

MFE2004 (SILICON)

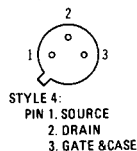
MFE2005

MFE2006

Silicon N-channel depletion mode (Type A) junction field-effect transistors designed for chopper applications.



CASE 22
(TO-18)



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	Vdc
Drain-Gate Voltage	V_{DG}	30	Vdc
Gate-Source Voltage	V_{GS}	30	Vdc
Forward Gate Current	$I_{G(f)}$	10	mAdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.8 10	Watts mW/ $^\circ\text{C}$
Operating Junction Temperature Range	T_J	-65 to +175	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Gate-Source Breakdown Voltage ($I_G = 1.0 \mu\text{Adc}$, $V_{DS} = 0$)	$V_{(BR)GSS}$	30	-	Vdc
Gate Reverse Current ($V_{GS} = 20 \text{ Vdc}$, $V_{DS} = 0$ ($V_{GS} = 20 \text{ Vdc}$, $V_{DS} = 0$, $T_A = 150^\circ\text{C}$)	I_{GSS}	- -	0.2 0.4	nAdc μAdc
Drain Cutoff Current ($V_{DS} = 20 \text{ Vdc}$, $V_{GS} = 12 \text{ Vdc}$ ($V_{DS} = 20 \text{ Vdc}$, $V_{GS} = 12 \text{ Vdc}$, $T_A = 150^\circ\text{C}$)	$I_{D(off)}$	- -	0.2 0.4	nAdc μAdc

ON CHARACTERISTICS

Zero-Gate Voltage Drain Current ⁽¹⁾ ($V_{DS} = 20 \text{ Vdc}$, $V_{GS} = 0$)	MFE2004 MFE2005 MFE2006	I_{DSS}	8.0 15 30	- - -	mAdc
Gate-Source Voltage ($V_{DS} = 20 \text{ Vdc}$, $I_D = 50 \mu\text{Adc}$)	MFE2004 MFE2005 MFE2006	V_{GS}	1.0 2.0 5.0	6.0 8.0 10	Vdc
Gate-Source Forward Voltage ($I_G = 1.0 \text{ mAdc}$, $V_{DS} = 0$)		V_{GSF}	-	1.0	Vdc
Drain-Source "ON" Voltage ($I_D = 3.0 \text{ mAdc}$, $V_{GS} = 0$) ($I_D = 6.0 \text{ mAdc}$, $V_{GS} = 0$) ($I_D = 10 \text{ mAdc}$, $V_{GS} = 0$)	MFE2004 MFE2005 MFE2006	$V_{DS(on)}$	- - -	0.4 0.4 0.4	Vdc
Static Drain-Source "ON" Resistance ($I_D = 1.0 \text{ mAdc}$, $V_{GS} = 0$)	MFE2004 MFE2005 MFE2006	$r_{DS(on)}$	- - -	80 50 30	Ohms

⁽¹⁾Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 3.0\%$.

MFE2004, MFE2005, MFE2006 (continued)
ELECTRICAL CHARACTERISTICS (continued)

Characteristic	Symbol	Min	Max	Unit
SMALL-SIGNAL CHARACTERISTICS				
Static Drain-Source "ON" Resistance ($V_{GS} = 0$, $I_D = 0$, $f = 1.0$ kHz)	$r_{ds(on)}$	-	80	Ohms
Input Capacitance ($V_{DS} = 0$, $V_{GS} = -12$ Vdc, $f = 1.0$ MHz)	C_{iss}	-	16	pF
Reverse Transfer Capacitance ($V_{DS} = 0$, $V_{GS} = 6.0$ Vdc, $f = 1.0$ MHz)	C_{rss}	-	5.0	pF
($V_{DS} = 0$, $V_{GS} = 8.0$ Vdc, $f = 1.0$ MHz)		-	5.0	
($V_{DS} = 0$, $V_{GS} = 12$ Vdc, $f = 1.0$ MHz)		-	5.0	

SWITCHING CHARACTERISTICS

Turn-On Delay Time (See Figure 1) ($V_{DD} = 3.0$ Vdc, $I_D = 3.0$ mA, $V_{GS} = 0$)	MFE2004	$t_{d(on)}$	-	20	ns
($V_{DD} = 3.0$ Vdc, $I_D = 6.0$ mA, $V_{GS} = 0$)	MFE2005		-	15	
($V_{DD} = 3.0$ Vdc, $I_D = 10$ mA, $V_{GS} = 0$)	MFE2006		-	10	
Rise Time (See Figure 1) ($V_{DD} = 3.0$ Vdc, $I_D = 3.0$ mA, $V_{GS} = 0$)	MFE2004	t_r	-	40	ns
($V_{DD} = 3.0$ Vdc, $I_D = 6.0$ mA, $V_{GS} = 0$)	MFE2005		-	20	
($V_{DD} = 3.0$ Vdc, $I_D = 10$ mA, $V_{GS} = 0$)	MFE2006		-	10	
Turn-Off Time (See Figure 1) ($V_{DD} = 3.0$ Vdc, $I_D = 3.0$ mA, $V_{GS(off)} = 6.0$ Vdc)	MFE2004	t_{off}	-	80	ns
($V_{DD} = 3.0$ Vdc, $I_D = 6.0$ mA, $V_{GS(off)} = 8.0$ Vdc)	MFE2005		-	60	
($V_{DD} = 3.0$ Vdc, $I_D = 10$ mA, $V_{GS(off)} = 12$ Vdc)	MFE2006		-	40	

FIGURE 1 – SWITCHING TIMES TEST CIRCUIT
