

MSAFX50N20A

Features

- Ultrafast body diode
- Rugged polysilicon gate cell structure
- Increased Unclamped Inductive Switching (UIS) capability
- Hermetically sealed, surface mount power package
- Low package inductance
- Very low thermal resistance
- Reverse polarity available upon request

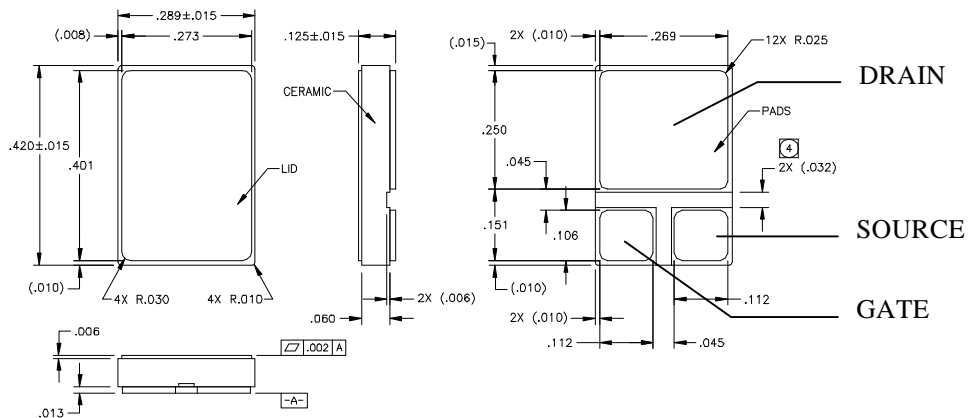
200 Volts
50 Amps
45 mΩ

N-CHANNEL
ENHANCEMENT MODE
POWER MOSFET

Maximum Ratings @ 25C (unless otherwise specified)

DESCRIPTION	SYMBOL	MAX.	UNIT
Drain-to-Source Breakdown Voltage (Gate Shorted to Source) @ T _J ≥ 25°C	BV _{DSS}	200	Volts
Drain-to-Gate Breakdown Voltage @ T _J ≥ 25°C, R _{GS} = 1 MΩ	BV _{DGR}	200	Volts
Continuous Gate-to-Source Voltage	V _{GS}	+/-20	Volts
Transient Gate-to-Source Voltage	V _{GSM}	+/-30	Volts
Continuous Drain Current 100°C	I _{D25} I _{D100}	50 40	Amps
Peak Drain Current, pulse width limited by T _{Jmax}	I _{DM}	200	Amps
Repetitive Avalanche Current	I _{AR}	50	Amps
Repetitive Avalanche Energy	E _{AR}	30	mJ
Single Pulse Avalanche Energy	E _{AS}	200	mJ
Voltage Rate of Change of the Recovery Diode @ I _S ≤ I _{DM} , di/dt ≤ 100 A/μs, V _{DD} ≤ V _{DSS} , T _J ≤ 150°C	dv/dt	5.0	V/ns
Power Dissipation	P _D	300	Watts
Junction Temperature Range	T _J	-55 to +150	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C
Continuous Source Current (Body Diode)	I _S	50	Amps
Pulse Source Current (Body Diode)	I _{SM}	200	Amps
Thermal Resistance, Junction to Case	θ _{JC}	0.25	°C/W

Mechanical Outline



Electrical Parameters @ 25°C (unless otherwise specified)

DESCRIPTION	SYMBOL	CONDITIONS	MIN	TYP.	MAX	UNIT
Drain-to-Source Breakdown Voltage (Gate Shorted to Source)	BV_{DSS}	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	200			V
Temperature Coefficient of the Drain-to-Source Breakdown Voltage	$\Delta BV_{DSS}/\Delta T_J$			tbd		V/°C
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 4\text{ mA}$	2.0		4.0	V
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V_{DC}, V_{DS} = 0\text{ V}, T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			± 100 ± 200	nA
Drain-to-Source Leakage Current (Zero Gate Voltage Drain Current)	I_{DSS}	$V_{DS} = 0.8 \cdot BV_{DSS}, T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			200 1000	μA
Static Drain-to-Source On-State Resistance (1)	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 25\text{ A}, T_J = 25^\circ\text{C}$ $I_D = 50\text{ A}, T_J = 25^\circ\text{C}$ $I_D = 25\text{ A}, T_J = 125^\circ\text{C}$		0.09	0.045 0.055	Ω
Forward Transconductance (1)	g_{fs}	$V_{DS} \geq 10\text{ V}; I_D = 50\text{ A}$	26	32		S
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		4400		μF
Output Capacitance	C_{oss}			800		
Reverse Transfer Capacitance	C_{rss}			285		
Turn-on Delay Time	$T_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 100\text{ V},$ $I_D = 25\text{ A}, R_G = 2.00\ \Omega$		20	25	ns
Rise Time	t_r			15	20	
Turn-off Delay Time	$t_{d(off)}$			75	90	
Fall Time	t_f			20	25	
Total Gate Charge	$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 100\text{ V}, I_D = 25\text{ A}$		190	220	nC
Gate-to-Source Charge	Q_{gs}			35	50	
Gate-to-Drain (Miller) Charge	Q_{gd}			95	110	
Body Diode Forward Voltage (1)	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$			1.5	V
Reverse Recovery Time (Body Diode)	t_{rr}	$I_F = 10\text{ A},$ 25 C $-di/dt = 100\text{ A}/\mu\text{s},$ 125 C			200 300	ns
Reverse Recovery Charge	Q_{rr}	$I_F = 10\text{ A},$ 25 C $di/dt = 100\text{ A}/\mu\text{s},$ 125 C			1.5 2.6	μC

Notes

- (1) Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$
- (2) Microsemi Corp. does not manufacture the MOSFET die; contact company for details.