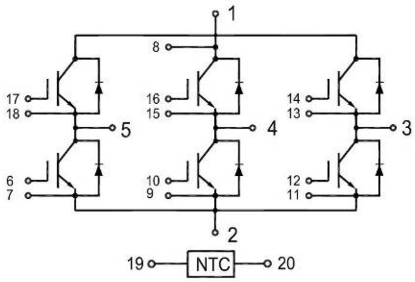
GSID200A120S5C1

Si IGBT Module

Features：

- Short Circuit Rated ＞10 μs
- Low Saturation Voltage: VCE (sat) = 1.65 V @ IC = 200 A , TC = 25 ℃
- Low Switching Loss
- 100% RBSOA Tested（2×Ic）
- Low Stray Inductance
- Lead Free, Compliant with RoHS Requirement

Applications：



- High Power Converters
- Motor Drives
- UPS Systems

Maximum Rated Values of IGBT(T_C = 25 ℃ unless otherwise specified)

V_{CES}	Collector-Emitter Blocking Voltage		1200	V
V_{GES}	Gate-Emitter Voltage		±20	V
I_C	Continuous Collector Current	T_C = 80 ℃	200	A
		T_C = 25 ℃	382	A
I_{CM}	Repetitive Peak Collector Current	T_J = 175 ℃	400	A
t_{SC}	Short Circuit Withstand Time		>10	μs
P_D	Maximum Power Dissipation per IGBT	T_C = 25 ℃ T_{Jmax} = 175 ℃	1260	W

Electrical Characteristics of IGBT (T_C = 25 ℃ unless otherwise specified)

Static characteristics

Symbol	Description	Conditions		Min	Typ	Max	Unit
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	I_C = 4 mA, V_{CE} = V_{GE}		4.0	5.7	6.0	V
$V_{CE(sat)}$ (Terminal)	Collector-Emitter Saturation Voltage	I_C = 200 A, V_{GE} = 15 V	T_J = 25 ℃		1.65	1.95	V
			T_J = 125 ℃		1.85		V
			T_J = 150 ℃		1.90		V
$V_{CE(sat)}$ (Chip)	Collector-Emitter Saturation Voltage	I_C = 200 A, V_{GE} = 15 V	T_J = 25 ℃		1.65	1.90	V
			T_J = 125 ℃		1.80		V
			T_J = 150 ℃		1.85		V
I_{CES}	Collector-Emitter Leakage Current	V_{GE} = 0 V, V_{CE} = V_{CES}, T_J = 25 ℃				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = ±20 V, V_{CE} = 0 V, T_J = 25 ℃				400	nA
C_{ies}	Input Capacitance	V_{CE} = 25 V, V_{GE} = 0 V , f = 1 MHz			16.5		nF
C_{res}	Reverse transfer Capacitance				0.60		nF

Switching Characteristics

$t_{d(on)}$	Turn-on Delay Time	V_{CC} = 600 V, I_C = 200 A, R_{Gon} = 2 Ω, V_{GE} = ±15 V, Inductive Load	T_J = 25 ℃		307		ns
			T_J = 125 ℃		310		
			T_J = 150 ℃		309		
t_r	Rise Time		T_J = 25 ℃		104		ns
			T_J = 125 ℃		105		
			T_J = 150 ℃		109		
$t_{d(off)}$	Turn-off Delay Time	V_{CC} = 600 V, I_C = 200 A, R_{Goff} = 2 Ω, V_{GE} = ±15 V, Inductive Load	T_J = 25 ℃		313		ns
			T_J = 125 ℃		335		
			T_J = 150 ℃		335		
t_f	Fall Time		T_J = 25 ℃		182		ns
			T_J = 125 ℃		319		
			T_J = 150 ℃		335		

E_{on}	Turn-on Switching Loss	V_{CC} = 600 V, I_C = 200 A, R_{Gon} = 2 Ω, V_{GE} = ±15 V, di/dt = 1855 A/μs (T_J = 150 ℃) Inductive Load	T_J = 25 ℃		14.5		mJ
			T_J = 125 ℃		19.0		
			T_J = 150 ℃		20.2		
E_{off}	Turn-off Switching Loss	V_{CC} = 600 V, I_C = 200 A, R_{Goff} = 2 Ω, V_{GE} = ±15 V, dv/dt = 3767 V/μs (T_J = 150 ℃) Inductive Load	T_J = 25 ℃		15.7		mJ
			T_J = 125 ℃		22.7		
			T_J = 150 ℃		24.7		
Q_g	Total Gate Charge	VGE = +15 V…_-15 V	T_J = 25 ℃		1065		nC
			T_J = 125 ℃		1057		
			T_J = 150 ℃		1060		
R_{gint}	Internal Gate Resistor				3.75		Ω
RBSOA	Reverse Bias Safe Operation Area	I_C = 400 A, V_{CC} = 1050 V, Vp = 1200 V, Rg = 2 Ω, V_{GE} = +15 V to 0 V, T_J = 150 °C			Trapezoid		
SCSOA	Short Circuit Safe Operation Area	V_{CC} = 600 V, V_{GE} = 15 V, T_J = 150 °C		10			μs
$R_{\theta JC}$	IGBT Thermal Resistance: Junction-To-Case (per leg)				0.119		℃/W

Diode, Inverter

Maximum Rated Values (T_C = 25 ℃ unless otherwise specified)

V_{RRM}	Repetitive Peak Reverse Voltage	1200	V
I_F	Diode Continuous Forward Current	200	A
I_{FM}	Peak FWD Current Repetitive	400	A

Electrical Characteristics of Diode (T_C = 25 ℃ unless otherwise specified)

Symbol	Description	Conditions		Min	Typ	Max	Unit
V_F (Terminal)	Forward Voltage	I_F = 200 A	T_J = 25 ℃		2.00		V
			T_J = 125 ℃		2.20		
			T_J = 150 ℃		2.10		
V_F (Chip)	Forward Voltage	I_F = 200 A	T_J = 25 ℃		2.00		V
			T_J = 125 ℃		2.20		
			T_J = 150 ℃		2.10		

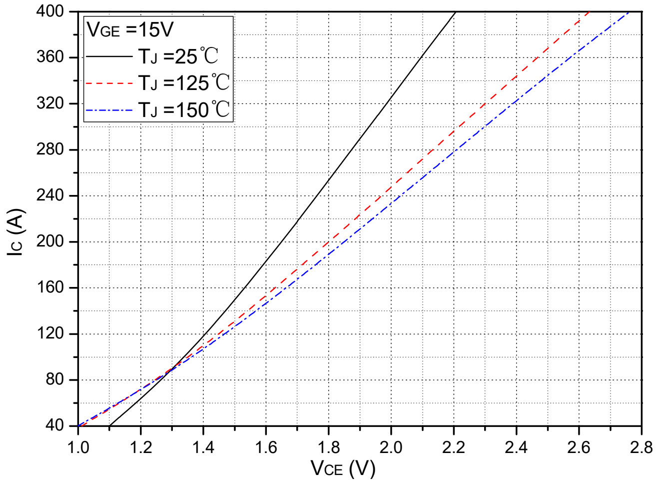
I_{rr}	Peak Reverse Recovery Current	I_F = 200 A, di/dt = 1500 A/μs, V_{rr} = 600 V, V_{GE} = -15 V	T_J = 25 ℃		109		A
			T_J = 125 ℃		144		
			T_J = 150 ℃		155		
Q_{rr}	Reverse Recovery Charge	I_F = 200 A, di/dt = 1500 A/μs, V_{rr} = 600 V, V_{GE} = -15 V	T_J = 25 ℃		13.7		μC
			T_J = 125 ℃		25.5		
			T_J = 150 ℃		30.1		
E_{rec}	Reverse Recovery Energy	I_F = 200 A, di/dt = 1500 A/μs, V_{rr} = 600 V, V_{GE} = -15 V	T_J = 25 ℃		5.4		mJ
			T_J = 125 ℃		11.7		
			T_J = 150 ℃		14.3		
$R_{θJC}$	Diode Thermal Resistance: Junction-To-Case (per leg)				0.13		℃/W

NTC-Thermistor Characteristic values

Symbol	Description	Min	Typ	Max	Unit
R_{25}	T_C = 25 ℃		5		kΩ
△R/R	T_C = 100 ℃， R_{100} = 481 Ω			±5	%
P_{25}	T_C = 25 ℃		50		mW
$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2-1/(298.15\ K))]$		3380		K
$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2-1/(298.15\ K))]$		3440		K

Module

Symbol	Description		Min	Typ	Max	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted)	f = 50 Hz, 1 minute	2500			V
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
$R_{θCS}$	Case-To-Sink Thermally (Conductive Grease Applied)			0.02		℃/W
T	Power Terminals Screw: M6		3.0		6.0	N·m
T	Mounting Screw: M5		3.0		6.0	N·m
G	Weight			390		g



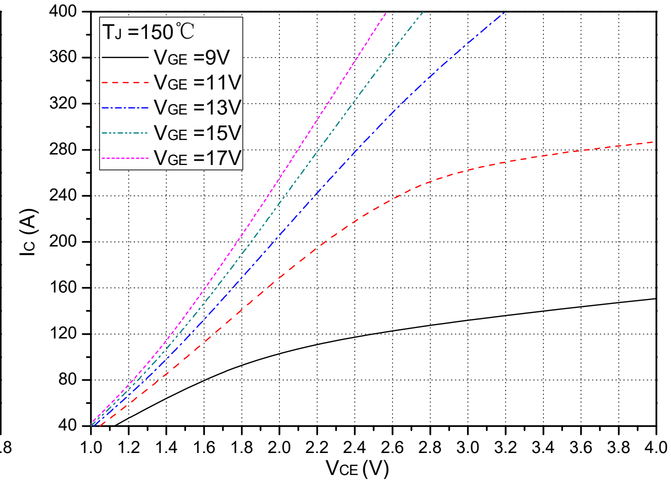
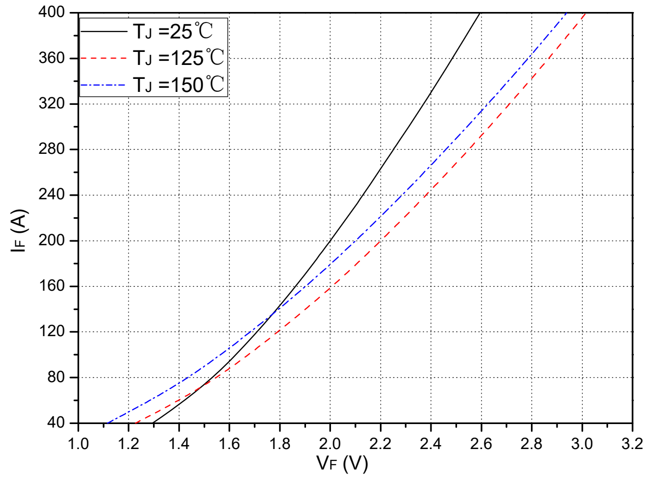


Fig.1 Typical Saturation Voltage Characteristics(chip) Fig.2 Typical Output Characteristics(chip)



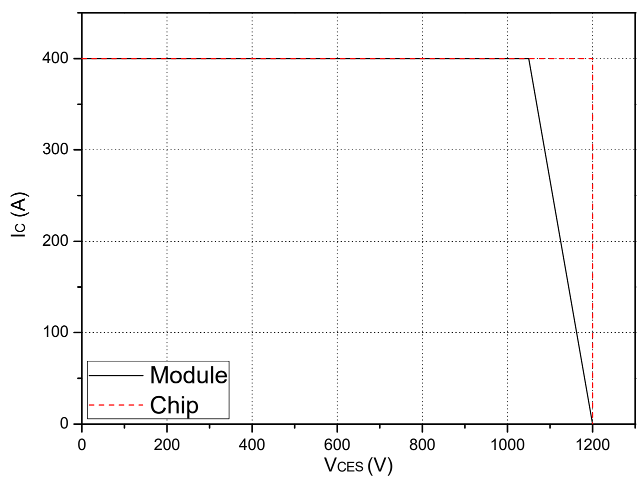
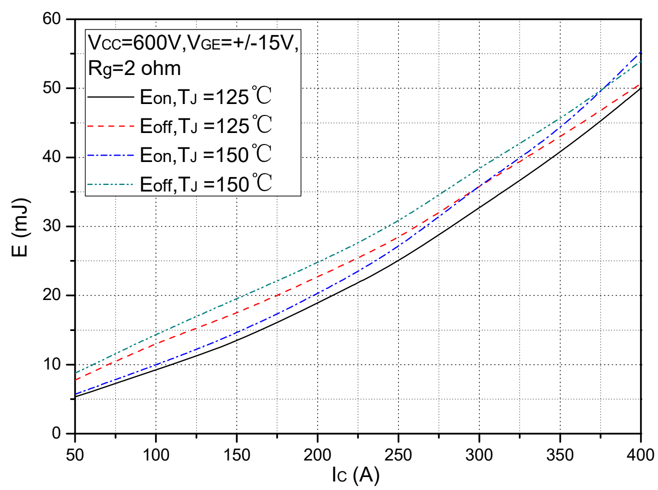


Fig.3 Forward Characteristics of Diode（chip） Fig.4 Reverse Bias Safe Operation Area (RBSOA)



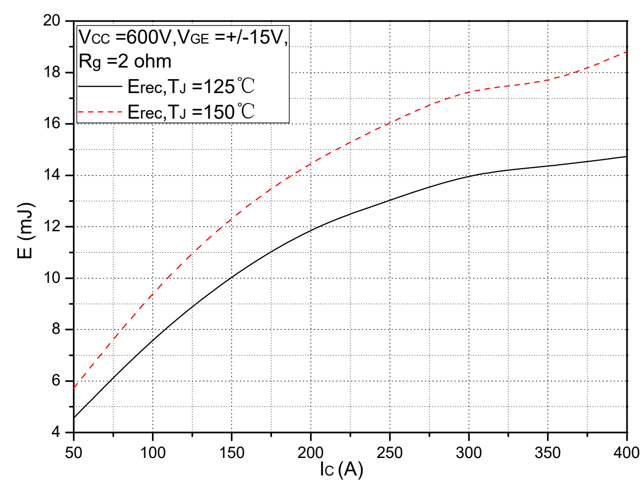
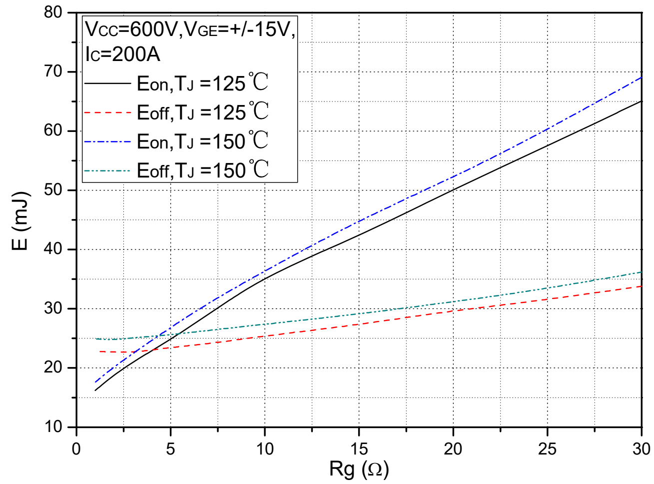


Fig.5 Typical Switching Loss vs. Collector Current Fig.6 Typical Switching Loss vs. Collector Current



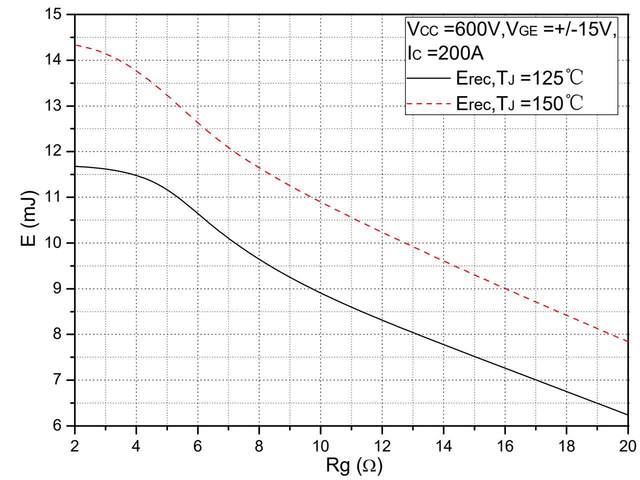
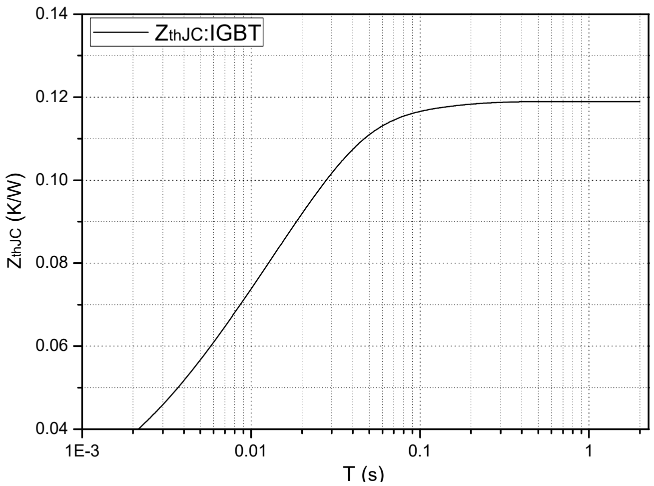


Fig.7 Typical Switching Loss vs. Gate Resistance Fig.8 Typical Switching Loss vs. Gate Resistance



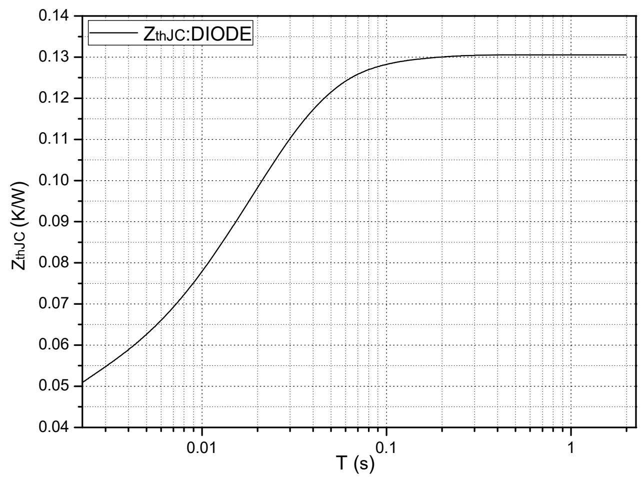


Fig.9 Transient thermal impedance (IGBT) Fig.10 Transient thermal impedance (Diode)

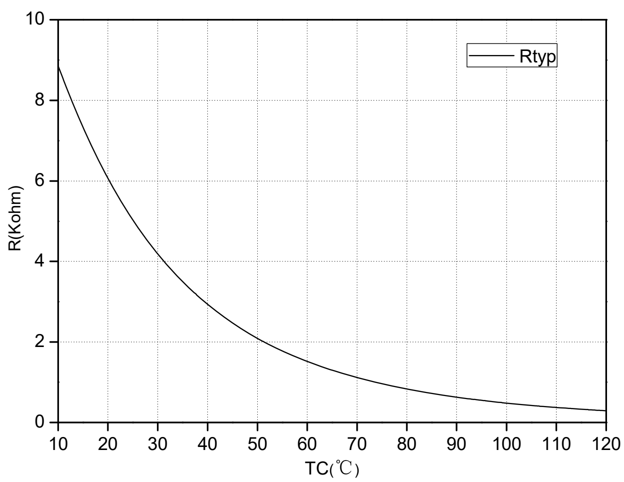
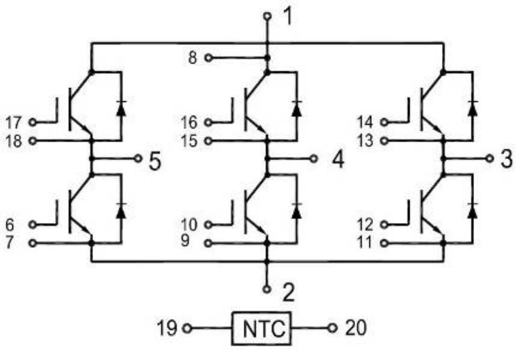
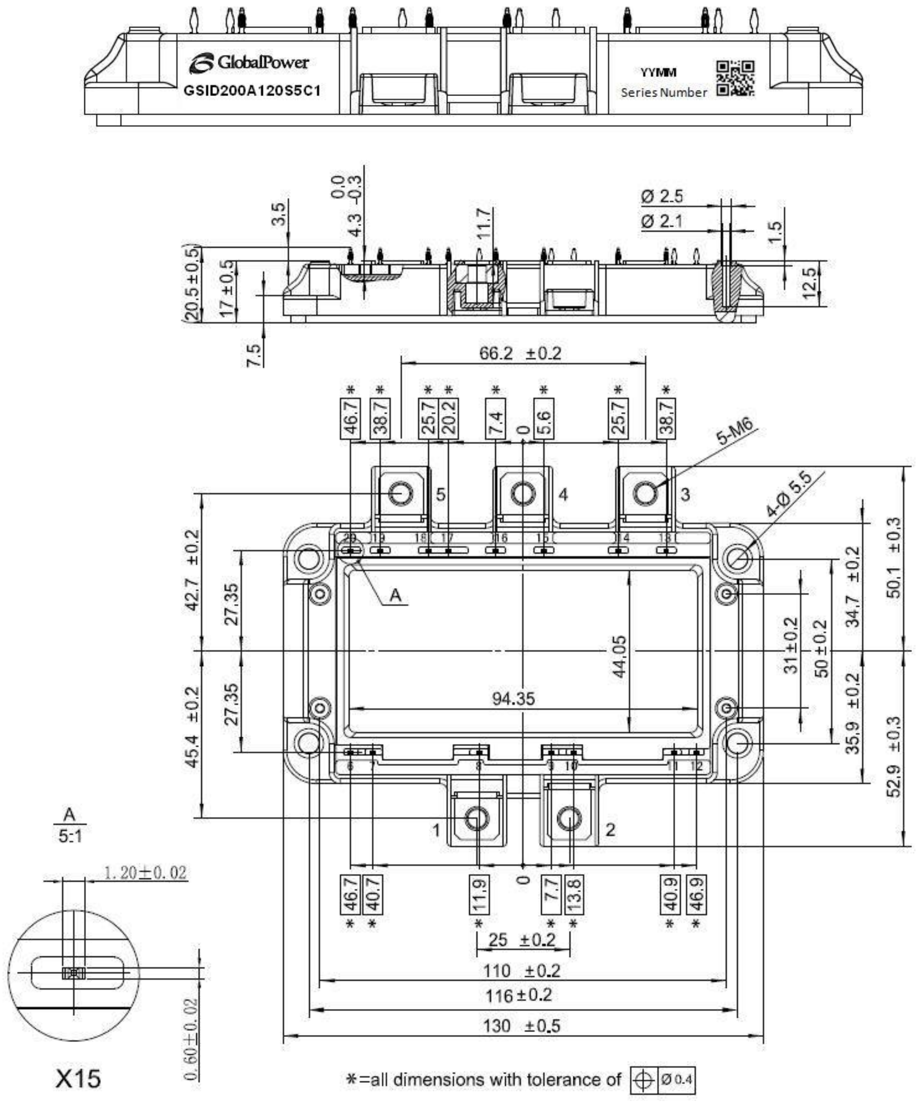


Fig.11 NTC Temperature characteristics

Internal Circuit



Package Outline (Unit: mm):



Revision History

Date	Revision	Notes
10/23/2015	0.1	Initial release of preliminary datasheet.
11/15/2015	0.2	Add the test data at junction temperature of 150^{o}C.
12/28/2015	0.3	Update the freewheeling diode specifications.
01/31/2016	0.4	Add the internal gate resistor parameter
01/03/2020	0.5	Applied company name change
03/20/2020	0.6	Revise internal IGBT data

Notes

RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of www.SemiQ.com.

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