

RJP65T43DPQ-A0

650V - 30A - IGBT

Application: Power Factor Correction circuit

R07DS1376EJ0100

Rev. 1.00

Feb 24, 2017

Features

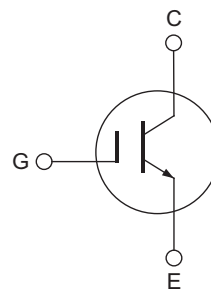
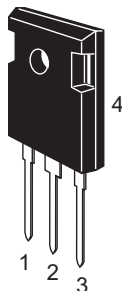
- Low collector to emitter saturation voltage
 $V_{CE(sat)} = 1.8 \text{ V typ. (at } I_C = 20 \text{ A, } V_{GE} = 15 \text{ V, } T_a = 25^\circ\text{C)}$
- Trench gate and thin wafer technology (G7H series)
- High speed switching
 $t_f = 45 \text{ ns typ. (at } V_{CC} = 400\text{V, } V_{GE} = 15\text{V, } I_C = 20\text{A, } R_g = 10\Omega, T_a = 25^\circ\text{C, Inductive load)}$
- Operation frequency ($20\text{kHz} \leq f < 100\text{kHz}$)
 Rating of collector current $I_C = 30\text{A (at } T_c = 100^\circ\text{C)}$
- Not guarantee short circuit withstand time

Key Nominal Performance

Type	V_{CES}	I_C	$V_{CE(sat)}, T_a=25^\circ\text{C}$	T_j	Marking	Package
RJP65T43DPQ-A0	650V	20A	1.8V	175°C	RJP65T43	TO-247A

Outline

RENESAS Package code: PRSS0003ZH-A
 (Package name: TO-247A)



1. Gate
2. Collector
3. Emitter
4. Collector

Absolute Maximum Ratings

($T_c = 25^\circ\text{C}$)

Item	Symbol	Ratings	Unit
Collector to emitter voltage	V_{CES}	650	V
Gate to emitter voltage	V_{GES}	± 30	V
Collector current	$T_c = 25^\circ\text{C}$	I_C	60
	$T_c = 100^\circ\text{C}$	I_C	30
Collector peak current	$i_{c(peak)}$ ^{Note1}	150	A
Collector dissipation	P_C	150	W
Junction to case thermal resistance	θ_{j-c}	1.0	$^\circ\text{C/W}$
Junction temperature	T_j ^{Note2}	175	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Note: Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect a reliability even if it are within the absolute maximum ratings. Please consider derating condition for appropriate reliability in reference Renesas Semiconductor Reliability Handbook (Recommendation for Handling and Usage of Semiconductor Devices) and individual reliability data.

Electrical Characteristics

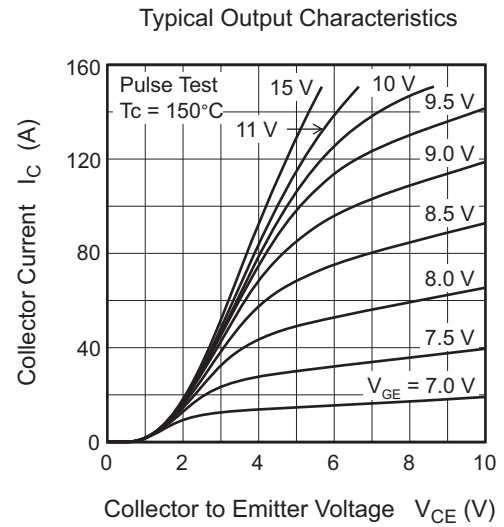
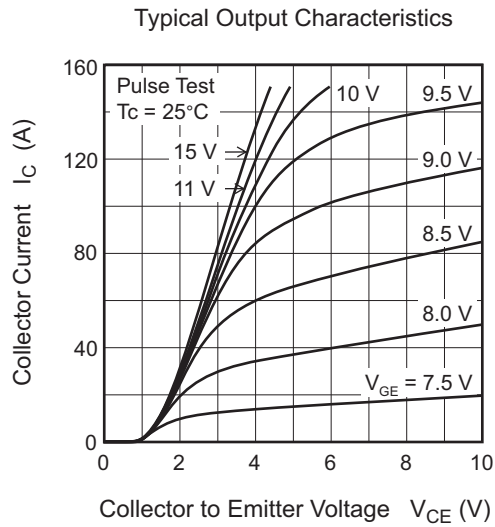
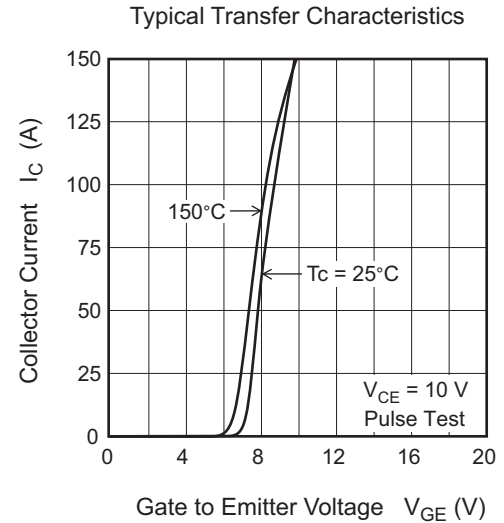
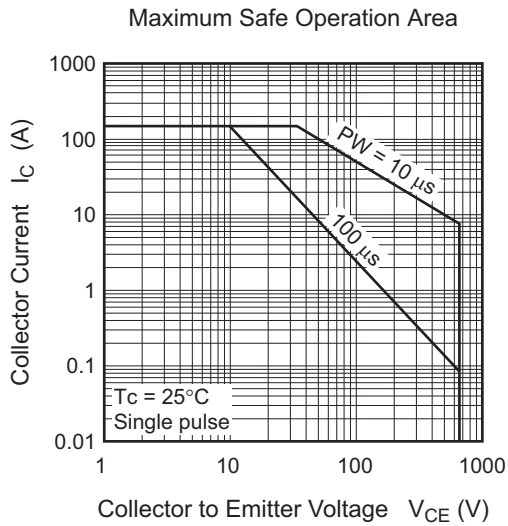
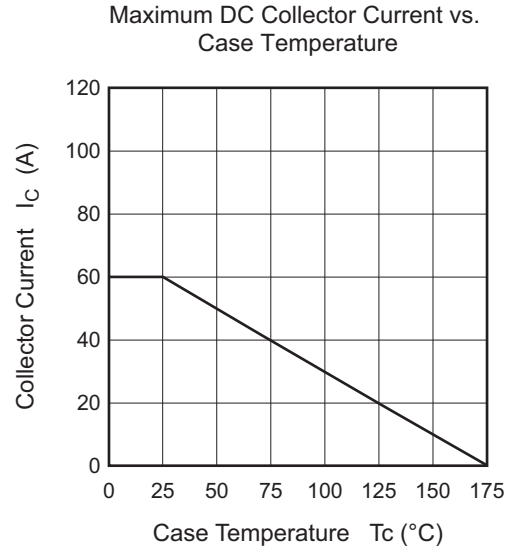
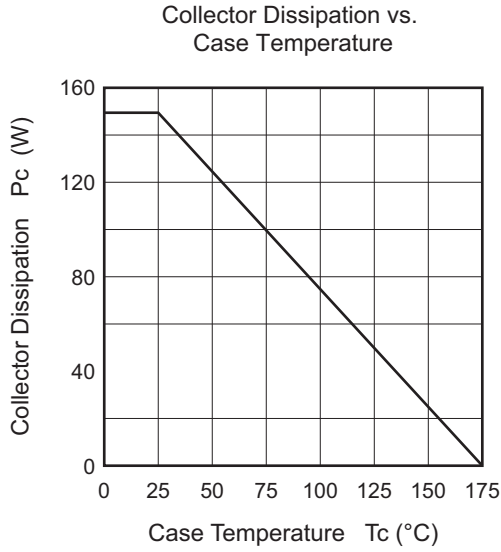
(Ta = 25°C)

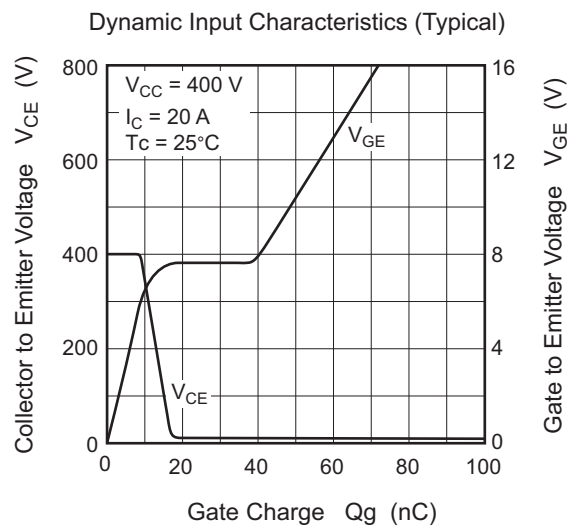
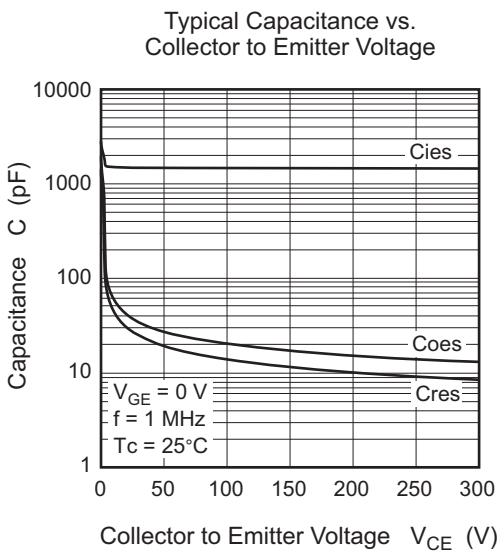
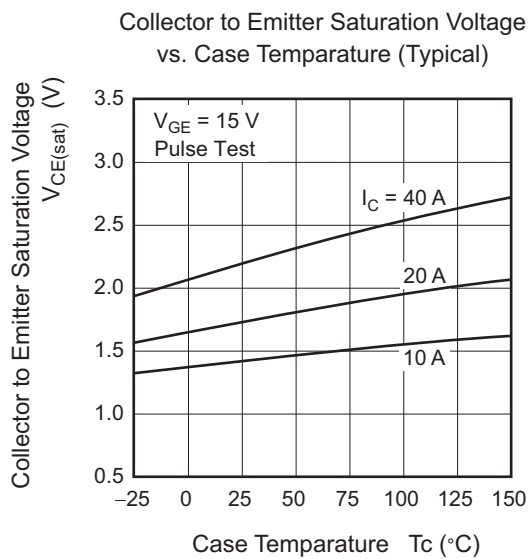
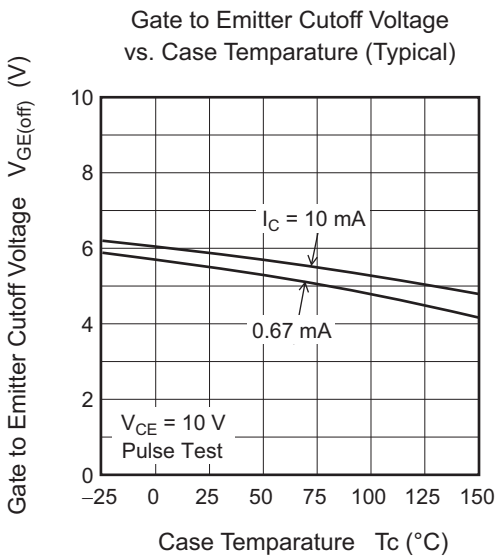
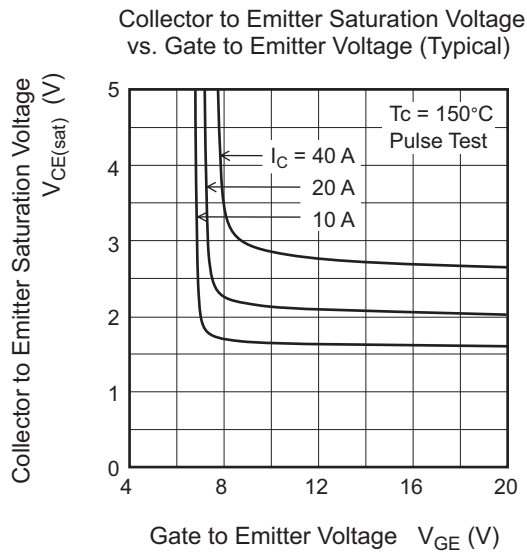
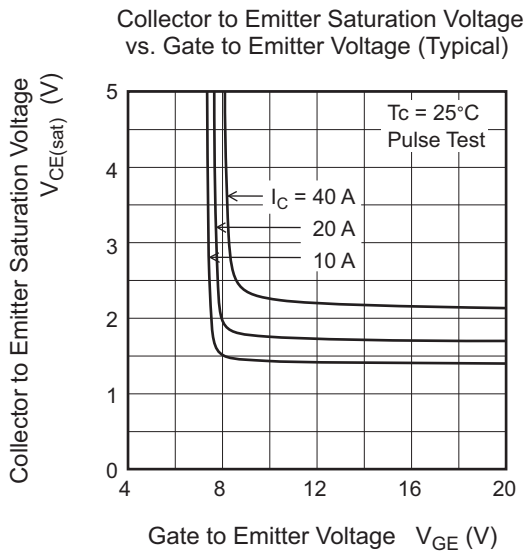
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Zero gate voltage collector current	I _{CES}	—	—	1	μA	V _{CE} = 650 V, V _{GE} = 0
Gate to emitter leak current	I _{GES}	—	—	±1	μA	V _{GE} = ±30 V, V _{CE} = 0
Gate to emitter cutoff voltage	V _{GE(off)}	4.0	—	7.0	V	V _{CE} = 10V, I _C = 0.67 mA
Collector to emitter saturation voltage	V _{CE(sat)}	—	1.8	2.4	V	I _C = 20 A, V _{GE} = 15V ^{Note3}
Total gate charge	Q _g	—	69	—	nC	V _{CE} = 400 V
Gate to emitter charge	Q _{ge}	—	10	—	nC	V _{GE} = 15V
Gate to collector charge	Q _{gc}	—	30	—	nC	I _C = 20A
Input capacitance	C _{ies}	—	1550	—	pF	V _{CE} = 25 V
Output capacitance	C _{oes}	—	37	—	pF	V _{GE} = 0
Reveres transfer capacitance	C _{res}	—	26	—	pF	f = 1 MHz
Turn-on delay time	t _{d(on)}	—	35	—	ns	V _{CC} = 400 V
Rise time	t _r	—	20	—	ns	V _{GE} = 15 V, I _C = 20 A
Turn-off delay time	t _{d(off)}	—	105	—	ns	R _g = 10 Ω, T _C = 25 °C
Fall time	t _f	—	45	—	ns	Inductive load ^{Note4}
Turn-on loss energy	E _{on}	—	0.17	—	mJ	
Turn-off loss energy	E _{off}	—	0.13	—	mJ	
Turn-on delay time	t _{d(on)}	—	32	—	ns	V _{CC} = 400 V
Rise time	t _r	—	20	—	ns	V _{GE} = 15 V, I _C = 20 A
Turn-off delay time	t _{d(off)}	—	115	—	ns	R _g = 10 Ω, T _C = 150°C
Fall time	t _f	—	45	—	ns	Inductive load ^{Note4}
Turn-on loss energy	E _{on}	—	0.28	—	mJ	
Turn-off loss energy	E _{off}	—	0.53	—	mJ	

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

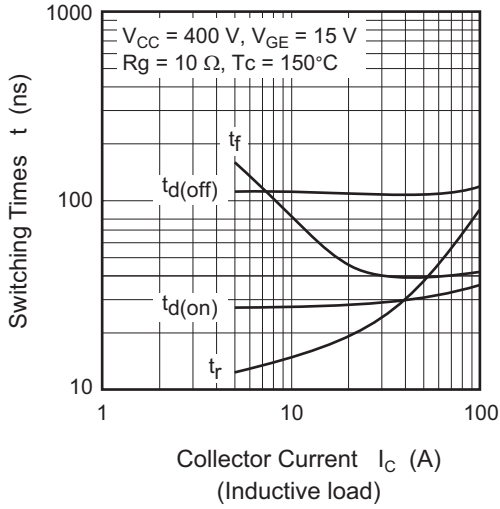
2. Please use this device in the thermal conditions which the junction temperature does not exceed 175°C. Renesas IGBT Application Note is disclosed about reliability test and application condition up to 175°C.
3. Pulse test
4. Switching time test circuit and waveform are shown below.

Main Characteristics

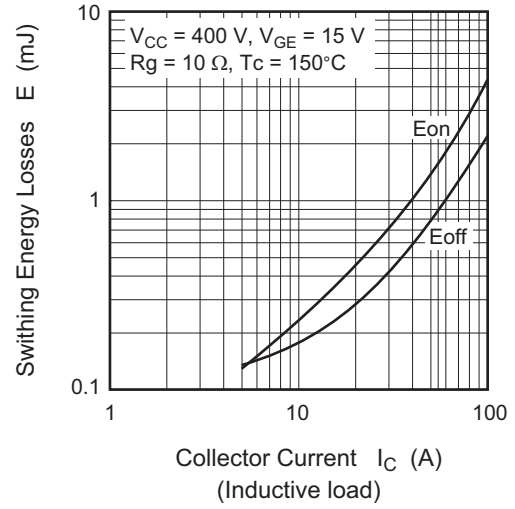




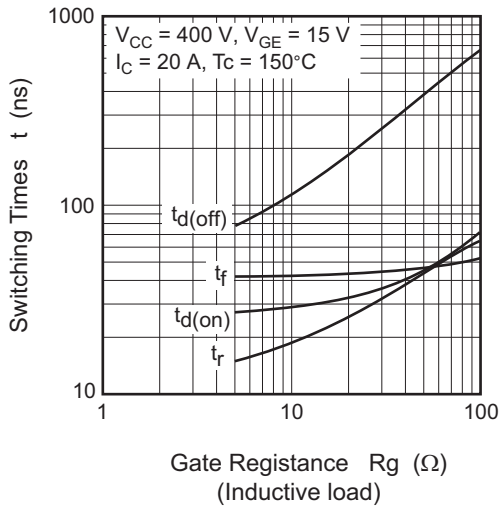
Switching Characteristics (Typical) (1)



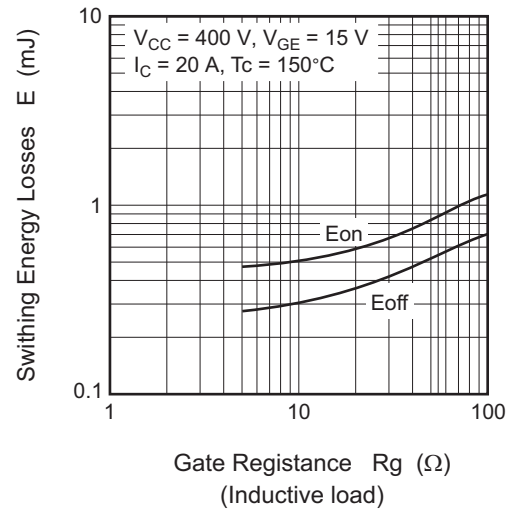
Switching Characteristics (Typical) (2)



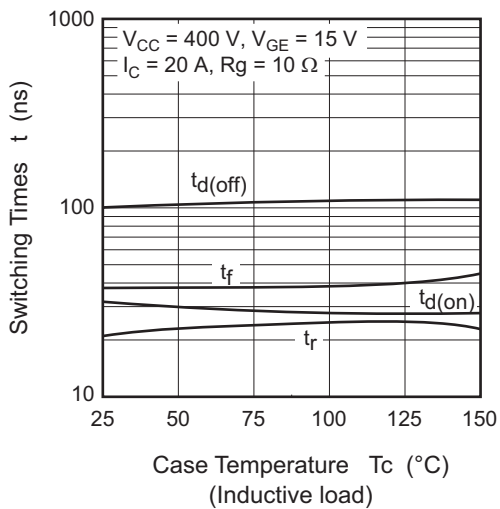
Switching Characteristics (Typical) (3)



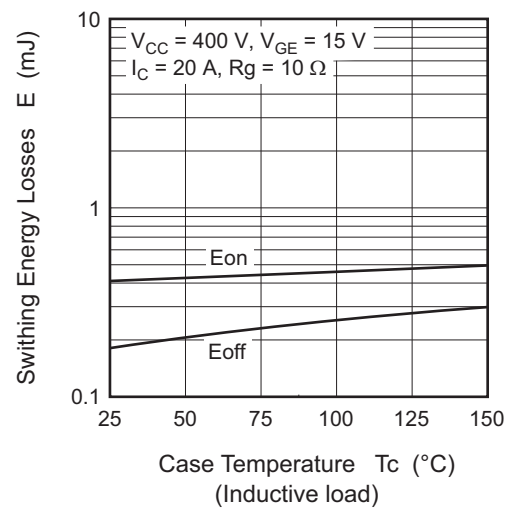
Switching Characteristics (Typical) (4)

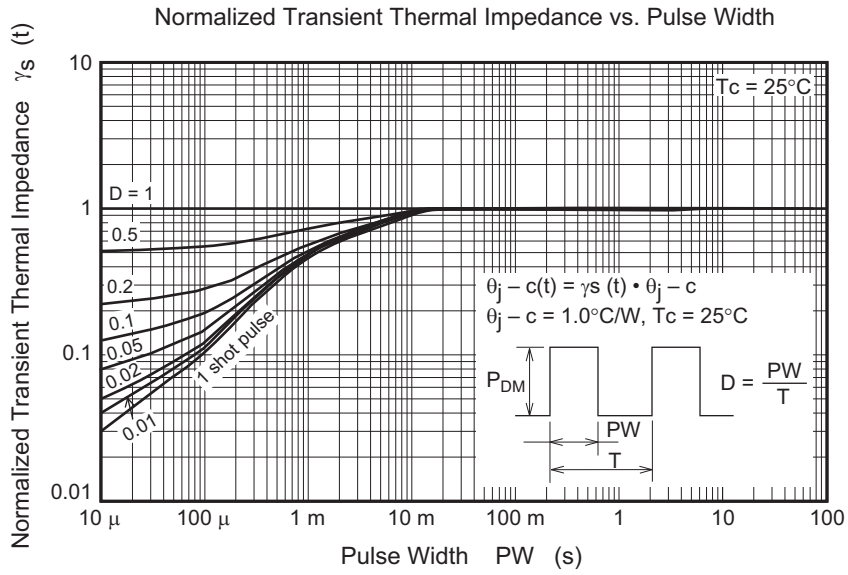


Switching Characteristics (Typical) (5)

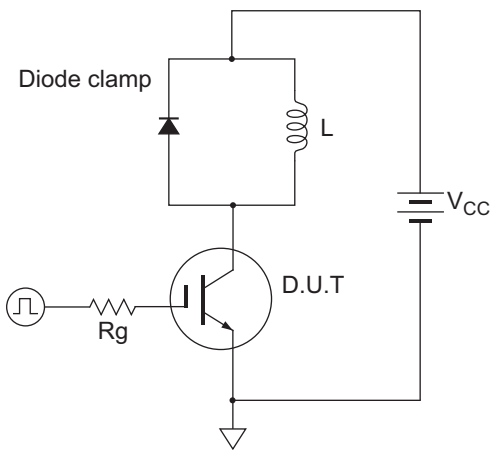


Switching Characteristics (Typical) (6)

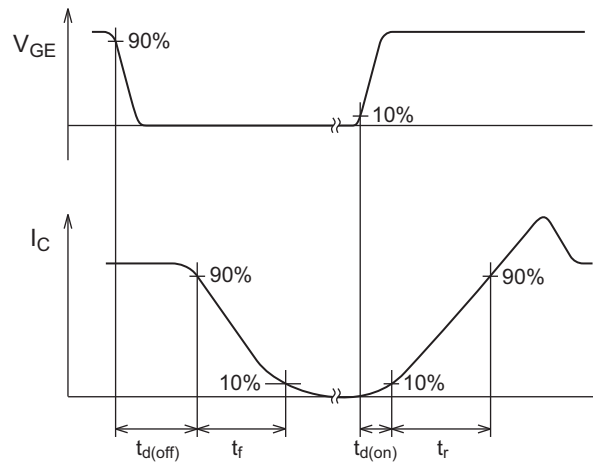




Switching Time Test Circuit



Waveform



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(Rev.3.0-1 November 2016)



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