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Progress Powered by Technology

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MSAGX60F60A
MSAHX60F60A

600 Volts
60 Amps
2.9 Volts vce(sat)

N-CHANNEL INSULATED GATE BIPOLAR TRANSISTOR

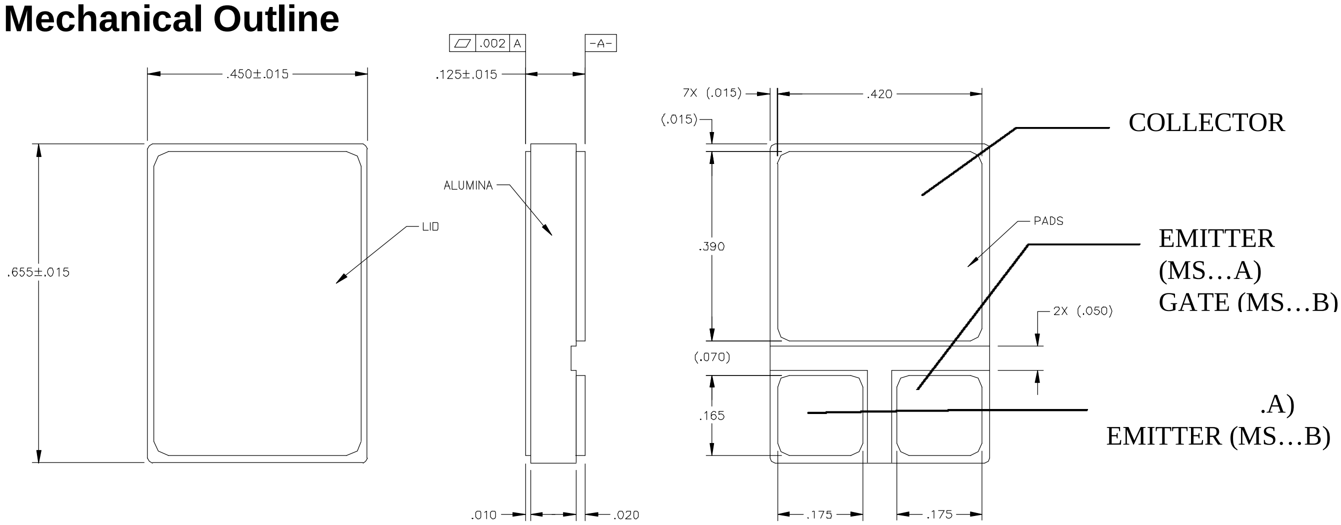
Features

- 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)60F60B
- high frequency IGBT, low switching losses
- anti-parallel FREDiode (MSAHX60F60A 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}	600	Volts
Collector-to-Gate Breakdown Voltage @ $T_J \geq 25°C$, R_{GS}= 1 MΩ	BV_{CGR}	600	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}	60 32	Amps
Peak Collector Current, pulse width limited by T_{jmax},	I_{CM}	120	Amps
Safe Operating Area (RBSOA) @ V_{GE}= 15V, L= 100µH (clamped inductive load), R_G= 4.7Ω, Tj= 125°C, V_{CE}= 0.8 x V_{CES}	I_{max}	64	Amps
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, MSAHX60F60A only)	I_S	32	Amps
Pulse Source Current (Body Diode, MSAHX60F60A only)	I_{SM}	100	Amps
Thermal Resistance, Junction to Case	θ_{JC}	0.4	°C/W

Mechanical Outline



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	600			V
Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 250 µA	2.5		5.0	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			200 1000	µA
Collector-to-Emitter Saturation Voltage (1)	$V_{CE(sat)}$	V_{GE}= 15V, I_C= 30A T_J = 25°C I_C= 60A T_J = 25°C I_C= 30A T_J = 125°C		2.2 3.5 2.2	2.9	V
Forward Transconductance (1)	g_{fs}	V_{CE} ≥ 10 V; I_C = 30 A	15	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		2500 230 70		pF
INDUCTIVE LOAD, Tj= 25°C Turn-on Delay Time Rise Time Turn-off Delay Time Fall Time Off Energy	 $t_{d(on)}$ t_{ri} $t_{d(off)}$ t_{fi} E_{off}	V_{GE} = 15 V, V_{CE} = 480 V, I_C = 30 A, R_G = 4.7 Ω, L= 100 µH note 2, 3		 25 30 175 125 1.3	 175 	 ns ns 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} = 480 V, I_C = 30 A, R_G = 4.7 Ω, L= 100 µH note 2, 3		 25 35 1 250 260 4		 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} = 300V, I_C = 30A		125 23 50	150 35 75	nC
Antiparallel diode forward voltage (MSAHX60F60A only)	V_F	I_E= 15 A T_J = 25 °C I_E= 15 A T_J = 150 °C I_E= 30 A T_J = 25 °C I_E= 50 A T_J = 25 °C		 1.7 1.9	1.5 1.3 	V V V V
Antiparallel diode reverse recovery time (MSAHX60F60A only)	t_{rr}	I_E= 10 A, dI_E/dt= 100 A/us, T_J= 25°C I_E= 30 A, dI_E/dt= 100 A/us, T_J= 25°C		 140	100 	ns ns
Antiparallel diode reverse recovery charge (MSAHX60F60A only)	Q_{rr}	I_E= 10 A, dI_E/dt= 100 A/us, T_J= 25°C I_E= 30 A, dI_E/dt= 100 A/us, T_J= 25°C		160 320		nC nC
Antiparallel diode peak recovery current (MSAHX60F60A only)	I_{RM}	I_E= 10 A, dI_E/dt= 100 A/us, T_J= 25°C I_E= 30 A, dI_E/dt= 100 A/us, T_J= 25°C		3 4.2		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.