Santa Ana, CA

Microsemi
Progress Powered by Technology

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MSAER38N10A
MSAFR38N10A

100 Volts
38 Amps
55 mΩ

**N-CHANNEL
ENHANCEMENT MODE
POWER MOSFET**

Features

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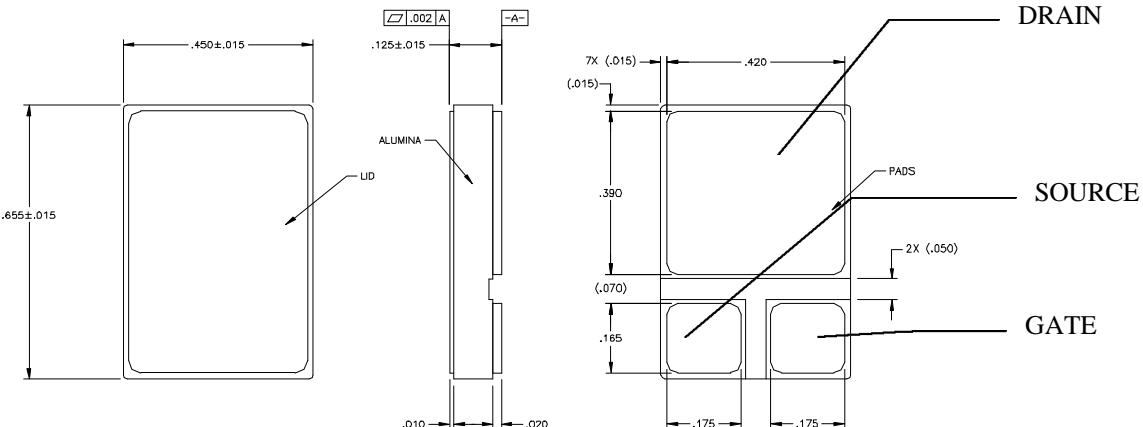- Reverse polarity available upon request

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}	100	Volts
Drain-to-Gate Breakdown Voltage @ $T_J \geq 25°C$, R_{GS}= 1 MΩ	BV_{DGR}	100	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	I_{D25}	38	Amps
Tj= 100°C	I_{D100}	24	
Peak Drain Current, pulse width limited by T_{Jmax}	I_{DM}	150	Amps
Repetitive Avalanche Current	I_{AR}	38	Amps
Repetitive Avalanche Energy	E_{AR}	15	mJ
Single Pulse Avalanche Energy	E_{AS}	150	mJ
Voltage Rate of Change of the Recovery Diode @ $I_S \leq I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$, $T_J \leq 150°C$	dv/dt	5.5	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	38	Amps
Pulse Source Current (Body Diode)	I_{SM}	150	Amps
Thermal Resistance, Junction to Case	θ_{JC}	0.4	°C/W

Mechanical Outline

Datasheet# MSC0257B

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	100			V
Temperature Coefficient of the Drain-to-Source Breakdown Voltage	$\Delta BV_{DSS}/\Delta T_J$			0.13		V/°C
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 1$ mA	2.0		4.0	V
Gate-to-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V_{DC}$, $V_{DS} = 0$ $T_J = 25$°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			25 250	μA
Static Drain-to-Source On-State Resistance (1)	$R_{DS(on)}$	$V_{GS} = 10$V, $I_D = 24$A $T_J = 25$°C $I_D = 38$A $T_J = 25$°C $I_D = 24$A $T_J = 125$°C		 1.0	0.055 0.065 	Ω
Forward Transconductance (1)	g_{fs}	$V_{DS} \geq 15$ V; $I_D = 24$ A	9			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		3700 1100 200		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, $V_{DS} = 50$ V, $I_D = 38$ A, $R_G = 2.35$ Ω			35 190 170 130	ns
Total Gate Charge Gate-to-Source Charge Gate-to-Drain (Miller) Charge	$Q_{g(on)}$ Q_{gs} Q_{gd}	$V_{GS} = 10$ V, $V_{DS} = 50$V, $I_D = 38$A	50 8 25		125 22 65	nC
Body Diode Forward Voltage (1)	V_{SD}	$I_F = I_S$, $V_{GS} = 0$ V MSAE MSAF			1.2 1.8	V
Reverse Recovery Time (Body Diode)	t_{rr}	$I_F = 10$ A, MSAE -di/dt = 100 A/μs, MSAF			50 500	ns
Reverse Recovery Charge	Q_{rr}	$I_F = 10$ A, MSAE di/dt = 100 A/μs, MSAF			tbd 2.9	μC

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