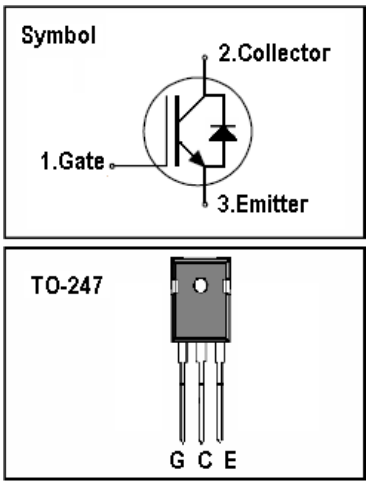
IGBT



Features

- 650V,75A
- $V_{CE(sat)(typ.)}$=1.9V@V_{GE}=15V,I_C=75A
- High speed switching
- Positive VCE(on) Temperature Coefficient
- Trench & Field Stop Technology

General Description

JIAEN FS-IGBTs offer lower losses and higher energy efficiency for application such as solar inverter、servo drive amplifier and ups applications.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	650	V
V_{GES}	Gate-Emitter Voltage	± 20	V
I_C	Continuous Collector Current (T_C=25 ℃)	115	A
	Continuous Collector Current (T_C=100℃)	75	A
I_{CM}	Pulsed Collector Current (Note 1)	225	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	75	A
I_{FM}	Diode Maximum Forward Current (Note 1)	225	A
t_{sc}	Short Circuit Withstand Time（Tj≤150℃）	5	us
P_D	Maximum Power Dissipation (T_C=25 ℃)	375	W
	Maximum Power Dissipation (T_C=100℃)	187	W
T_J	Operating Junction Temperature Range	-55 to +175	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.4	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.42	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/ W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	650	-	-	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 650V, V_{GE}= 0V	-	-	75	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=30V, V_{CE}= 0V	-	-	100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V	-	-	100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	3.2	4.0	4.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C= 75A TC=25℃	1.50	1.90	2.40	V
		I_C= 75A TC=125℃		2.15		
Qg	Total Gate Charge	V_{CC}=520V V_{GE}=15V I_C=75A	-	118		nC
Qge	Gate-Emitter Charge		-	32		nC
Qgc	Gate-Collector Charge		-	30		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=520V V_{GE}=15V I_C=75A R_G=15Ω Inductive Load T_C=25 ℃ note2	-	45	-	ns
t_r	Turn-on Rise Time		-	100	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	232	-	ns
t_f	Turn-off Fall Time		-	137	-	ns
Eon	Turn-on Switching Loss		-	3.56	-	mJ
Eoff	Turn-off Switching Loss		-	4.58	-	mJ
Ets	Total Switching Loss		-	8.14	-	mJ
Cies	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 1MHz	-	3780	-	pF
Coes	Output Capacitance		-	356	-	pF
Cres	Reverse Transfer Capacitance		-	37	-	pF

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=75A	-	1.58	2.0	V
		I_F=75A TC=125℃		1.35		
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 400V I_F= 75A dI_F/dt = 200A/us	-	135		ns
I_{rr}	Diode peak Reverse Recovery Current		-	28		A
Q_{rr}	Diode Reverse Recovery Charge		-	1.8		uC

Notes：

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. From jiaen labroratory

Typical Performance Characteristics

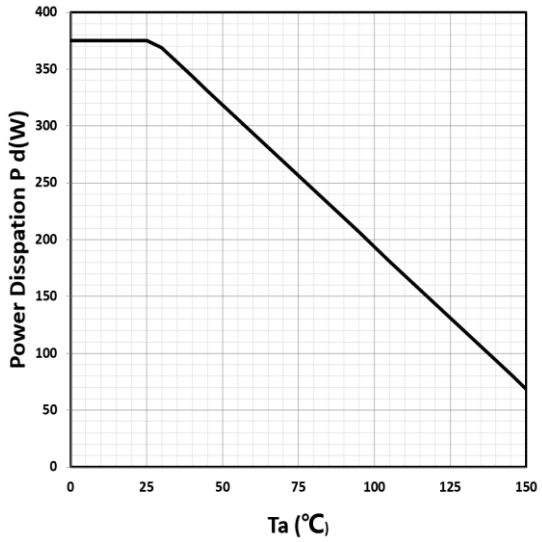


Figure1: power dissipation VS. case temprature

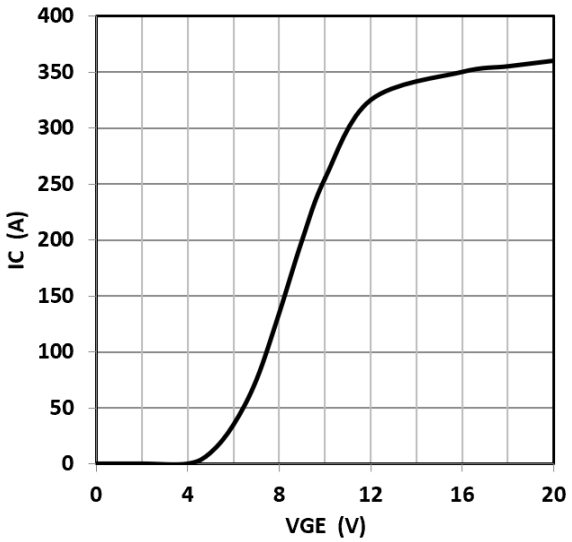


Figure2: VGE VS IC

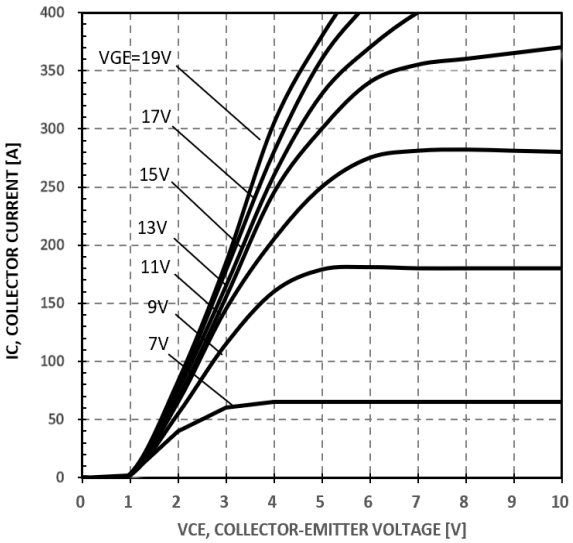


Figure3:typical IGBT output characteristics,

TJ=25℃

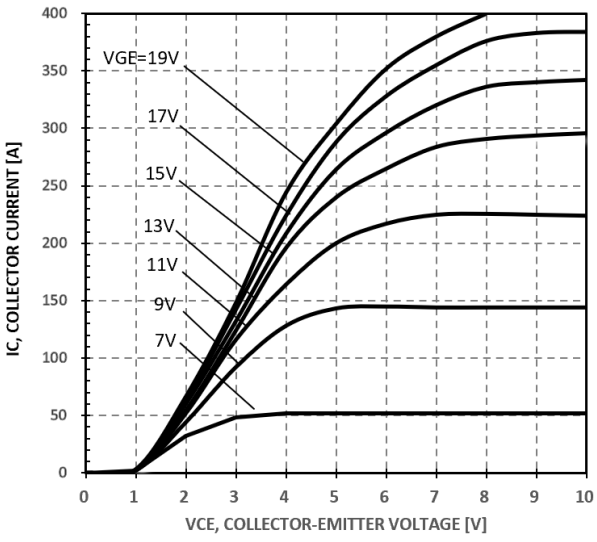


Figure4: typical IGBT output characteristics,

TJ=150℃

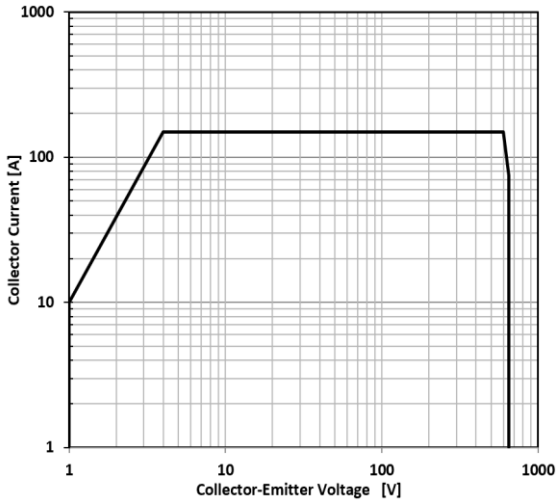


Figure5: reverse bias SOA,TJ=125℃,VGE=15V

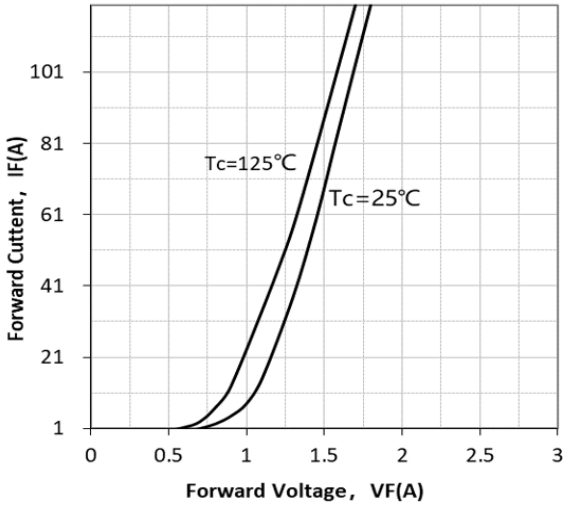


Figure6: typical diode forward characteristic

Figure7: gate threshold voltage

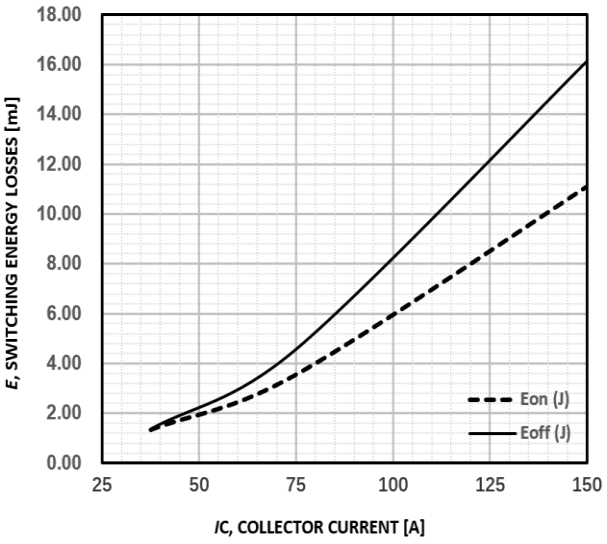


Figure7: typical energy loss VS. IC, TC=25℃,

L=100uH， VCE=520V,VGE=15V,Rg=15Ω

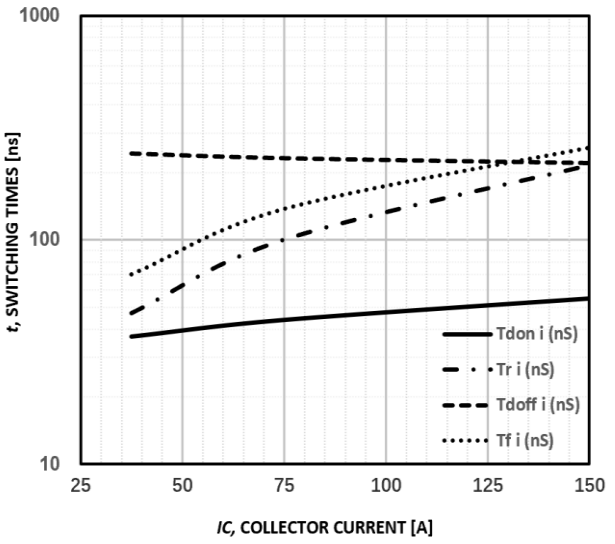


Figure8: typical switching time VS. IC, TC=25℃,

L=100uH, VCE=520V,VGE=15V,Rg=15Ω

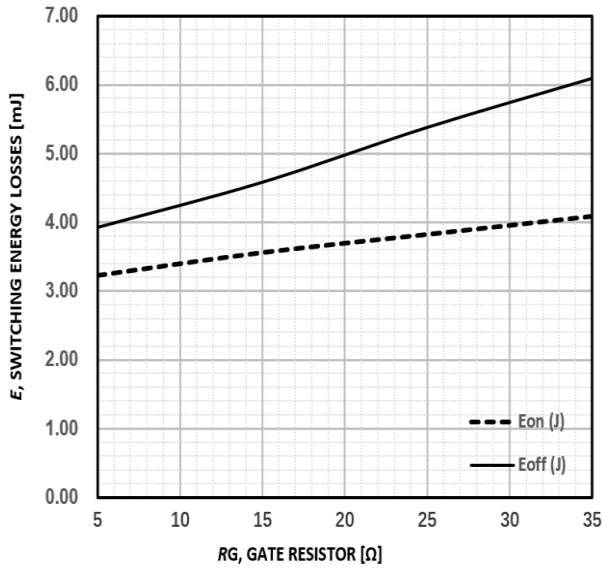


Figure9: typical energy loss VS. Rg,TC=25℃, L=100uH, VCE=520V, VGE=15V ,IC=75A

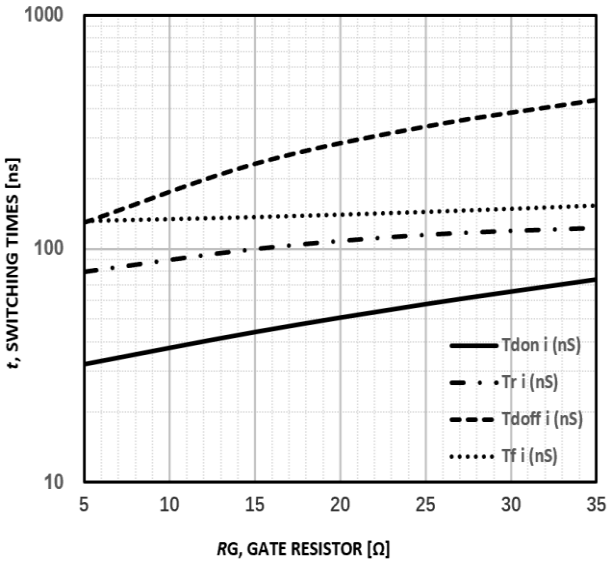


Figure10: typical switching time VS. Rg,TC=25℃, L=100uH,VCE=520V,VGE=15V,IC=75A

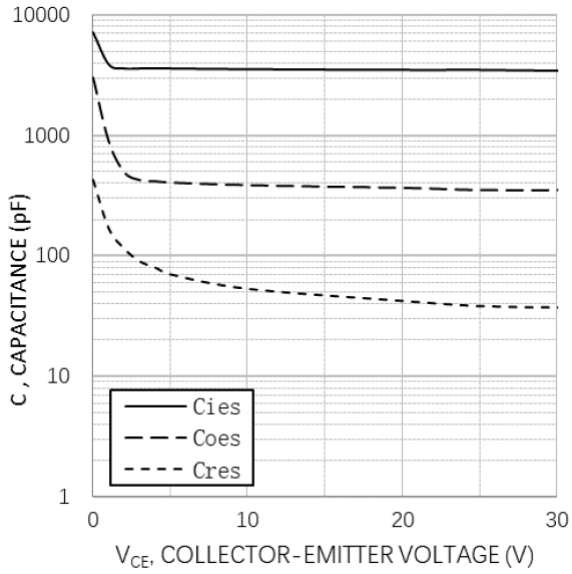


Figure11:typical capacitance VS. VCE, VGE=0V,f=100kHz

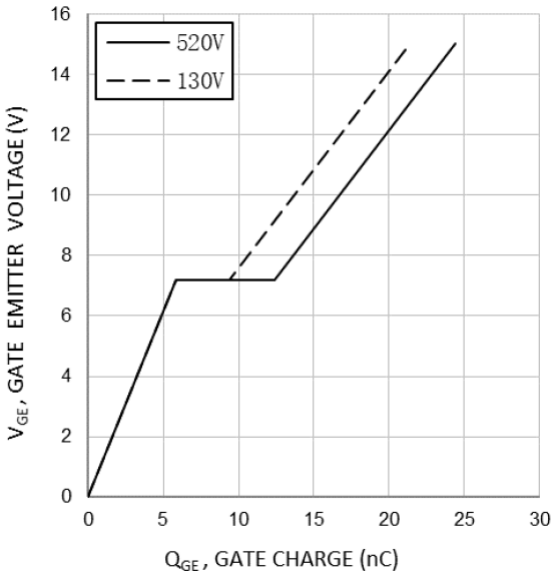
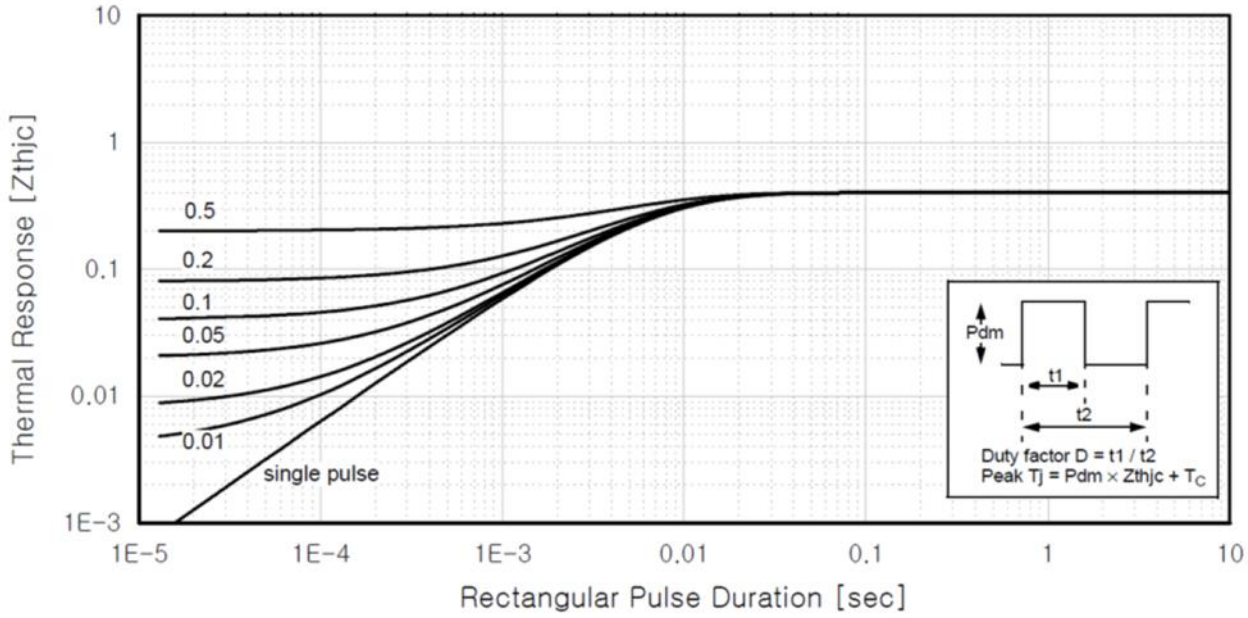


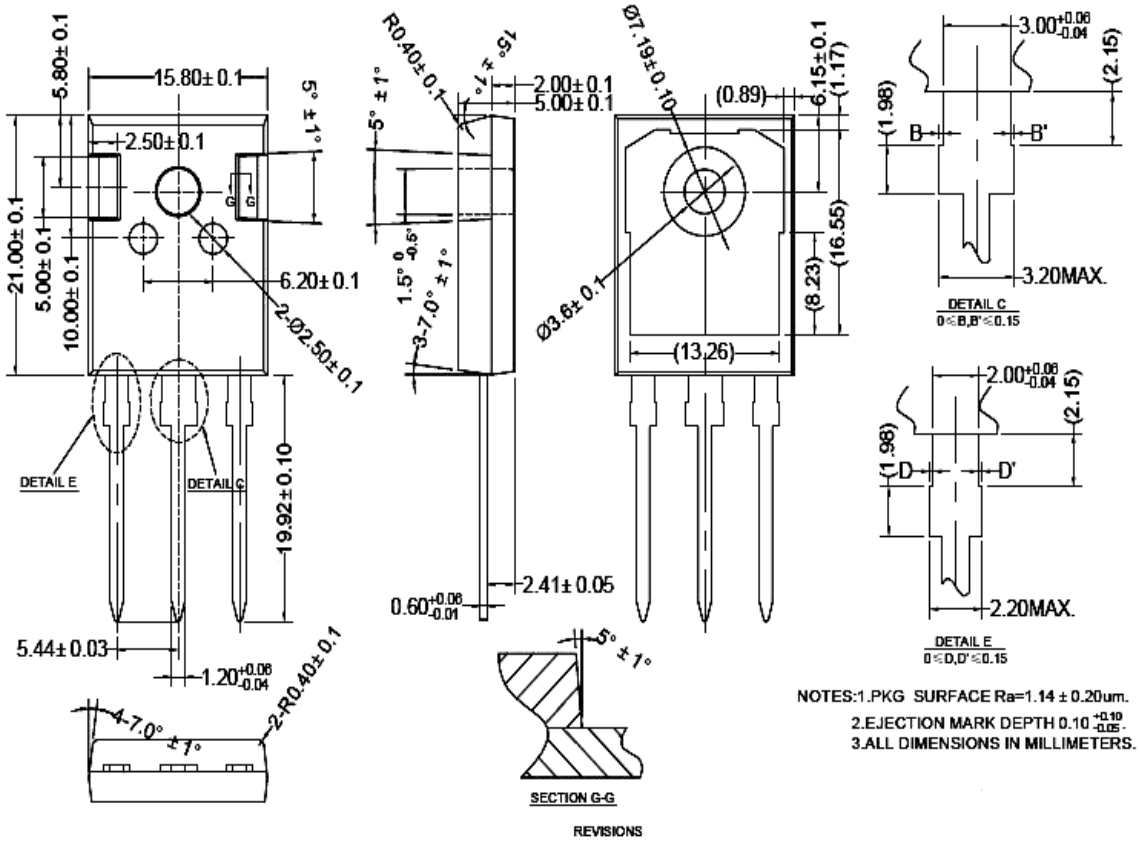
Figure12:typical gate charge VS. VGE,IC=75A

Figure13: normalized transient thermal impedance, junction-to-case

Note1.Duty factor D=t1/t2 Note2: peak TJ=PDM × Zthjc + TC



TO247 PACKAGE OUTLINE



公差标注	公差值	表面粗糙度
0	±0.2	Ra3.2~6.3
0.0	±0.1	Ra1.6~3.2
0.00	±0.01	Ra0.8~1.6
0.000	±0.005	Ra0.4~0.8
0.0000	±0.002	Ra0.2~0.4

0≤D,D'≤0.15

NOTES:1.PKG SURFACE Ra=1.14 ± 0.20um.
2.EJECTION MARK DEPTH 0.10 +0.10 -0.05.
3.ALL DIMENSIONS IN MILLIMETERS.

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