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Progress Powered by Technology

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MSAFX50N20A

200 Volts
50 Amps
45 mΩ

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

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

Maximum Ratings @ 25°C (unless otherwise specified)

DESCRIPTION	SYMBOL	MAX.	UNIT
Drain-to-Source Breakdown Voltage (Gate Shorted to Source) @ $T_J \geq 25°C$	BV_{DSS}	200	Volts
Drain-to-Gate Breakdown Voltage @ $T_J \geq 25°C$, $R_{GS} = 1 M\Omega$	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 Tj= 25°C Tj= 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}	tbd	mJ
Voltage Rate of Change of the Recovery Diode @ $I_S \leq I_{DM}$, $di/dt \leq 100 A/\mu s$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150°C$	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

Datasheet# MSC0258B
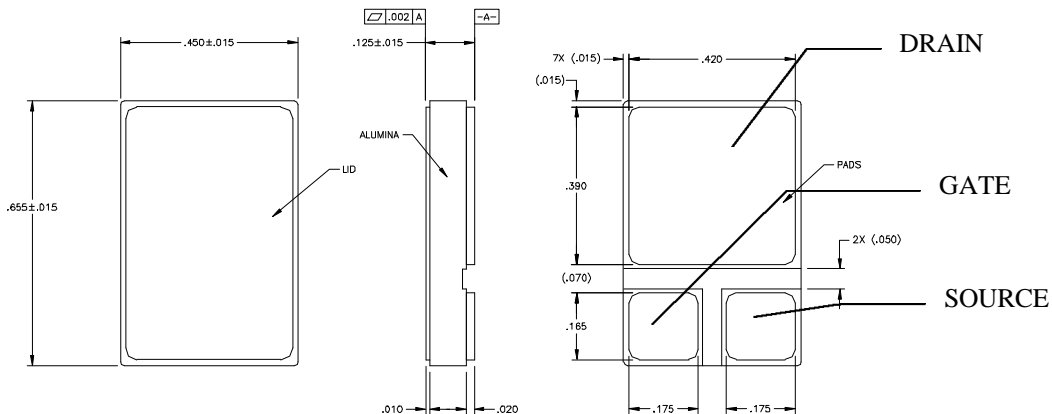
Electrical Parameters @ 25°C (unless otherwise specified)

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

Notes

(1)   Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2%
(2)   Microsemi Corp. does not manufacture the mosfet die; contact company for details.