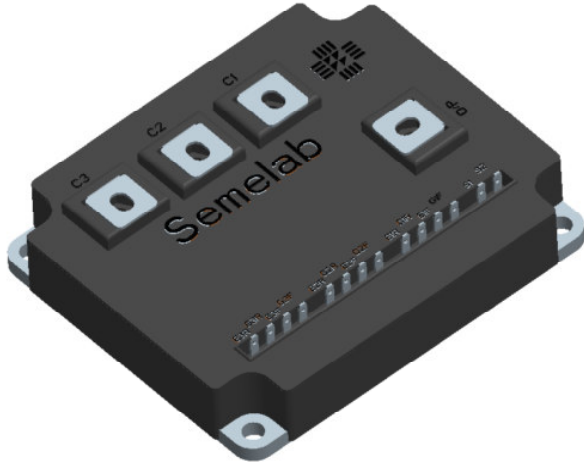


SML300MAT06



FEATURES

- HIGH RELIABILITY PLASTIC HYBRID MODULE
- SUITABLE FOR MATRIX CONVERTER APPLICATIONS
- POSITIVE TEMPERATURE COEFFICIENT OF V_{CEsat}
- VERY LOW C_{ies} , C_{oes} , C_{res}

Maximum Rated Values (At 25°C unless otherwise stated)

| Symbol | Name | Conditions | Value | Unit |
|-----------|-----------------------------------|--|------------|------|
| V_{CES} | Collector Emitter Voltage | | 600 | V |
| V_{GES} | Gate Emitter Voltage | | ±20 | V |
| I_C | DC-Collector Current | $T_C = 25^\circ\text{C}$ | 375 | A |
| | | $T_C = 65^\circ\text{C}$ | 300 | A |
| I_{CM} | Repetitive Peak Collector Current | $T_C = 25^\circ\text{C}; t_p = 1\text{ms}$ | 600 | A |
| P_{TOT} | Power Dissipation | Per IGBT, $T_{CASE} = 25^\circ\text{C}$ | 2080 | W |
| T_J | Operating Temperature | | -55...+125 | °C |
| T_{ST} | Storage Temperature | | -55...+150 | °C |

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IGBT Characteristic Values

| Symbol | Name | Conditions | min. | typ. | max. | Unit |
|---------------|--------------------------------------|--------------------------------------|------|------|------|---------|
| $V_{(BR)CES}$ | Collector Emitter Breakdown Voltage | $V_{GE} = 0, I_C = 4mA$ | 600 | - | - | V |
| $V_{GE(th)}$ | Gate Threshold Voltage | | 4.5 | 5.5 | 6.5 | V |
| I_{CES} | Collector-Emitter Cut-Off Current | | - | 2 | 1000 | μA |
| I_{GES} | Gate-Emitter Leakage Current | | - | 2 | - | mA |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | | - | 1.95 | 2.45 | V |
| C_{ies} | Input Capacitance | $V_{GE} = 0V$ | - | 13 | - | nF |
| C_{res} | Reverse Transfer Capacitance | $V_{CE} = 25V$ | - | 1.1 | - | nF |
| L_{CE} | Stray Inductance (module) | $f = 1MHz, T_J = 125^\circ C$ | - | 15 | - | nH |
| $T_{d(on)}$ | Turn On Delay Time | $V_{CC} = 300V$ | - | 105 | - | ns |
| T_r | Rise Time | $V_{GE} = \pm 15V$ | - | 71 | - | ns |
| $T_{d(off)}$ | Turn Off Delay Time | $I_C = 300A$ ind. load | - | 355 | - | ns |
| T_f | Fall Time | $R_{G(on)} = R_{G(off)} = 3.3\Omega$ | - | 47 | - | ns |
| E_{on} | Turn On Energy Loss | $T_J = 125^\circ C$ | - | 6.5 | - | mJ |
| E_{off} | Turn Off Energy Loss | | - | 11 | - | mJ |

Inverse Diode Characteristic Values

| Symbol | Name | Conditions | min. | typ. | max. | Unit |
|-----------|-------------------------------|--|------|------|------|---------|
| V_F | Forward Voltage | $I_F = 300A, V_{GE} = 0V, T_J = 25^\circ C$ | - | 1.25 | 1.6 | V |
| | | $I_F = 300A, V_{GE} = 0V, T_J = 125^\circ C$ | - | 1.2 | - | |
| I_{RRM} | Peak Reverse Recovery Current | $I_F = 300A, T_J = 125^\circ C$ | - | 256 | - | A |
| Q_{rr} | Reverse Recovery Charge | $I_F = 300A, T_J = 125^\circ C$ | - | 34 | - | μC |
| E_{REC} | Reverse Recovery Energy | $I_F = 300A, T_J = 125^\circ C$ | - | 7.0 | - | mJ |

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Mechanical And Thermal Properties

| Symbol | Name | Conditions | min. | typ. | max. | Unit |
|------------|-------------------------------------|------------------------------------|------------|--------------|------------|--|
| R_{thJC} | Thermal Resistance Junction to Case | per IGBT per Diode | - - | 0.06 0.11 | - - | $^{\circ}CW^{-1}$ $^{\circ}CW^{-1}$ |
| R_{thcK} | Thermal Resistance Case to Heatsink | per module ¹ | - | - | 0.01 | $^{\circ}CW^{-1}$ |
| M | Mounting Torque | module mounting screw terminals | TBA TBA | - - | TBA TBA | Nm Nm |
| W | Module Weight | | - | TBA | - | g |

¹ thermal grease, planar heat-sink

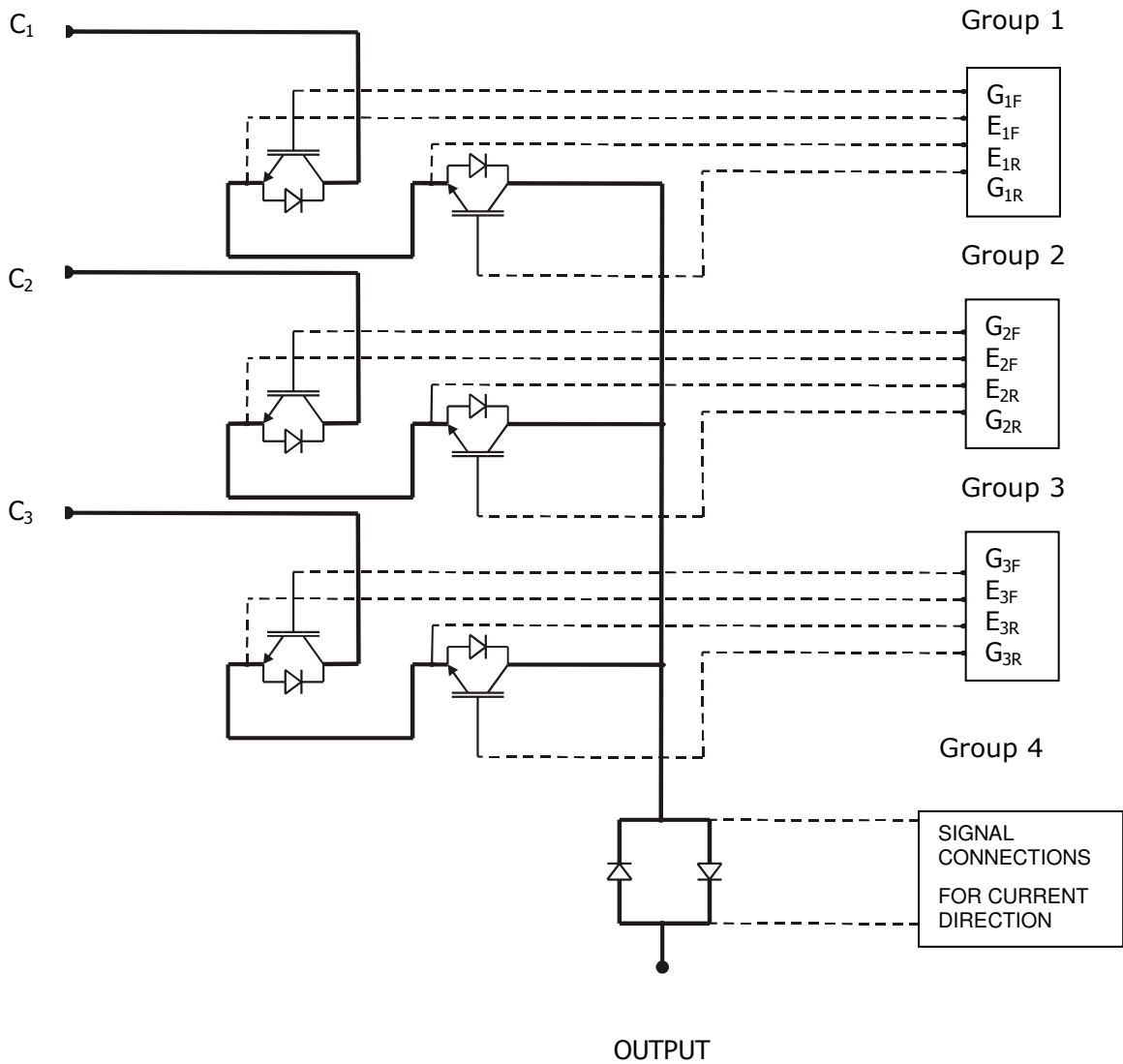
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Package and Circuit

Circuit Diagram

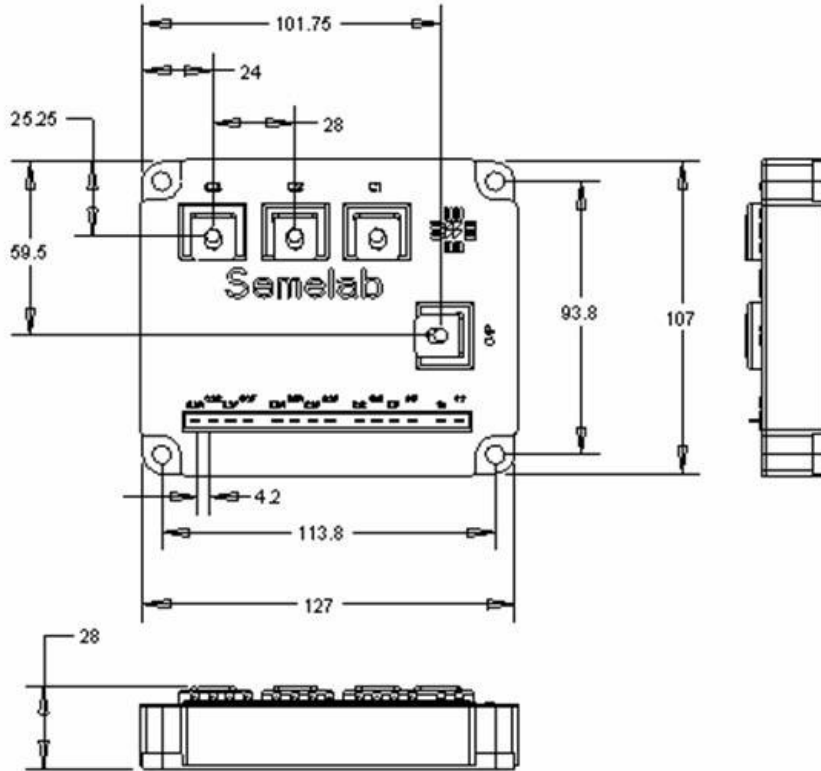


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Package Outline



Dimensions in mm

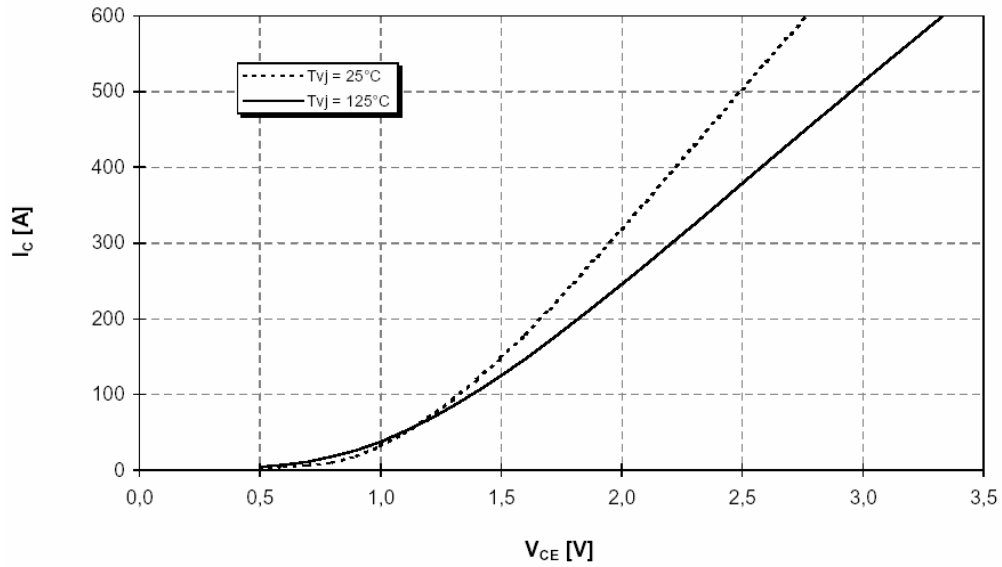
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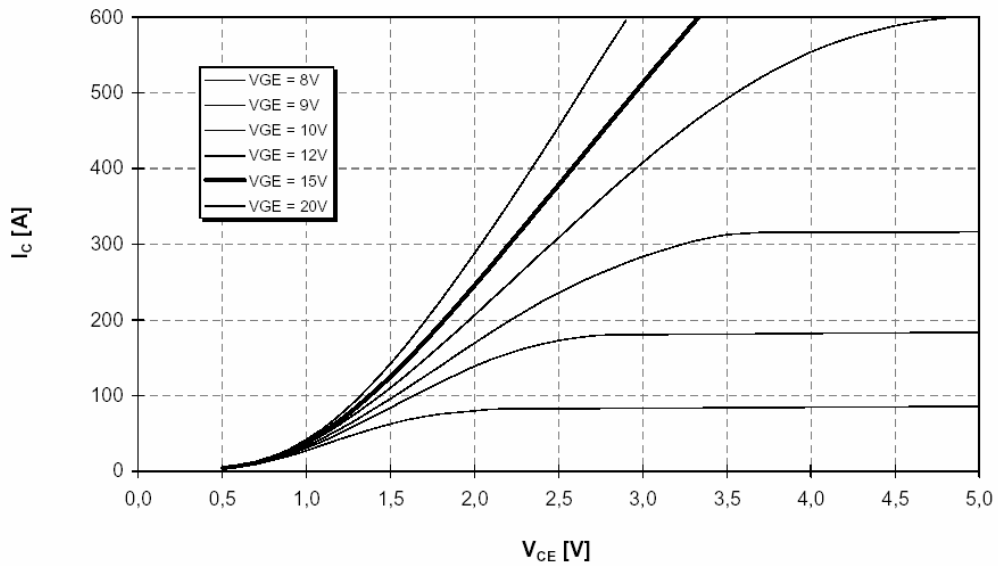
Output characteristic (typical)

$V_{GE} = 15V$



Output characteristic (typical)

$T_{vj} = 125^\circ C$



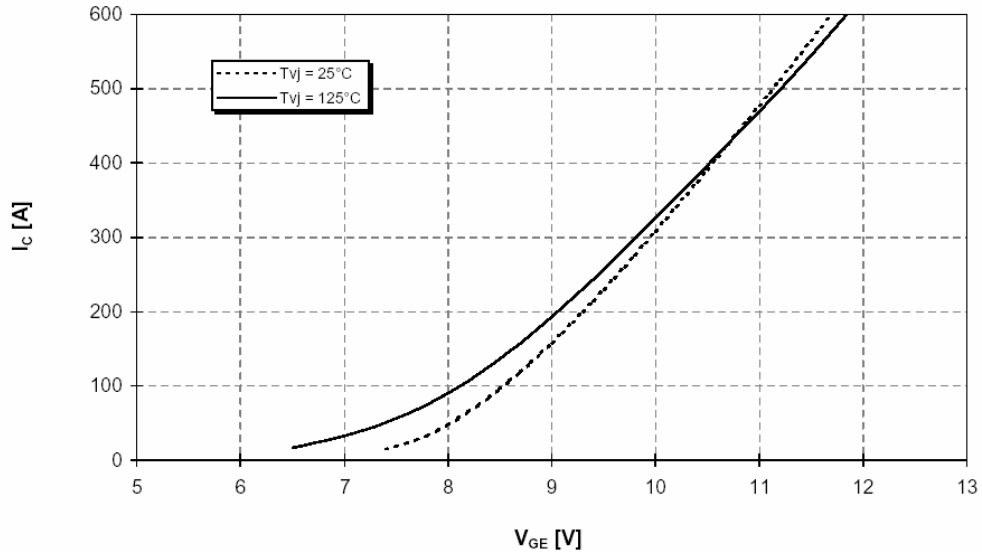
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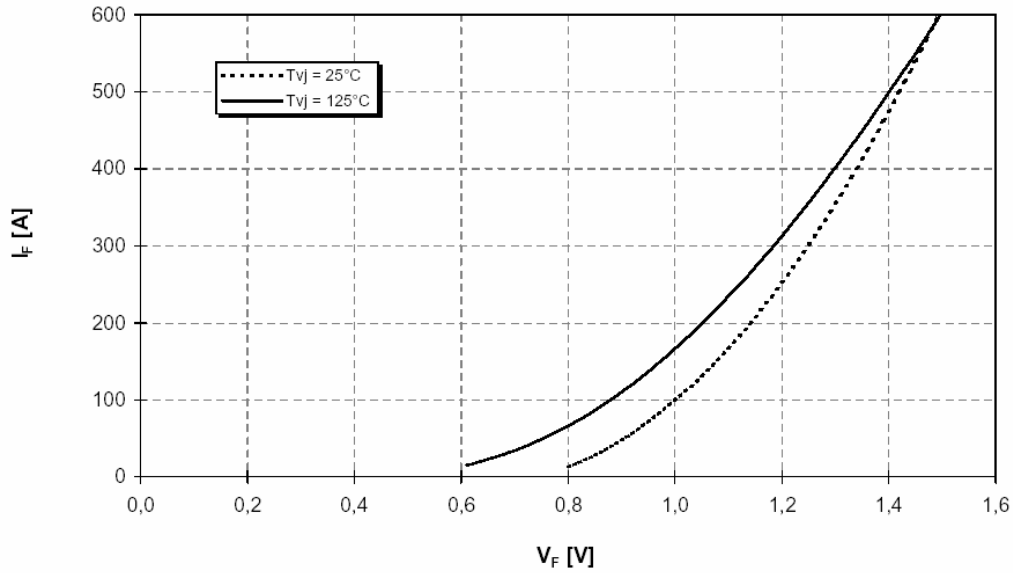
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Transfer characteristic (typical)

$V_{CE} = 20V$



Forward characteristic of inverse diode (typical)



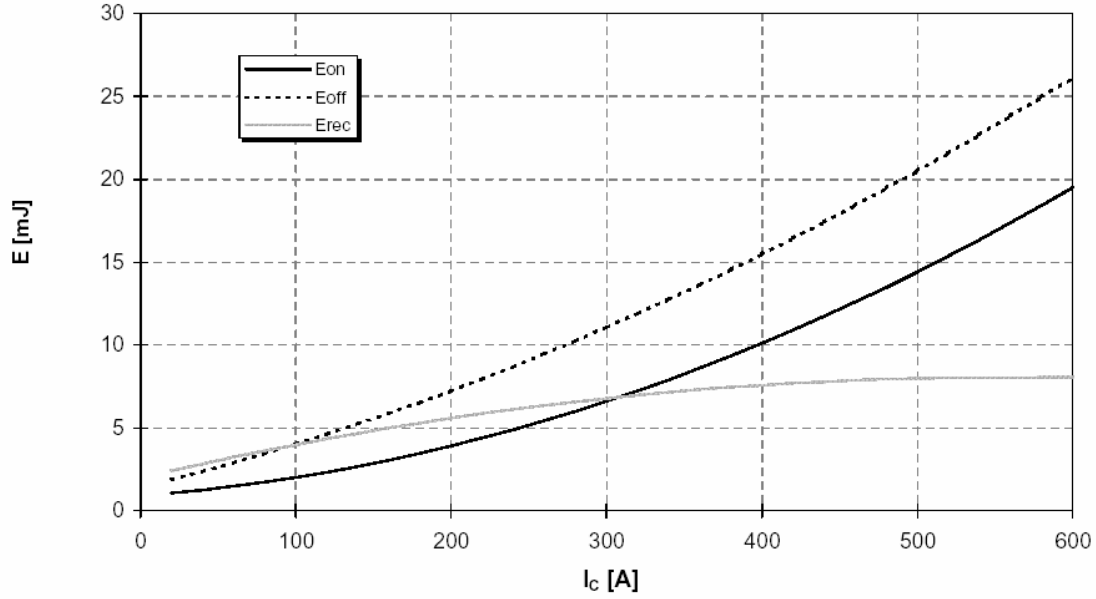
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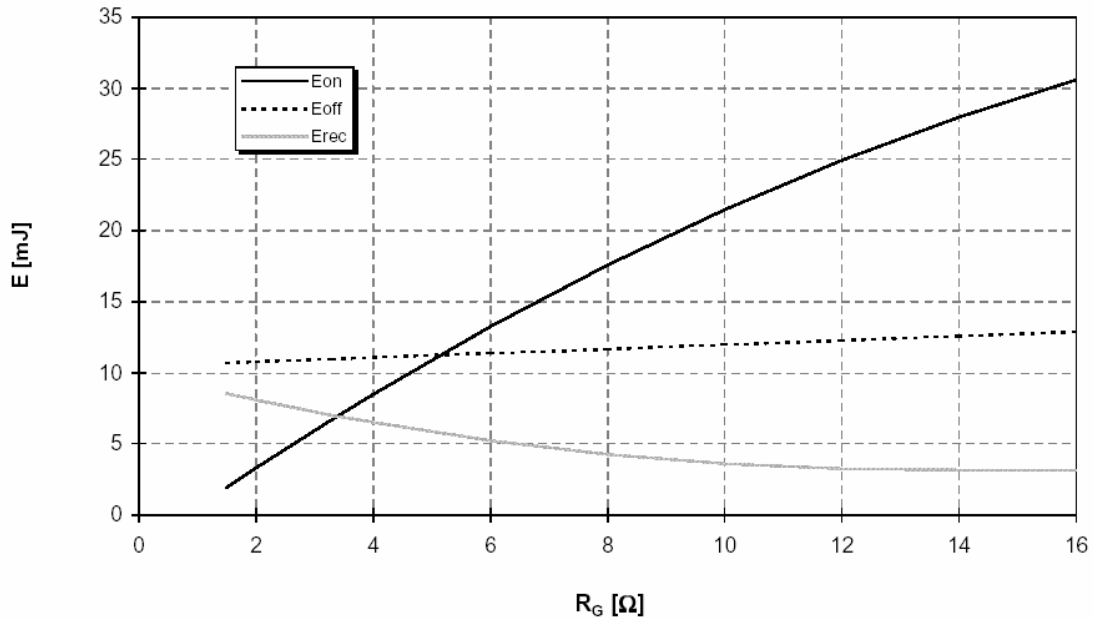
Switching losses (typical)

$R_{G,on} = 3,3\Omega$, $R_{G,off} = 3,3\Omega$, $V_{CC} = 300V$, $T_{vj} = 125^\circ C$



Switching losses (typical)

$I_c = 300A$, $V_{CC} = 300V$, $T_{vj} = 125^\circ C$

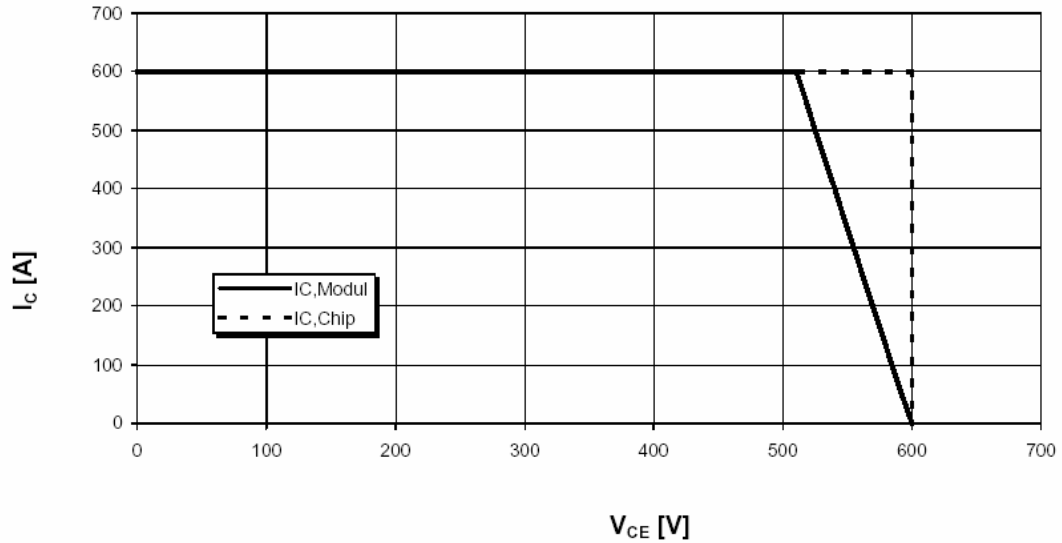


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Reverse bias safe operation area (RBSOA) $V_{GE} = +15V, R_{G,off} = 3,3\Omega, T_{vj} = 125^{\circ}C$



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