

V_{CES}	650V
I_C (Nominal)	20A
$V_{CE(sat)}$ (Typ.)	1.55V
Max. Possible Chips per Wafer	2877pcs

●Features

- 1) Trench Light Punch Through Type
- 2) Low Collector - Emitter Saturation Voltage
- 3) Short Circuit Withstand Time 7μs

●Application

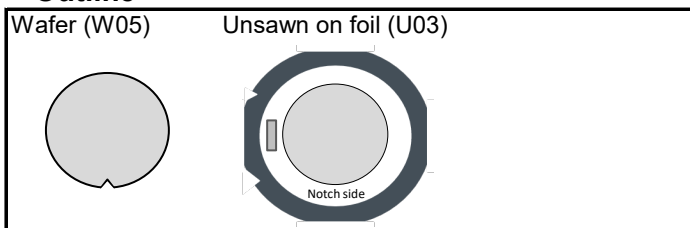
General Inverter

for Automotive and Industrial Use

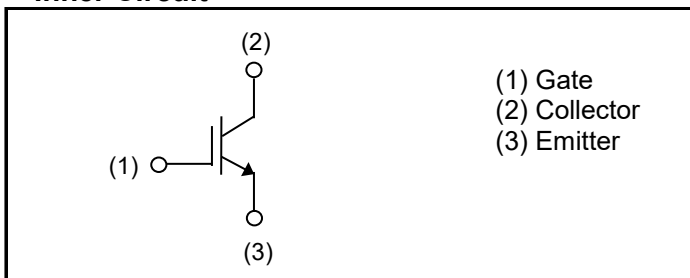
Heater for Automotive

Relay Circuit (ex. Pre Charge Relay)

●Outline



●Inner Circuit



●Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Collector - Emitter Voltage, $T_j = 25^\circ\text{C}$	V_{CES}	650	V
Gate - Emitter Voltage	V_{GES}	±30	V
Collector Current	I_C^{*1}	*1)	A
Pulsed Collector Current	I_{CP}^{*2}	60	A
Operating Junction Temperature	T_j	-40 to +175	°C

*1 Depending on thermal properties of assembly

*2 Pulse width limited by T_{jmax} .

●Design Assurance

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Short Circuit Withstand Time	t_{sc}^{*3}	$V_{GE} = 15V, T_j = 25^{\circ}C$ $V_{CC} \leq 360V$ $V_{CC} \leq 400V$	7 6.5	- -	- -	μs
Short Circuit Withstand Time	t_{sc}^{*3}	$V_{GE} = 15V, T_j = 150^{\circ}C$ $V_{CC} \leq 400V$	5	-	-	μs
Reverse Bias Safe Operating Area	RBSOA ^{*3}	$I_C = 60A, V_{CC} = 550V,$ $V_P = 650V, V_{GE} = 15V,$ $R_G = 50\Omega, T_j = 175^{\circ}C$	FULL SQUARE			-

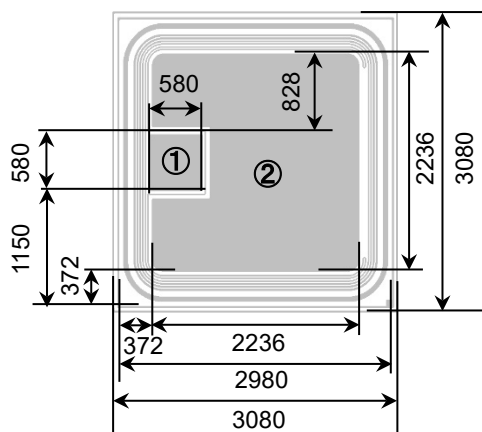
*3 Design assurance without measurement

●Electrical Characteristics (at $T_j = 25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Collector - Emitter Breakdown Voltage	BV_{CES}	$I_C = 1\mu A, V_{GE} = 0V$	650	-	-	V
Collector Cut - off Current	I_{CES}	$V_{CE} = 650V, V_{GE} = 0V$	-	-	1	μA
Gate - Emitter Leakage Current	I_{GES}	$V_{GE} = \pm 30V, V_{CE} = 0V$	-	-	± 500	nA
Gate - Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE} = 5V, I_C = 4.9mA$	5.2	6.0	6.8	V
Collector - Emitter Saturation Voltage	$V_{CE(sat)}^{*3}$	$I_C = 20A, V_{GE} = 15V,$ $T_j = 25^{\circ}C$	-	1.55	1.85	V
		$T_j = 150^{\circ}C$	-	2.00	-	
Input Capacitance	C_{ies}	$V_{CE} = 30V,$	-	1680	-	pF
Output Capacitance	C_{oes}	$V_{GE} = 0V,$	-	41	-	
Reverse transfer Capacitance	C_{res}	$f = 1MHz$	-	15	-	
Total Gate Charge	Q_g	$V_{CE} = 400V,$	-	69	-	nC
Gate - Emitter Charge	Q_{ge}	$I_C = 20A,$	-	21	-	
Gate - Collector Charge	Q_{gc}	$V_{GE} = 15V$	-	27	-	

*3 Design assurance without measurement

●Chip Information

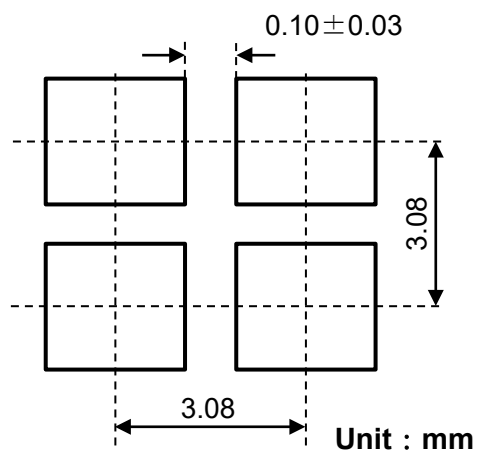
Unit : μm

 : Pad Area

① : Gate Bonding Pad

② : Emitter Bonding Pad

Backside : Collector



Wafer Size	200mm
Wafer Thickness	0.075±0.01mm
Chip Size	3.08mm×3.08mm
Cut Line Width	0.10±0.03mm
Top Side Metallization	AlCu:4.4μm
Back Side Metallization	Ti/Ni:0.4μm/Au:0.05μm
Passivation	Polyimide
Active Area Total	4.96mm ²

●Further Electrical Characteristics

Switching characteristics and thermal properties are depending strongly on module design and mounting technology and can therefore not be specified for a bare die.

This chip data sheet refers to the device data sheet	RGA40NL65
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