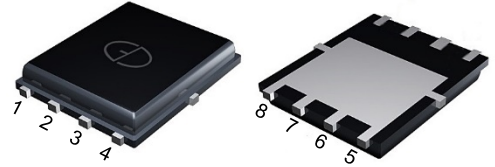


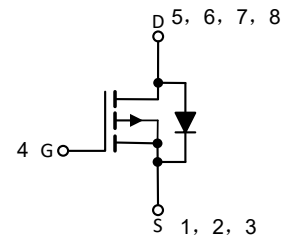
## P-Channel -30V (D-S) Power MOSFET

### Features

- 100% Avalanche Tested
- Extremely Low Losses with Low FOM  $R_{ds(on)} \cdot Q_g$
- RoHS Compliant, Halogen Free, Pb-Free
- MSL 1



PDFN5060



### Applications

- Load switch
- Synchronous Rectification
- Ultra high performance power switching

### Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain Source Voltage	$V_{DS}$	-30	V	
Gate Source Voltage	$V_{GS}$	$\pm 20$	V	
Drain Current, Continuous $V_{GS}=-10\text{V}$	$I_D$	$T_C=25^\circ\text{C}$	-111	A
		$T_C=100^\circ\text{C}$	-70	
Drain Current, Pulsed (Note 1)	$I_{DM}$	-444	A	
Single Avalanche Energy (Note 2)	$E_{AS}$	306	mJ	
Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	96	W
		$T_C=100^\circ\text{C}$	38	
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$	

Note 1: Single pulse;  $t_p \leq 1\mu\text{s}$ .

Note 2:  $V_{DD} = -30\text{V}$ ,  $I_D = -20\text{A}$ ,  $L = 0.5\text{mH}$ ,  $R_G = 25\Omega$ , starting  $T_J = 25^\circ\text{C}$ .

### Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{thJC}$	1.3	$^\circ\text{C/W}$
Thermal Resistance Junction to Ambient (Note 3)	$R_{thJA}$	62.5	$^\circ\text{C/W}$

Note 3: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a  $25^\circ\text{C}$  still air environment.

<b>Electrical Characteristics</b> ( $T_J = 25^\circ\text{C}$ unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$	--	--	-1	$\mu A$
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_{DS}=-250\mu A$	-1.2	-1.6	-2	V
Gate Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	$\pm 100$	nA
Drain-Source On-state Resistance (Note 4)	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-20A$	--	3.8	4.6	m $\Omega$
		$V_{GS}=-4.5V, I_D=-20A$	--	5.4	6.5	
Total Gate Charge	$Q_g$	$V_{GS(off)}=0V, V_{GS(on)}=-10V, V_{DD}=-15V, I_D=-20A$	--	137	--	nC
Gate-Source Charge	$Q_{gs}$		--	22	--	
Gate-Drain Charge	$Q_{gd}$		--	28	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DD}=-15V, R_L=0.75\Omega, R_G=3\Omega$	--	13	--	ns
Turn-on Rise Time	$t_r$		--	100	--	
Turn-off Delay Time	$t_{d(off)}$		--	121	--	
Turn-off Fall Time	$t_f$		--	111	--	
Gate Resistance	$R_g$	$V_{GS}=0V, f=1MHz, \text{open drain}$	--	1.9	--	$\Omega$
Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=-30V, f=1MHz$	--	4460	--	pF
Output Capacitance	$C_{oss}$		--	647	--	
Reverse Transfer Capacitance	$C_{rss}$		--	668	--	

<b>Reverse Diode Characteristics</b> ( $T_J = 25^\circ\text{C}$ unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Current, Continuous	$I_{SD}$	$T_C=25^\circ\text{C}$	--	--	-111	A
Diode Forward Voltage (Note 4)	$V_{SD}$	$I_F=20A, V_{GS}=0V$	--	--	-1.2	V
Reverse Recovery Time	$T_{rr}$	$V_R=-20V, I_F=-20A, di/dt = 100 A/\mu s$	--	27	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	15	--	nC

Note 4: Pulse test; pulse width  $\leq 380\mu s$ , duty cycle  $\leq 1\%$ .

## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Fig. 1 - Output Characteristics

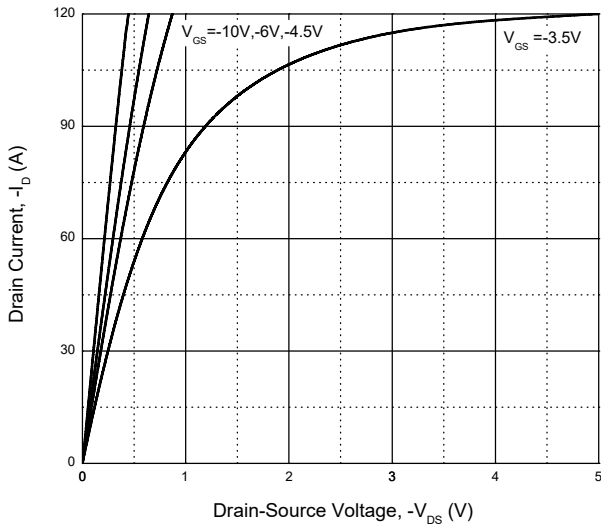


Fig. 2 - Transfer Characteristics

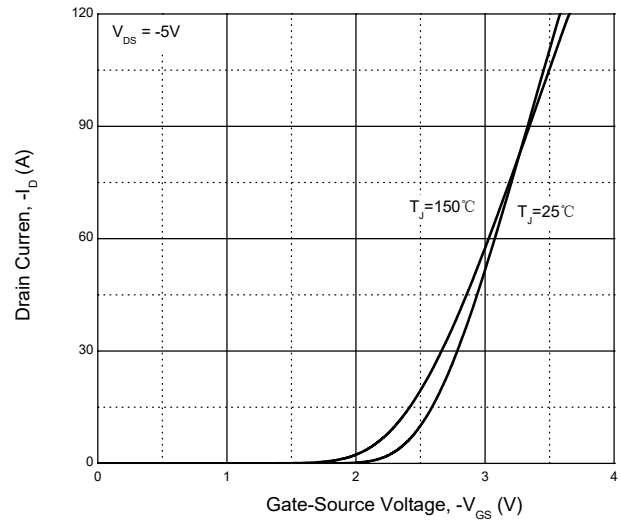


Fig. 3 - Drain-Source On-Resistance

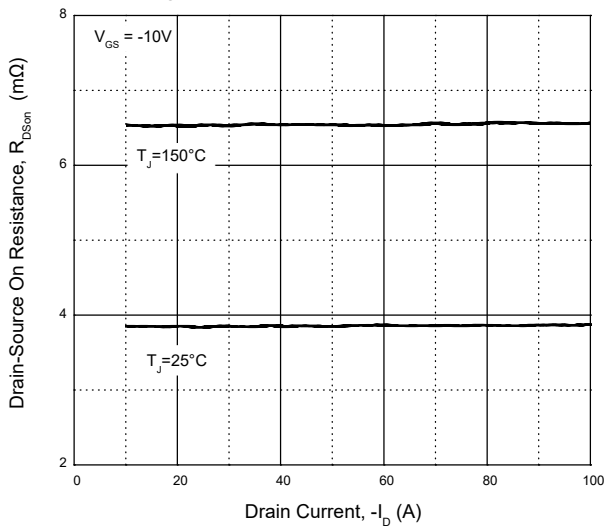


Fig. 4 - Normalized On-Resistance

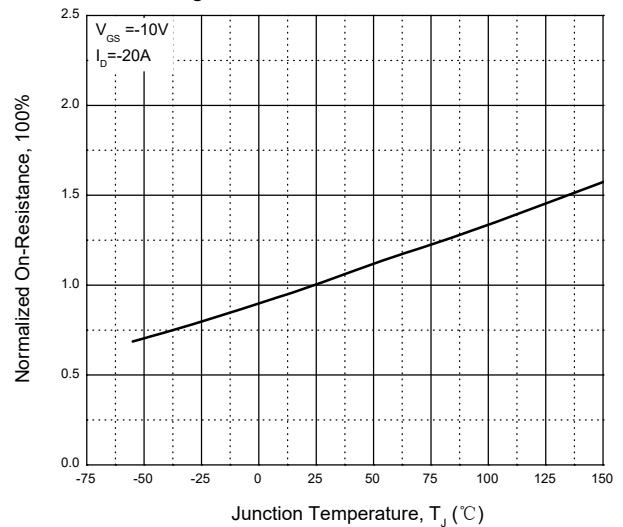


Fig. 5 - Drain-Source On-Resistance

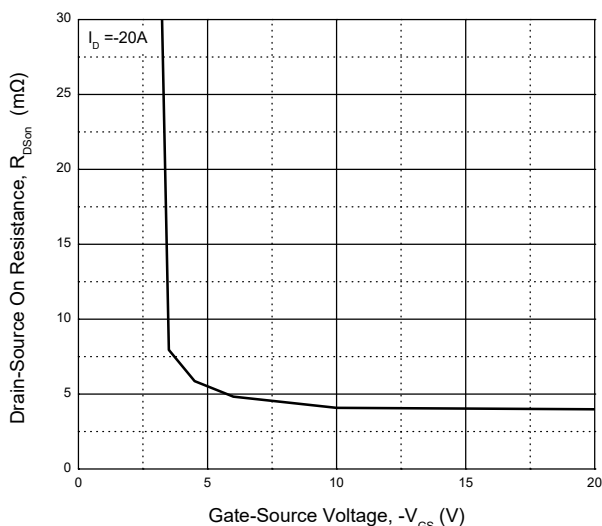
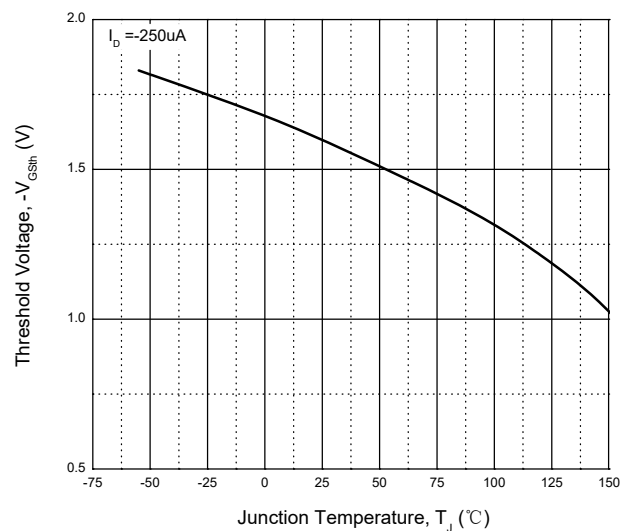


Fig. 6 - Threshold Voltage



## Typical Characteristics Curves (T<sub>J</sub> = 25°C unless otherwise noted)

Fig. 7 - Capacitance

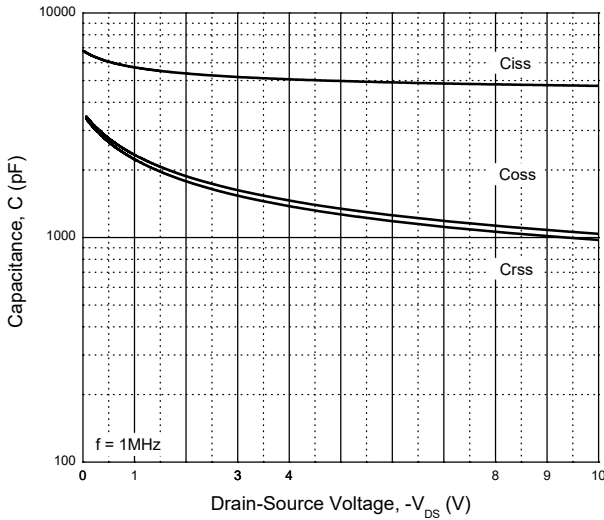


Fig. 8 - Gate Charge

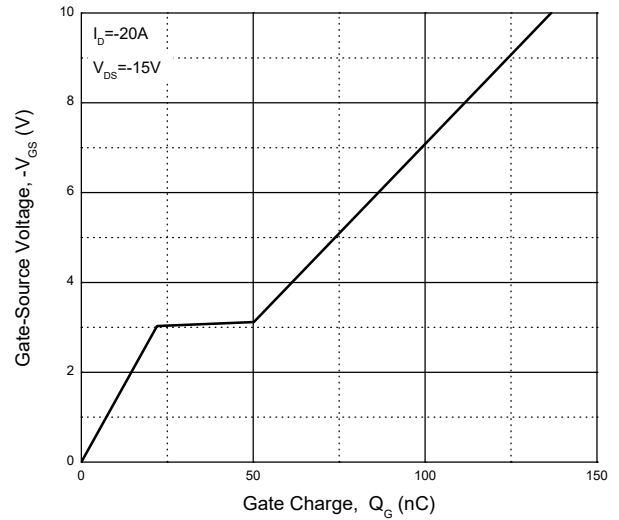


Fig. 9 - Forward Characteristic

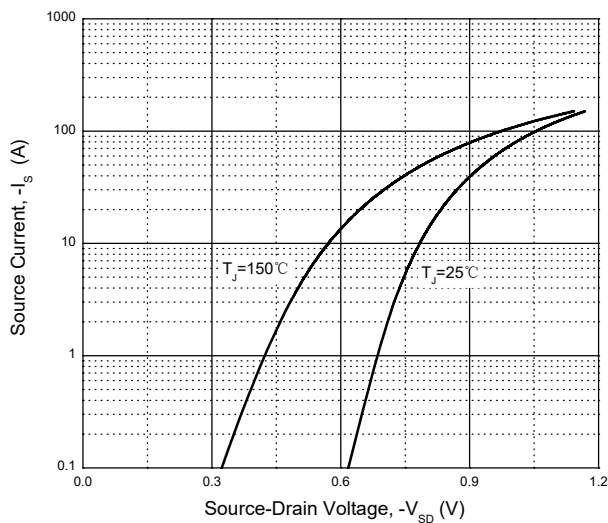


Fig. 10 - Safe Operating Area

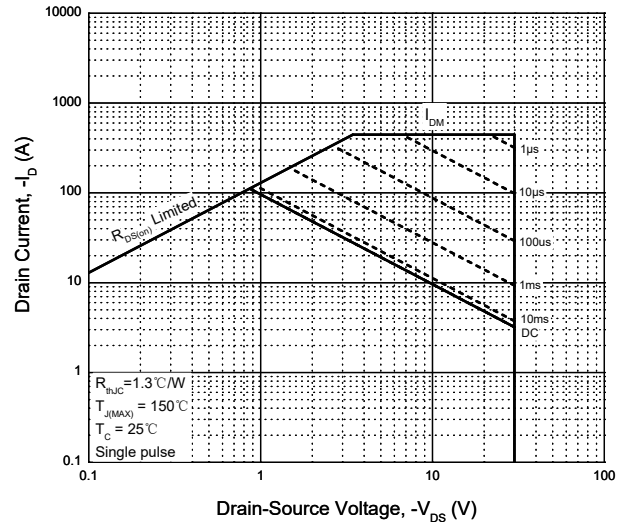
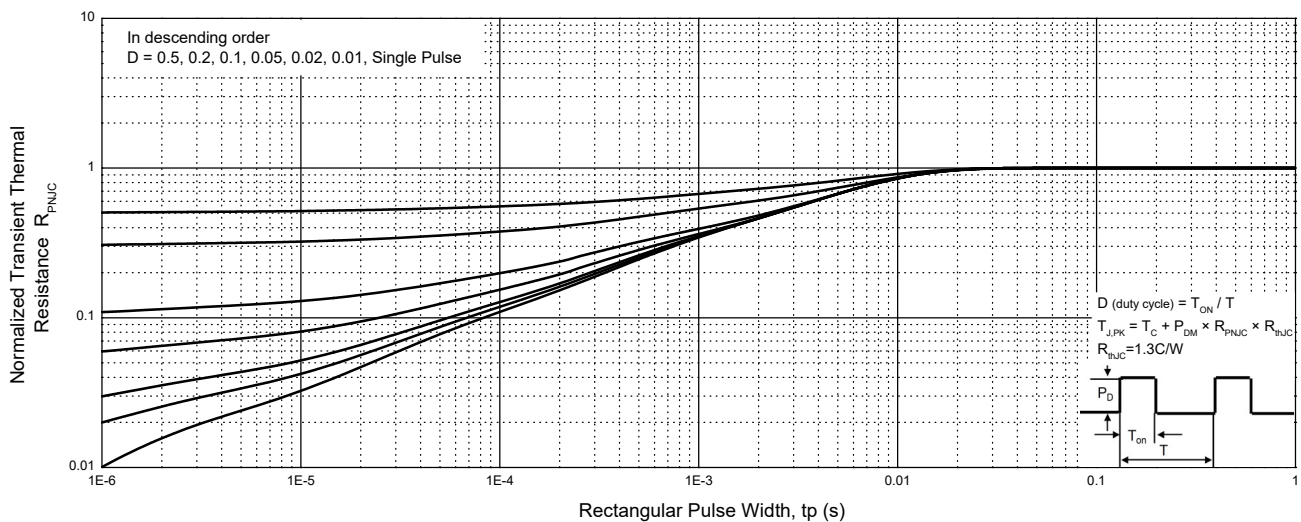


Fig.11 - Normalized Thermal Impedance, Junction-Case



**Typical Characteristics Curves** ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

Fig. 12 - Power Derating

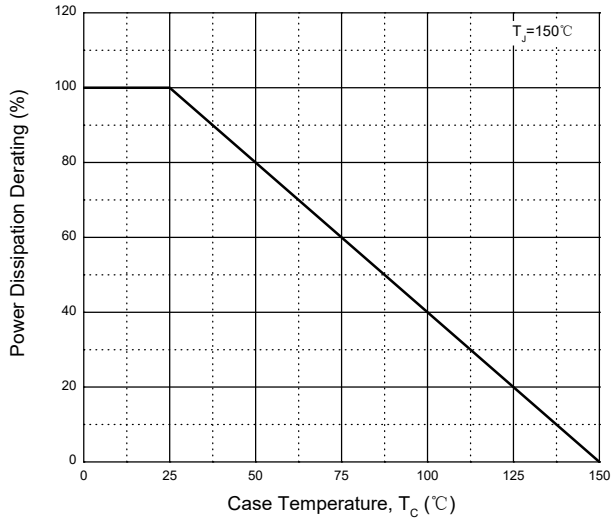
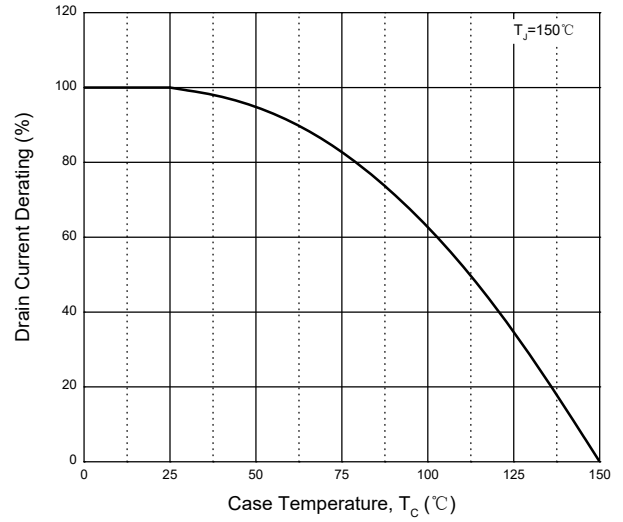
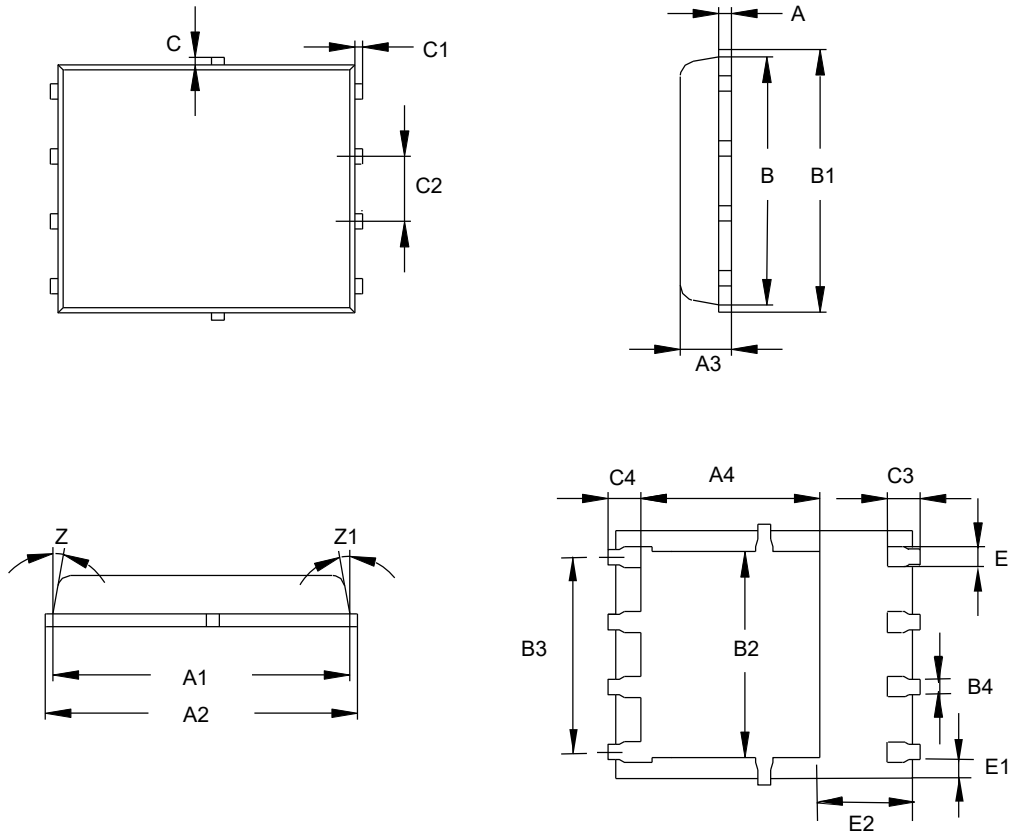


Fig. 13 - Drain Current Derating



## Package Outline Dimensions (Unit: millimeters)

### PDFN5060



PDFN5060							
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	0.15	0.25	0.35	C	0.05	0.15	0.25
A1	5.6	5.8	6.0	C1	0.05	0.15	0.25
A2	5.9	6.1	6.3	C2	1.17	1.27	1.37
A3	0.9	1	1.1	C3	0.53	0.63	0.73
A4	3.40	3.50	3.60	C4	0.53	0.63	0.73
B	4.7	4.9	5.1	E	0.31	0.41	0.51
B1	5.0	5.2	5.4	Z	8°	10°	12°
B2	3.9	4.0	4.1	Z1	8°	10°	12°
B3	3.71	3.81	3.91	B4	0.2	0.3	0.1
E1	0.25	0.35	0.45	E2	-	2.55	-

**Marking Outline**



Part Name:GMP00403M

1. Logo Mark: 
2. P/N Mark: 00403M
3. Date Code: XXXX
4. Pin 1#: ●

**Revision History**

Version	Date	Major Changes
Rev.A	2024.10.23	Official Release

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