

1. Features

- $V_{CE(sat)}=1.55V(\text{typ.})@V_{GE}=15V, T_{vj}=25^{\circ}C$
- Low $V_{CE(sat)}$
- Fast Switching
- High Ruggedness
- Short-Circuit Rated

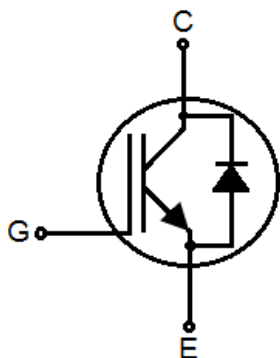
2. Applications

- Solar Inverters
- Uninterrupted Power Supply
- Industrial Inductive Heating
- Energy Storage

3. Pin configuration



TO-247



Pin	Function
1	G
2	C
3	E

4. Ordering information

Part Number	Package	Brand
KGM75N120AI	TO-247	KIA

5. Maximum ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_{vj} \geq 25^{\circ}\text{C}$	V_{CE}	1200	V
DC collector current, limited by $T_{vjmax} T_C = 25^{\circ}\text{C}$	I_C	155	A
DC collector current, limited by $T_{vjmax} T_C = 100^{\circ}\text{C}$		100	A
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}	300	A
Turn off safe operating area $V_{CE} \leq 600\text{V}$, $T_{vj} \leq 150^{\circ}\text{C}$, $t_p = 1\mu\text{s}$	-	TBD	A
Diode forward current, limited by $T_{vjmax} T_C = 25^{\circ}\text{C}$	I_F	112	A
Diode forward current, limited by $T_{vjmax} T_C = 100^{\circ}\text{C}$		75	A
Diode pulsed current, t_p limited by T_{vjmax}	I_{Fpuls}	300	A
Gate-emitter voltage	V_{GE}	± 20	V
Transient Gate-emitter voltage	V_{GE}	± 30	V
Short circuit withstand time $V_{GE} = 15.0\text{V}$, $V_{CC} \leq 400\text{V}$ Allowed number of short circuits < 1000 Time between short circuits: $\geq 1.0\text{s}$ $T_{vj} = 150^{\circ}\text{C}$	t_{SC}	-	μs
Power dissipation $T_C = 25^{\circ}\text{C}$	P_{tot}	625	W
Power dissipation $T_C = 100^{\circ}\text{C}$		-	W
Operating junction temperature	$T_{vj(OP)}$	-40 to +175	$^{\circ}\text{C}$
Storage temperature	T_{stg}	-40 to +150	$^{\circ}\text{C}$
Soldering temperature, wave soldering 1.6mm(0.063in.) from case for 10s	-	260	$^{\circ}\text{C}$
Mounting torque, M3 screw Maximum of mounting processes: 3	M	-	Nm

Maximum Ratings For optimum lifetime and reliability, 397 recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.

6. Thermal characteristics

Parameter	Symbol	Rating		Unit
		Min.	Max.	
IGBT Thermal Resistance, Junction-Case	$R_{\theta(J-C)}$	-	0.24	°C/W
Diode Thermal Resistance, Junction-Case	$R_{\theta(J-C)}$	-	0.45	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta(J-A)}$	-	40	°C/W

7. Electrical characteristics

($T_{vj}=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristic						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=250\mu A$	1200	-	-	V
Collector-emitter breakdown voltage		$V_{GE}=0V, I_C=1mA$	1200	-	-	V
Collector-emitter saturation voltage	V_{CEsat}	$V_{GE}=15V, I_C=75A, T_{vj}=25^{\circ}\text{C}$	-	1.55	1.9	V
		$V_{GE}=15V, I_C=75A, T_{vj}=175^{\circ}\text{C}$	-	2.0	-	V
Diode forward voltage	V_F	$V_{GE}=0V, I_F=75A, T_{vj}=25^{\circ}\text{C}$	-	2.44	2.9	V
		$V_{GE}=0V, I_F=75A, T_{vj}=175^{\circ}\text{C}$	-	2.1	-	V
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=250\mu A$	4.2	5.2	6.2	V
Zero gate voltage collector current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}\text{C}$	-	-	10	μA
		$V_{CE}=1200V, V_{GE}=0V, T_{vj}=175^{\circ}\text{C}$	-	-	5000	μA
Gate-emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$	-	-	100	nA
Transconductance	g_{fs}	$V_{CE}=20V, I_C=75A$	-	TBC	-	S

($T_{vj}=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic Characteristic						
Input capacitance	C_{ies}	$V_{CE}=30\text{V}, V_{GE}=0\text{V},$ $f=1\text{MHZ}$	-	8200	-	pF
Output capacitance	C_{oes}		-	260	-	pF
Reverse transfer capacitance	C_{res}		-	150	-	pF
Gate charge	Q_G	$V_{CC}=600\text{V}, I_C=75\text{A},$ $V_{GE}=15\text{V}$	-	402	-	nC
IGBT Characteristic, at $T_{vj}=25^{\circ}\text{C}$						
Turn-on delay time	$t_{d(on)}$	$V_{CC}=400\text{V}, I_C=60\text{A},$ $V_{GE}=0.0/15\text{V}, R_g=4\Omega$	-	50	-	nS
Rise time	t_r		-	45	-	nS
Turn-off delay time	$t_{d(off)}$		-	400	-	nS
Fall time	t_f		-	65	-	nS
Turn-on energy	E_{on}		-	5.2	-	mJ
Turn-off energy	E_{off}		-	2.2	-	mJ
Total switching energy	E_{ts}		-	7.5	-	mJ
Diode reverse recovery time	t_{rr}	$I_F=40\text{A}, V_R=300\text{V},$ $di/dt= 600\text{A}/\mu\text{s}$	-	170	-	nS
Diode reverse recovery charge	Q_{rr}		-	3.2	-	μC
Diode peak reverse recovery current	I_{rrm}		-	45	-	A
Diode peak rate of fall of reverse recovery current during t_b	di_{rr}/dt		-	TBC	-	$\text{A}/\mu\text{s}$

8. Test circuits and waveforms

Fig. 1 Typical output characteristics

($T_J = 25^\circ\text{C}$, $t_p = 250\ \mu\text{s}$)

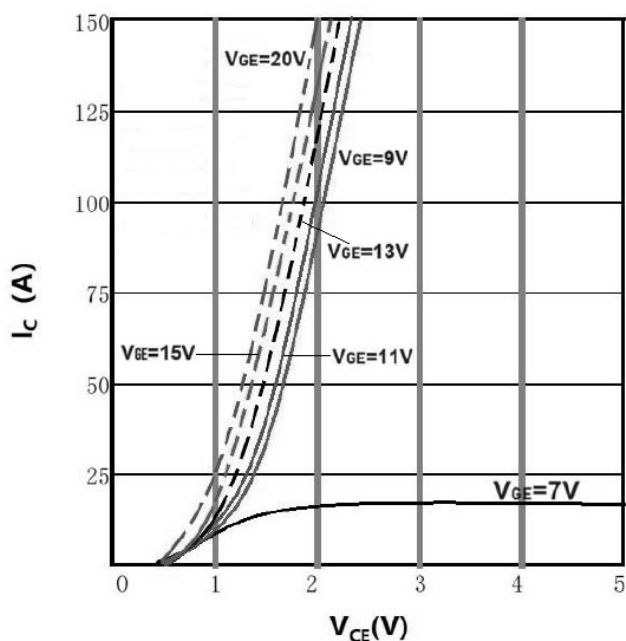


Fig. 2 Typical output characteristics

($T_J = 175^\circ\text{C}$, $t_p = 250\ \mu\text{s}$)

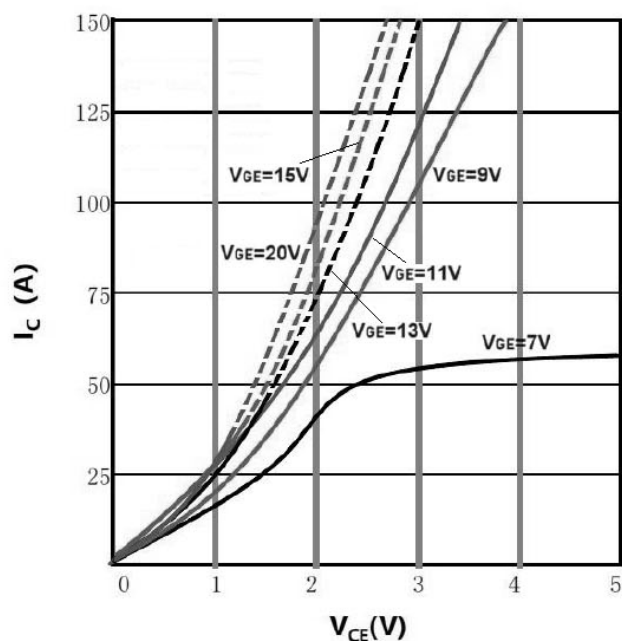


Fig. 3 Typical transfer characteristics

($V_{CE} = 20\ \text{V}$, $t_p = 250\ \mu\text{s}$)

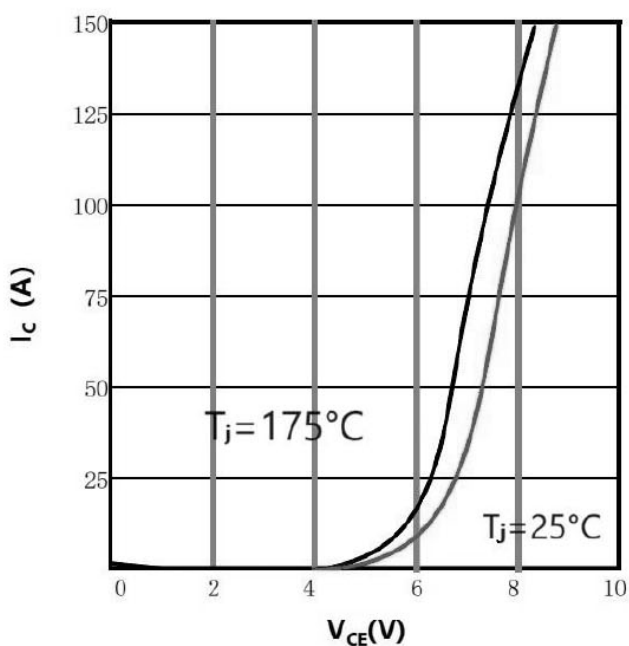


Fig. 4 Typical gate threshold voltage as a function of junction temperature
($V_{CE} = V_{GE}$, $I_C = 1.5\ \text{mA}$)

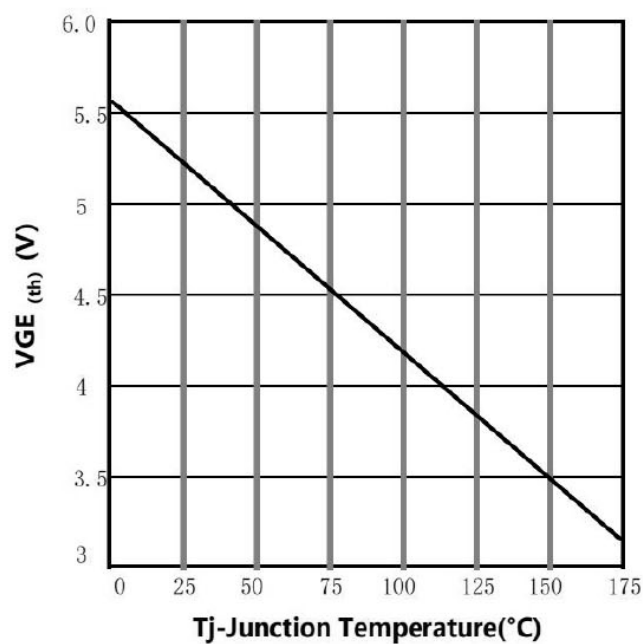


Fig. 5 Typical saturation voltage characteristics

($V_{GE} = 15\text{ V}$, $t_p = 250\text{ }\mu\text{s}$)

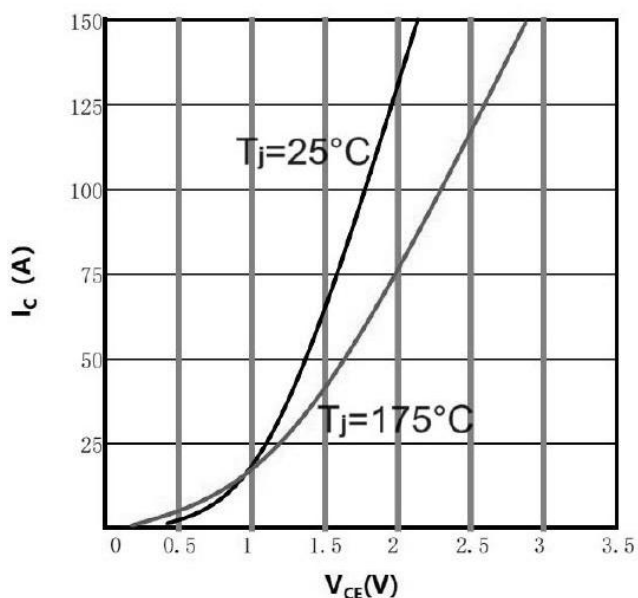


Fig. 6 Typical saturation voltage as a function

of junction temperature ($V_{GE} = 15\text{ V}$, $t_p = 250\text{ }\mu\text{s}$)

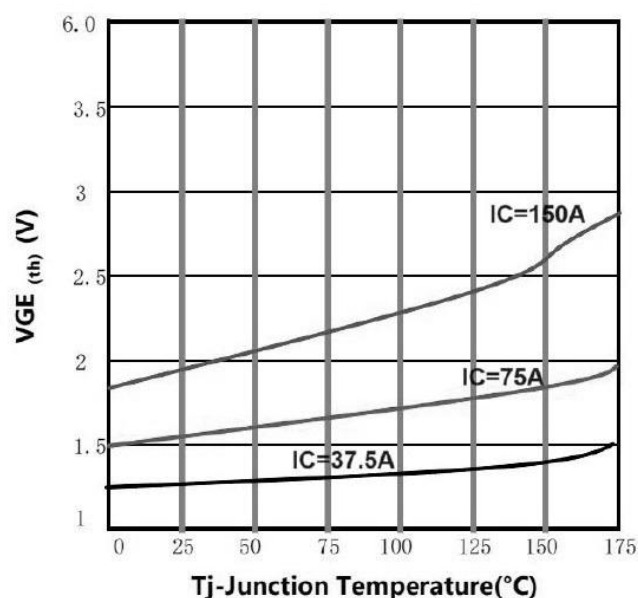


Fig. 7 Maximum DC collector current as a
function of case temperature

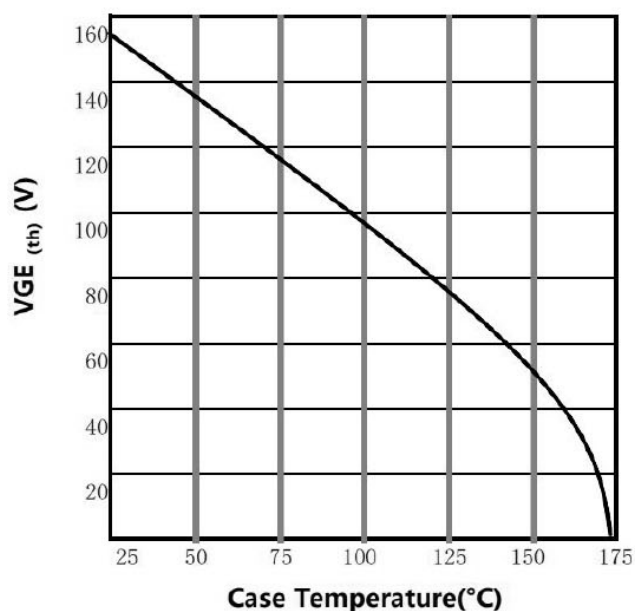


Fig. 8 Typical gate charge characteristics

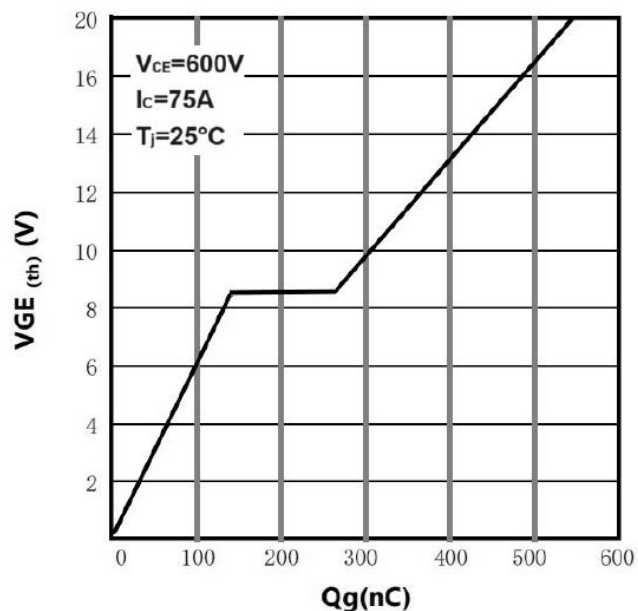


Fig. 9 Typical switching losses vs. I_c

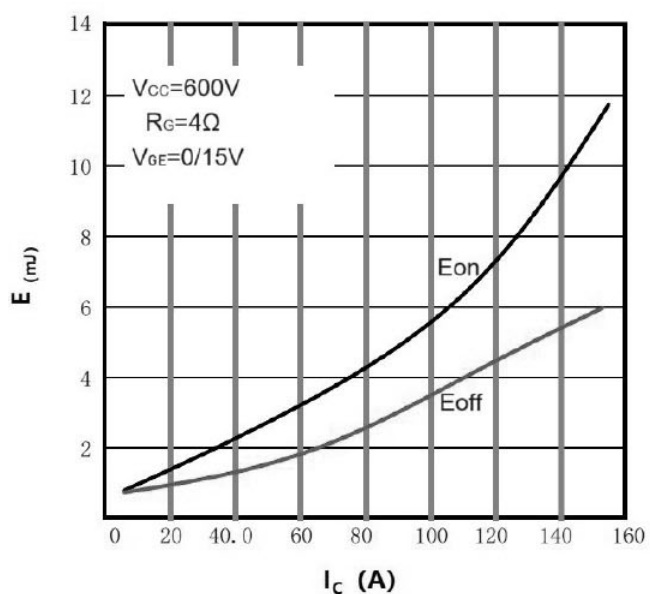


Fig. 10 Typical capacitance as a function of collector-to-emitter voltage

