}	150		$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150		$^\circ\text{C}$
Thermal resistance, channel to ambient ($t = 5 \text{ s}$) (Note 2a)	Single-device operation (Note 3a)	$R_{th(ch-a)(1)}$	92.6		$^\circ\text{C/W}$
	Single-device value at dual operation (Note 3b)	$R_{th(ch-a)(2)}$	111.6		
Thermal resistance, channel to ambient ($t = 5 \text{ s}$) (Note 2b)	Single-device operation (Note 3a)	$R_{th(ch-a)(1)}$	235.8		
	Single-device value at dual operation (Note 3b)	$R_{th(ch-a)(2)}$	378.8		

KPCF8402

■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit	
Gate leakage current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA	
		V _{GS} = ±16 V, V _{DS} = 0 V			10	μA	
Drain cut-off current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			-10	μA	
		V _{DS} = 30 V, V _{GS} = 0 V			10	μA	
Drain-source breakdown voltage	V (BR) DSS	I _D = -10 mA, V _{GS} = 0 V	-30			V	
	V (BR) DSX	I _D = -10 mA, V _{GS} = 20 V	-15			V	
Drain-source breakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	30			V	
	V (BR) DSX	I _D = 10 mA, V _{GS} = -20 V	15			V	
Gate threshold voltage	V _{th}	V _{DS} = -10 V, I _D = -1 mA	-0.8		-2.0	V	
		V _{DS} = 10 V, I _D = 1 mA	1.3		2.5	V	
Drain-source ON resistance	R _{DS (ON)}	V _{GS} = -4.5 V, I _D = -1.6 A		80	105	mΩ	
		V _{GS} = -10 V, I _D = -1.6 A		60	72	mΩ	
Drain-source ON resistance	R _{DS (ON)}	V _{GS} = 4.5 V, I _D = 2.0 A		58	77	mΩ	
		V _{GS} = 10 V, I _D = 2.0 A		38	50	mΩ	
Forward transfer admittance	Y _{fs}	V _{DS} = -10 V, I _D = -1.6 A	2.9	5.9		S	
		V _{DS} = 10 V, I _D = 2.0 A	3.4	6.8		S	
Input capacitance	C _{iss}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1 MHz		600		pF	
Reverse transfer capacitance	C _{rss}			60			
Output capacitance	C _{oss}			70			
Input capacitance	C _{iss}		V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		470		pF
Reverse transfer capacitance	C _{rss}				60		
Output capacitance	C _{oss}				80		
Switching time Rise time	t _r			5.3	ns		
Switching time Turn-on time	t _{on}			12			
Switching time Fall time	t _f			8.4			
Switching time Turn-off time	t _{off}			34			
Switching time Rise time	t _r			5.2	ns		
Switching time Turn-on time	t _{on}			8.3			
Switching time Fall time	t _f			4.0			
Switching time Turn-off time	t _{off}			22			
Total gate charge (gate-source plus gate-drain)	Q _g			14		nC	
Gate-source charge 1	Q _{gs1}	V _{DD} = -24V, V _{GS} = -10V, I _D = -3.2A		1.4			
Gate-drain (Gate-source charge "miller") charge	Q _{gd}			2.7			

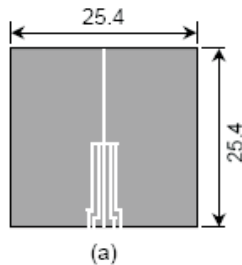
KPCF8402

■ Electrical Characteristics $T_a = 25^\circ\text{C}$

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD}=24\text{V}, V_{GS}=10\text{V}, I_D=6\text{A}$		10		nC
Gate-source charge 1	Q_{gs1}			1.7		
Gate-drain ("miller") charge	Q_{gd}			2.4		
Drain reverse current Pulse (Note 1)	I_{DRP}		P-Ch		-12.8	A
					16	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = -3.2\text{ A}, V_{GS} = 0\text{ V}$	N-Ch		1.2	V
		$I_{DR} = 4.0\text{ A}, V_{GS} = 0\text{ V}$			-1.2	V

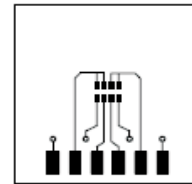
Note 1: Please use devices on condition that the channel temperature is below 150°C .

Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



(a)

FR-4
25.4 × 25.4 × 0.8
(Unit: mm)



(b)

FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

- Note 3: a) The power dissipation and thermal resistance values are shown for a single device (During single-device operation, power is only applied to one device.)
b) The power dissipation and thermal resistance values are shown for a single device (During dual operation, power is evenly applied to both devices.)

Note 4: P Channel: $V_{DD} = -24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 0.2\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = -1.6\text{ A}$
N Channel: $V_{DD} = 24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 0.5\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = 2.0\text{ A}$

Note 5: Repetitive rating; Pulse width limited by Max. Channel temperature.

Note 6: Black round marking "•" locates on the left lower side of parts number marking "F6B indicates terminal No. 1.

■ Circuit Configuration

