Microsemi
Santa Ana, CA
Progress Powered by Technology

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MSAGZ52F120A
MSAHZ52F120A

1200 Volts
52 Amps
3.2 Volts vce(sat)

N-CHANNEL
INSULATED GATE
BIPOLAR TRANSISTOR

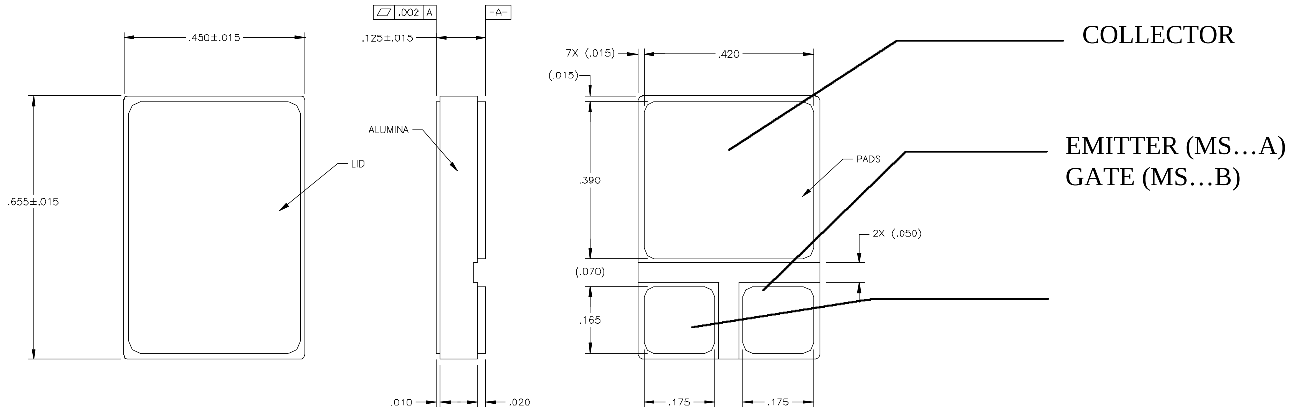
Features

- Rugged polysilicon gate cell structure
- high current handling capability, latch-proof
- Hermetically sealed, surface mount power package
- Low package inductance
- Very low thermal resistance
- Reverse polarity available upon request: MSAH(G)Z52F120B
- high frequency IGBT, low switching losses
- anti-parallel FREDiode (MSAHZ52F120A only)

Maximum Ratings @ 25°C (unless otherwise specified)

DESCRIPTION	SYMBOL	MAX.	UNIT
Collector-to-Emitter Breakdown Voltage (Gate Shorted to Emitter) @ $T_J \geq 25°C$	BV_{CES}	1200	Volts
Collector-to-Gate Breakdown Voltage @ $T_J \geq 25°C$, R_{GS}= 1 MΩ	BV_{CGR}	1200	Volts
Continuous Gate-to-Emitter Voltage	V_{GES}	+/-20	Volts
Transient Gate-to-Emitter Voltage	V_{GEM}	+/-30	Volts
Continuous Collector Current Tj= 25°C Tj= 90°C	I_{C25} I_{C90}	52 33	Amps
Peak Collector Current (pulse width limited by T_{jmax},) Tj= 25°C Tj= 90°C	$I_{CM(25)}$ $I_{CM(90)}$	104 66	Amps
Avalanche energy (single pulse) @ I_C= 25A, V_{CC}= 50V, L= 200µH, R_G= 25Ω, Tj= 25°C	E_{AS}	65	mJ
Short circuit current (SOA) , $V_{CE} \leq$ 1200V, T_J= 150°C, $t_{sc} \leq$ 10µs	$I_{C(sc)}$	260	A
Short circuit (reverse) current (RBSOA) , $V_{CE} \leq$ 1200V, T_J= 150°C	$I_{C(sc)RBSOA}$	66	A
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, MSAHZ52F120A only)	I_S	50	Amps
Pulse Source Current (Body Diode, MSAHZ52F120A only)	I_{SM}	100	Amps
Thermal Resistance, Junction to Case	θ	0.4	°C/W

Mechanical Outline



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Electrical Parameters @ 25°C (unless otherwise specified)

DESCRIPTION	SYMBOL	CONDITIONS	MIN	TYP.	MAX	UNIT
Collector-to-Emitter Breakdown Voltage (Gate Shorted to Emitter)	BV_{CES}	V_{GS} = 0 V, I_C = 250 µA	1200			V
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 350 µA	4.5	5.5	6.5	V
Gate-to-Emitter Leakage Current	I_{GES}	V_{GE} = ± 20V_{DC}, V_{CE} = 0 T_J = 25°C T_J = 125°C			±100 ±200	nA
Collector-to-Emitter Leakage Current (Zero Gate Voltage Collector Current)	I_{CES}	V_{CE} =0.8•BV_{CES} T_J = 25°C V_{GE} = 0 V T_J = 125°C			250 1000	µA
Collector-to-Emitter Saturation Voltage (1)	$V_{CE(sat)}$	V_{GE}= 15V, I_C= 25A T_J = 25°C I_C= 25A T_J = 125°C I_C= 60A T_J = 25°C I_C= 30A T_J = 125°C		2.7 3.3 3.4 4.3	3.2 3.9	V
Forward Transconductance (1)	g_{fs}	V_{CE} = 20 V; I_C = 25 A	8.5	20		S
Input Capacitance Output Capacitance Reverse Transfer Capacitance	C_{ies} C_{oes} C_{res}	V_{GE} = 0 V, V_{CE} = 25 V, f = 1 MHz		1650 250 110	2200 380 160	pF
INDUCTIVE LOAD, Tj= 125°C Turn-on Delay Time Rise Time On Energy Turn-off Delay Time Fall Time Off Energy	 $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off}	V_{GE} = 15 V, V_{CE} = 600 V, I_C = 25 A, R_G = 47 Ω, L= 100 µH note 2, 3		 75 65 3.6 420 45 2.4	 110 100 560 60 	 ns ns mJ ns ns mJ
INDUCTIVE LOAD, Tj= 125°C Turn-on Delay Time Rise Time On Energy Turn-off Delay Time Fall Time Off Energy	 $t_{d(on)}$ t_{ri} E_{on} $t_{d(off)}$ t_{fi} E_{off}	V_{GE} = 15 V, V_{CE} = 600 V, I_C = 50 A, R_G = 47 Ω, L= 100 µH note 2, 3		 95 90 10 420 45 4.2		 ns ns mJ ns ns mJ
Total Gate Charge Gate-to-Emitter Charge Gate-to-Collector (Miller) Charge	Q_g Q_{ge} Q_{gc}	V_{GE} = 15 V, V_{CE} = 600V, I_C = 25A		160 20 75		nC
Antiparallel diode forward voltage (MSAHZ52F120A only)	V_F	I_E= 10 A T_J = 25 °C I_E= 10 A T_J = 100 °C		2.4 2	3	V V
Antiparallel diode reverse recovery time (MSAHZ52F120A only)	t_{rr}	I_E= 10 A, dI_E/dt= 100 A/us, T_J= 25°C I_E= 10 A, dI_E/dt= 800 A/us, T_J= 125°C		 60	TBD	ns ns
Antiparallel diode reverse recovery charge (MSAHZ52F120A only)	Q_{rr}	I_E= 10 A, dI_E/dt= 100 A/us, T_J= 25°C I_E= 10 A, dI_E/dt= 800 A/us, T_J= 125°C		 800	TBD	nC nC
Antiparallel diode peak recovery current (MSAHZ52F120A only)	I_{RM}	I_E= 10 A, dI_E/dt= 100 A/us, T_J= 25°C I_E= 10 A, dI_E/dt= 800 A/us, T_J= 125°C		 22	TBD	A A

Notes

(1) Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2%
(2) switching times and losses may increase for larger V_{CE} and/or R_G values or higher junction temperatures.
(3) switching losses include "tail" losses
(4) Microsemi Corp. does not manufacture the igbt die; contact company for details.