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Progress Powered by Technology

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MSAFX20N60A

600 Volts
20 Amps
350 mΩ

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

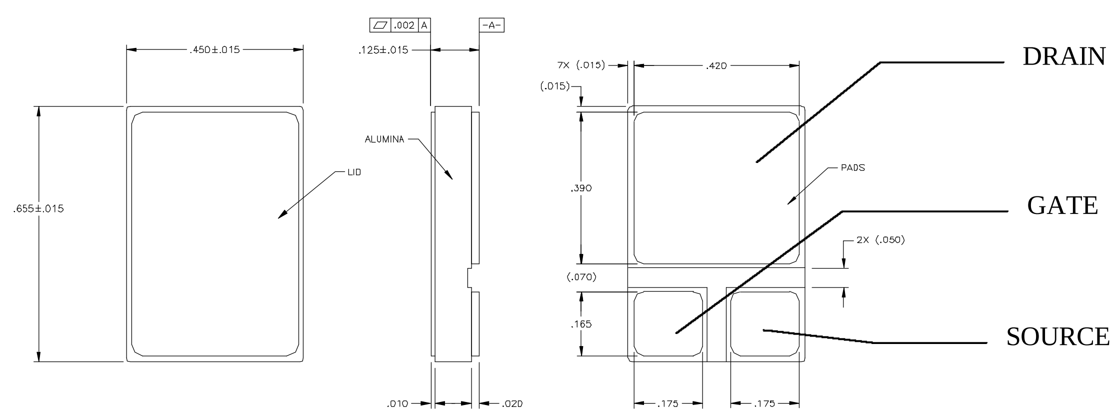
Features

- 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}	600	Volts
Drain-to-Gate Breakdown Voltage @ $T_J \geq 25°C$, R_{GS}= 1 MΩ	BV_{DGR}	600	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}	20 15	Amps
Peak Drain Current, pulse width limited by T_{Jmax}	I_{DM}	80	Amps
Repetitive Avalanche Current	I_{AR}	20	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 ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$, $T_J \leq 150°C$	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	20	Amps
Pulse Source Current (Body Diode)	I_{SM}	80	Amps
Thermal Resistance, Junction to Case	θ_{JC}	0.25	°C/W

Mechanical Outline



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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	600			V
Temperature Coefficient of the Drain-to-Source Breakdown Voltage	$\Delta BV_{DSS}/\Delta T_J$			0.5		V/°C
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 4 mA	2.0		4.5	V
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = ± 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•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= 10 A T_J = 25°C I_D= 20 A T_J = 25°C I_D= 10 A T_J = 125°C		 0.38 0.65	0.35	Ω
Forward Transconductance (1)	g_{fs}	V_{DS} ≥ 10 V; I_D = 10 A	11	18		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		4500 420 140		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} = 300 V, I_D = 10 A, R_G = 2.00 Ω		20 45 70 40	40 60 90 60	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} = 300 V, I_D = 10 A		150 30 60	170 40 85	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			250 400	ns
Reverse Recovery Charge	Q_{rr}	I_F = 10 A, 25 C di/dt = 100 A/µs, 125 C		1 2		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.