Ordering number : ENA2192

ATP304

P-Channel Power MOSFET
-60V, -100A, 6.5mΩ, ATPAK

ON Semiconductor®

http://onsemi.com

Features

- On-resistance R_{DS}(on)1=5.0mΩ(typ.)
- Input Capacitance Ciss=13000pF(typ.)
- 4.5V drive
- Halogen Free compliance

Specifications

Absolute Maximum Ratings at Ta = 25°C

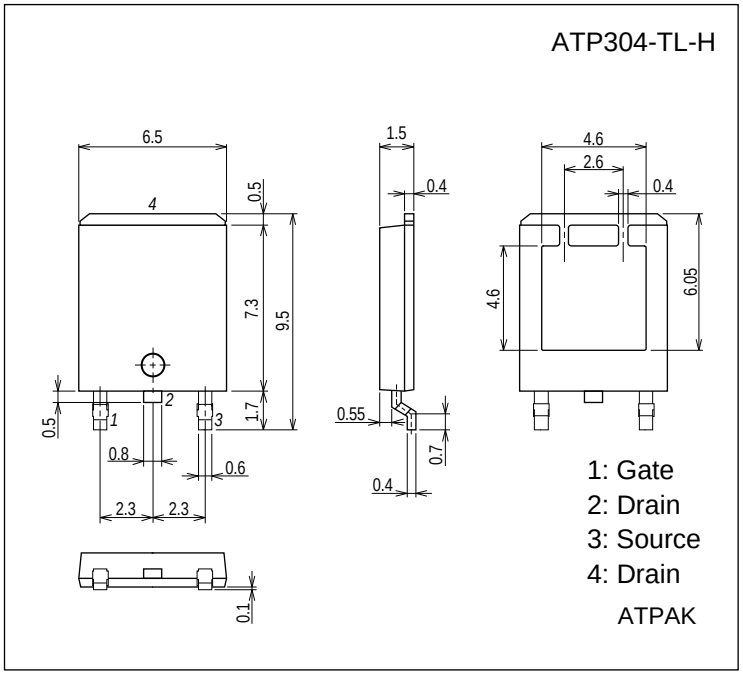
Parameter	Symbol	Conditions	Ratings	Unit
Drain to Source Voltage	V_{DSS}		-60	V
Gate to Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		-100	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	-400	A
Allowable Power Dissipation	P_D	Tc=25°C	90	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		- 55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		656	mJ
Avalanche Current *2	I_{AV}		-75	A

Note : *1 V_{DD}=-36V, L=100μH, I_{AV}=-75A
*2 L≤100μH, Single pulse

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Package Dimensions

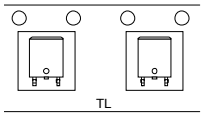
unit : mm (typ)
7057-001



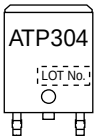
Ordering & Package Information

Device	Package	Shipping	note
ATP304-TL-H	ATPAK	3,000 pcs. / reel	Pb-Free and Halogen-Free

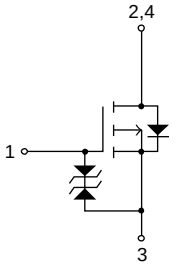
Packing Type: TL



Marking



Electrical Connection



Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=-1mA, V_{GS}=0V	-60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V			-10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±16V, V_{DS}=0V			±10	μA
Cutoff Voltage	V_{GS}(off)	V_{DS}=-10V, I_D=-1mA	-1.2		-2.6	V
Forward Transfer Admittance	| yfs |	V_{DS}=-10V, I_D=-50A		100		S
Static Drain to Source On-State Resistance	R_{DS}(on)1	I_D=-50A, V_{GS}=-10V		5.0	6.5	mΩ
	R_{DS}(on)2	I_D=-50A, V_{GS}=-4.5V		6.4	8.9	mΩ
Input Capacitance	Ciss	V_{DS}=-20V, f=1MHz		13000		pF
Output Capacitance	Coss			1080		pF
Reverse Transfer Capacitance	Crss			760		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		80		ns
Rise Time	t_r			650		ns
Turn-OFF Delay Time	t_d(off)			780		ns
Fall Time	t_f			460		ns
Total Gate Charge	Qg	V_{DS}=-36V, V_{GS}=-10V, I_D=-100A		250		nC
Gate to Source Charge	Qgs			55		nC
Gate to Drain “Miller” Charge	Qgd			50		nC
Diode Forward Voltage	V_{SD}	I_S=-100A, V_{GS}=0V		-1.0	-1.5	V
Reverse Recoverry Time	t_{rr}	See Fig.3		90		ns
Reverse Recoverry Charge	Q_{rr}	I_S=-100A, V_{GS}= 0V, di/dt=--100A/μs		245		nC

Fig.1 Unclamped Inductive Switching Test Circuit

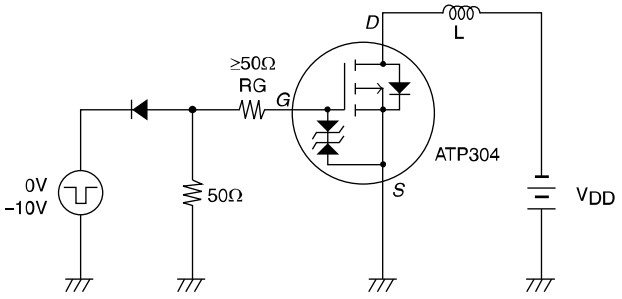


Fig.2 Switching Time Test Circuit

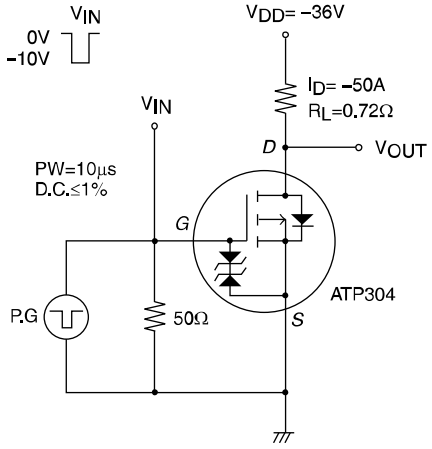
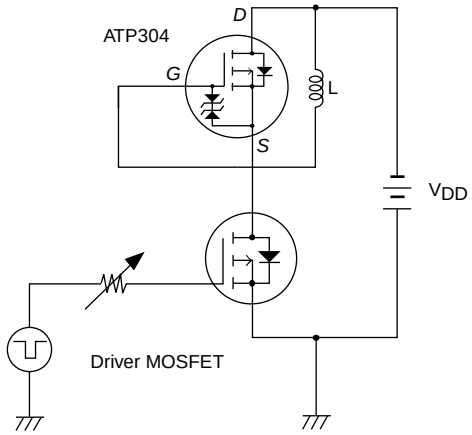
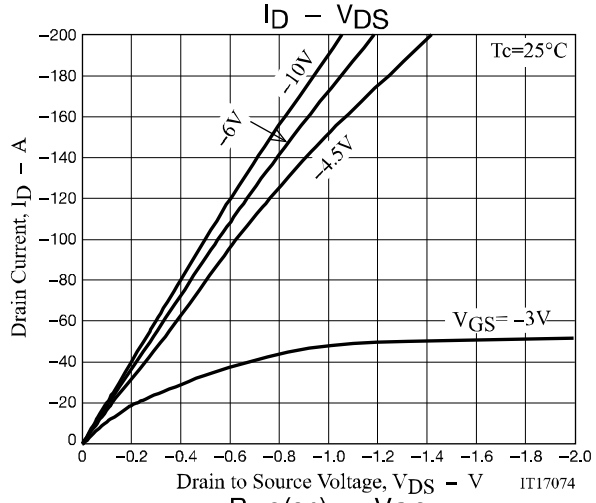
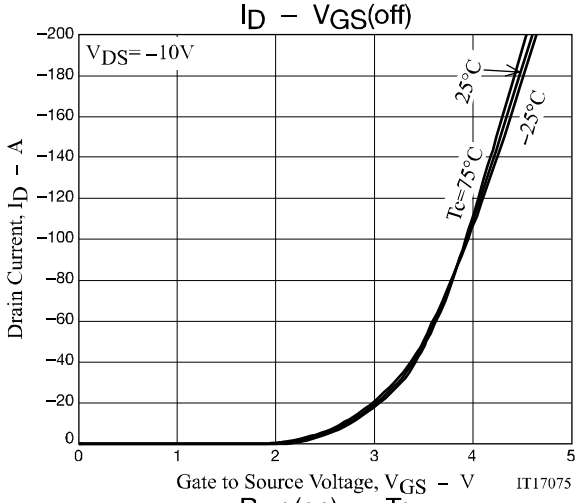
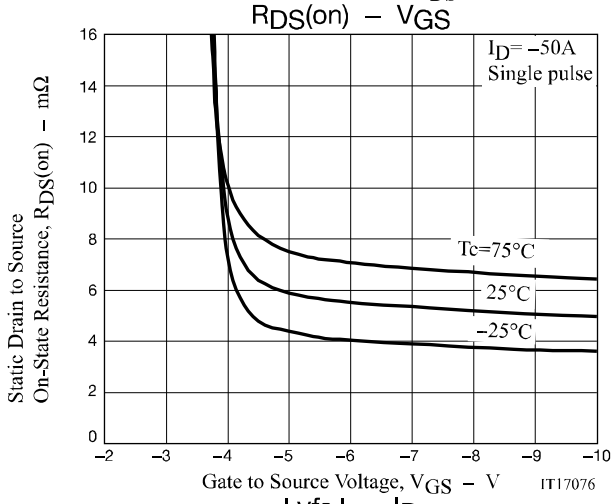


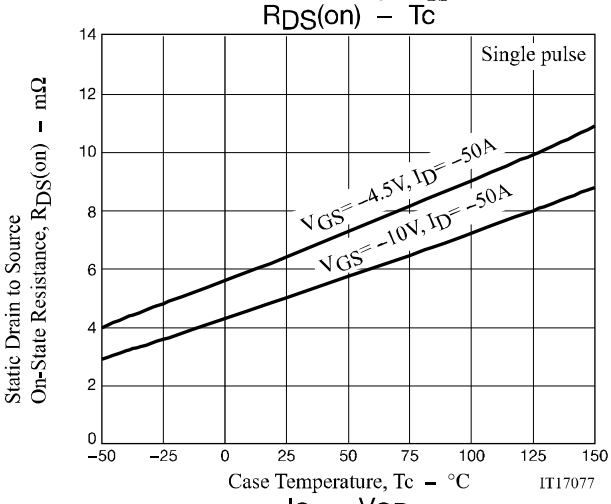
Fig.3 Reverse Recovery Time Test Circuit

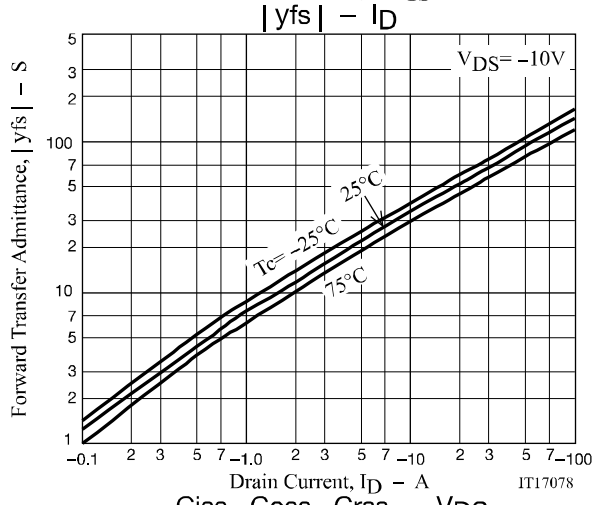


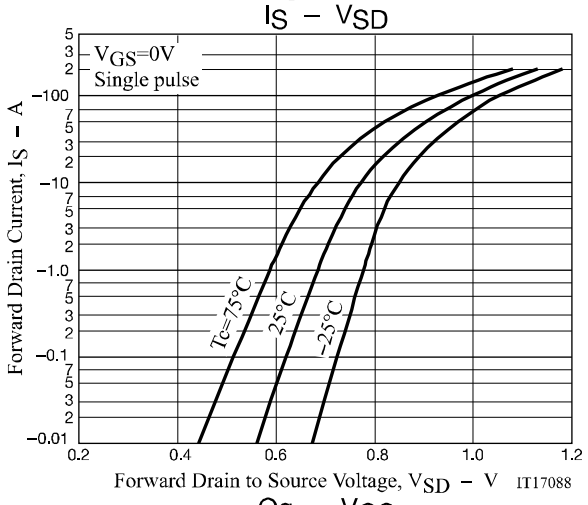

ID – VDS
Tc=25°C
–10V
–6V
–4.5V
VGS= –3V
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17074

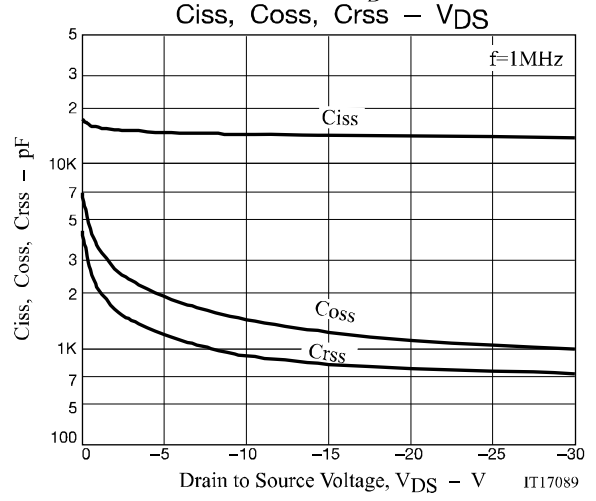

ID – VGS(off)
VDS= –10V
25°C
–25°C
Tc=75°C
Drain Current, ID – A
Gate to Source Voltage, VGS – V
IT17075

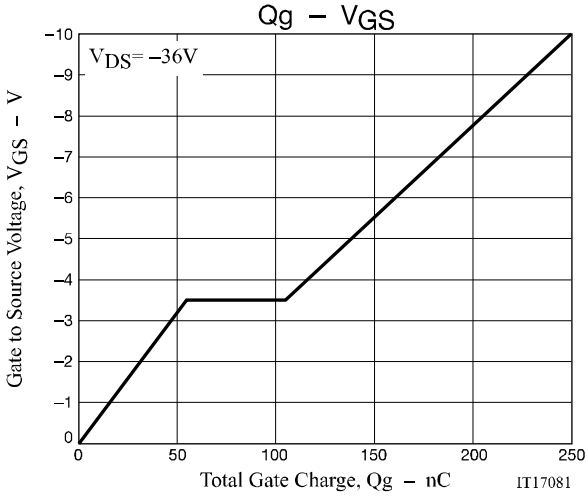

RDS(on) – VGS
ID= –50A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Gate to Source Voltage, VGS – V
IT17076

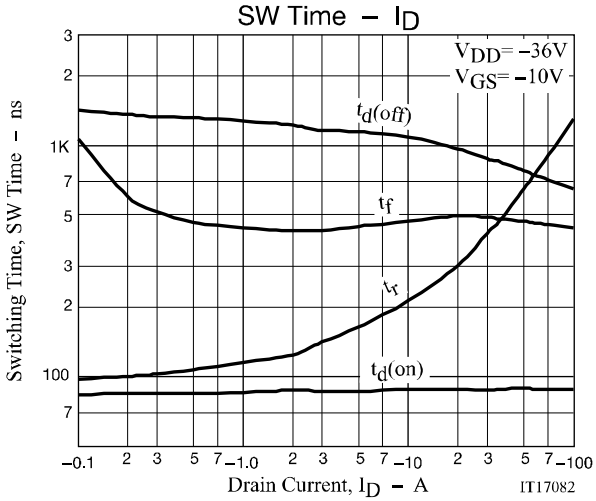

RDS(on) – Tc
Single pulse
VGS= –4.5V, ID= –50A
VGS= –10V, ID= –50A
Static Drain to Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT17077

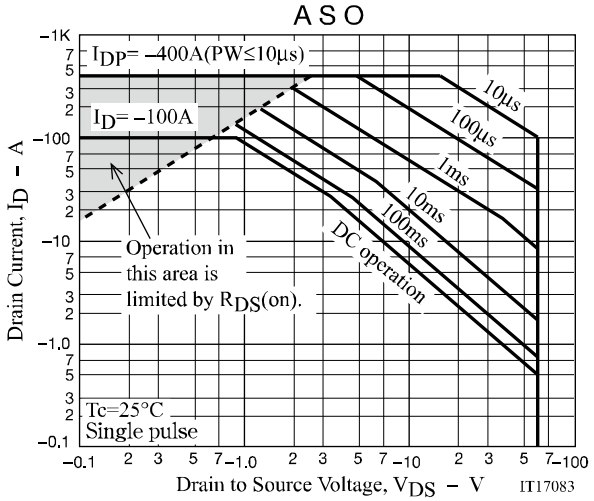

| yfs | – ID
VDS= –10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT17078

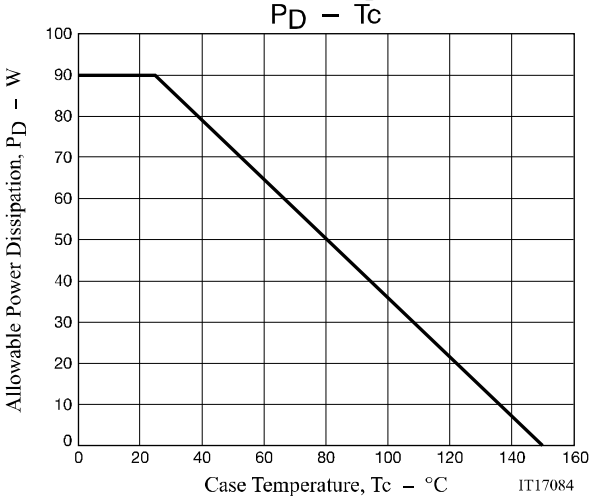

IS – VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Forward Drain Current, IS – A
Forward Drain to Source Voltage, VSD – V
IT17088

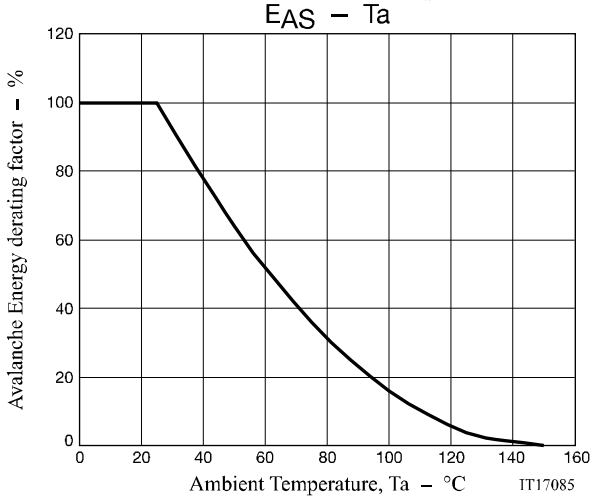

Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain to Source Voltage, VDS – V
IT17089


Qg – VGS
VDS= –36V
Gate to Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT17081


SW Time – ID
VDD= –36V
VGS= –10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT17082

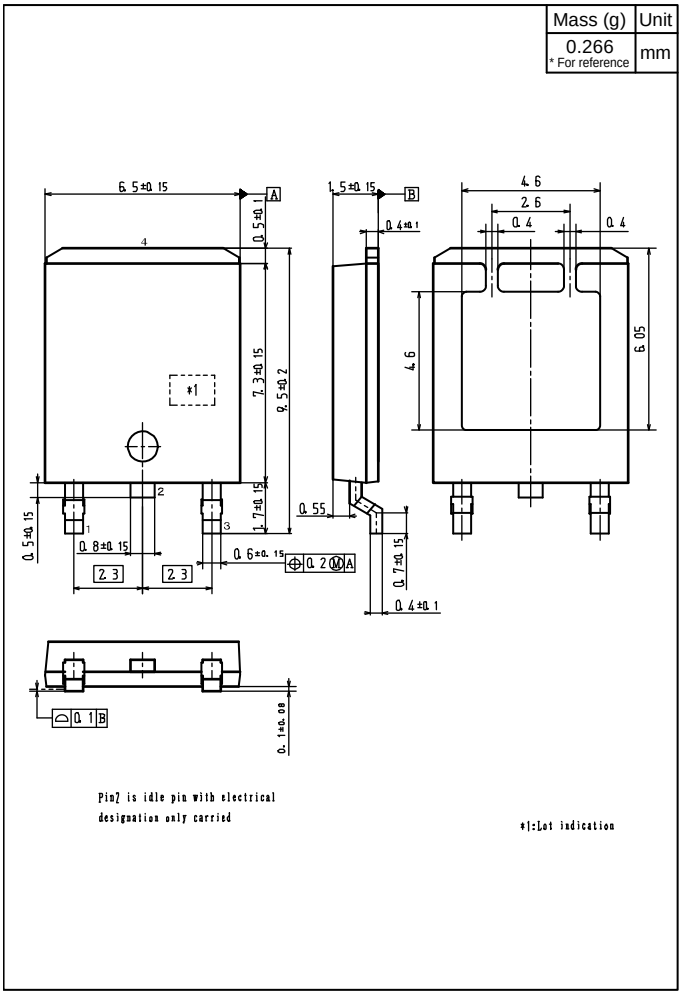

A S O
IDP= –400A(PW≤10μs)
ID= –100A
10μs
100μs
1ms
10ms
100ms
DC operation
Operation in
this area is
limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain to Source Voltage, VDS – V
IT17083


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT17084

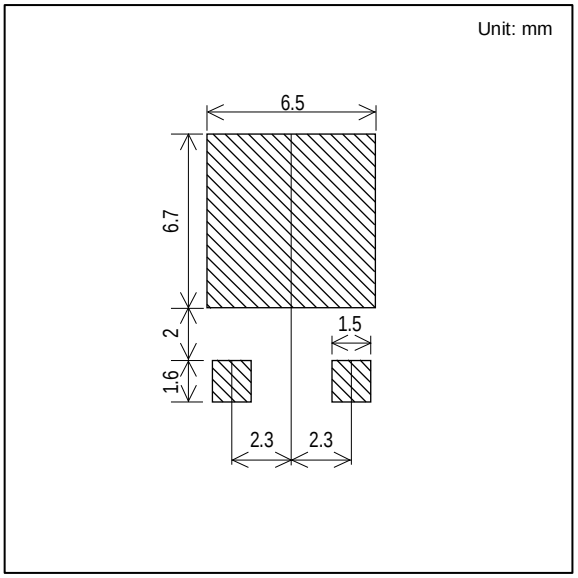

EAS – Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT17085

Outline Drawing

ATP304-TL-H



Land Pattern Example



Note on usage : Since the ATP304 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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