Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max (A) T_A = +25°C
-40V	25mΩ @ V_{GS} = -10V	-8.0A
	45mΩ @ V_{GS} = -4.5V	-6.0A

Features and Benefits

- Low $R_{DS(ON)}$ – Minimizes Conduction Losses
- Fast Switching Speed – Minimizes Switching Losses
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Description and Applications

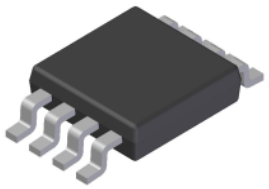
This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- Backlighting
- DC-DC Converters
- Printer Equipment

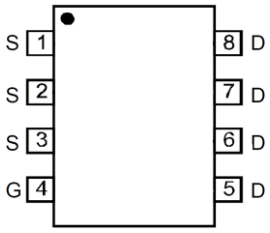
Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

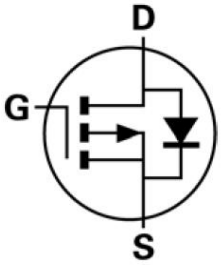
SO-8



Top View



Pin-Out Top View



Internal Schematic

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP4025LSSQ-13	SO-8	2,500/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com for more information about Diodes Incorporated's definitions of Halogen and Antimony free,"Green" and Lead-Free.
3. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

= Manufacturer's Marking
P4025LS = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 16 = 2016)
WW = Week (01 - 53)

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-40	V
Gate-Source Voltage			V_{GSS}	±20	
Continuous Drain Current	V_{GS} = -10V	(Note 7)	I_D	-8.0	A
		T_A = +70°C (Note 7)		-6.9	
		(Note 6)		-6.0	
Pulsed Drain Current	V_{GS} = -10V	(Note 8)	I_{DM}	-30	
Continuous Source Current (Body Diode)		(Note 8)	I_S	-8.0	
Pulsed Source Current (Body Diode)		(Note 8)	I_{SM}	-30	

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	1.52	W
	(Note 7)		2.4	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	82	°C/W
	(Note 7)		52	
Thermal Resistance, Junction to Lead	(Note 9)	$R_{\theta JL}$	48.85	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 10)						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	I_D = -250µA, V_{GS} = 0V
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	µA	V_{DS} = -40V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 10)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.8	-1.3	-1.8	V	I_D = -250µA, V_{DS} = V_{GS}
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	18	25	mΩ	V_{GS} = -10V, I_D = -3A
			30	45		V_{GS} = -4.5V, I_D = -3A
Forward Transconductance	g_{FS}	—	16.6	—	S	V_{DS} = -5V, I_D = -3A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.0	V	I_S = -1A, V_{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 11)						
Input Capacitance	C_{ISS}	—	1,640	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{OSS}	—	179	—		
Reverse Transfer Capacitance	C_{RSS}	—	128	—		
Gate Resistance	R_G	—	6.43	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_G	—	14.0	—	nC	V_{GS} = -4.5V; V_{DS} = -20V, I_D = -3A
Total Gate Charge	Q_G	—	33.7	—		V_{GS} = -10V; V_{DS} = -20V, I_D = -3A
Gate-Source Charge	Q_{GS}	—	5.5	—		
Gate-Drain Charge	Q_{GD}	—	7.3	—		
Turn-On Delay Time	$t_{D(ON)}$	—	6.9	—	ns	V_{DD} = -20V, V_{GS} = -10V I_D = -3A
Turn-On Rise Time	t_R	—	14.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	53.7	—		
Turn-Off Fall Time	t_F	—	30.9	—		

Notes:
6. For a device surface mounted on minimum recommended FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
7. Same as Note (6), except the device is surface mounted on 25mm x 25mm x 1.6mm FR4 PCB.
8. Repetitive rating on 25mm X 25mm FR4 PCB, D=0.02, pulse width 300µs – pulse width by maximum junction temperature.
9. Thermal resistance from junction to solder-point (at the end of the drain lead).
10. Short duration pulse test used to minimize self-heating effect.
11. Guaranteed by design. Not subject to production testing.

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Thermal Characteristics

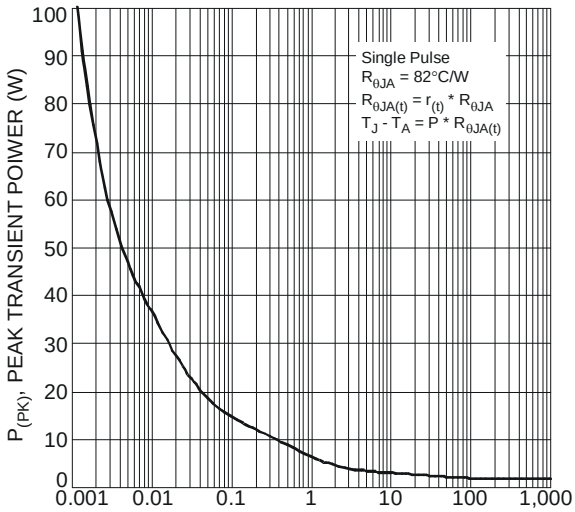

Fig. 1 Single Pulse Maximum Power Dissipation

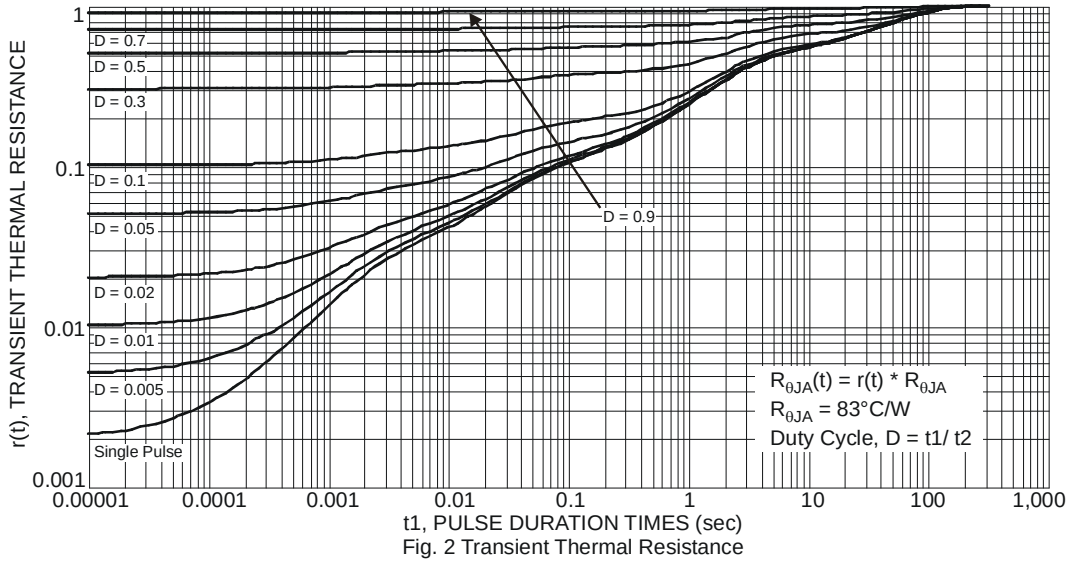

Fig. 2 Transient Thermal Resistance

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Typical Characteristics

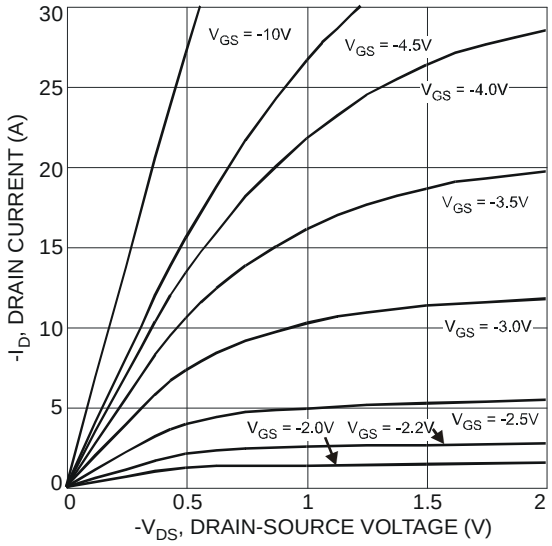

Fig. 3 Typical Output Characteristic

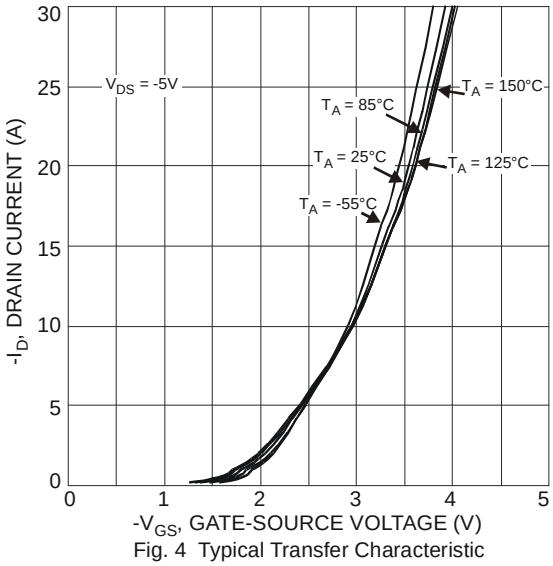

Fig. 4 Typical Transfer Characteristic

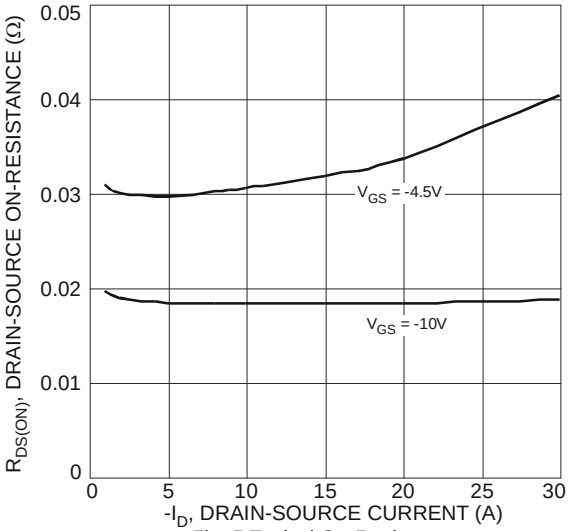

Fig. 5 Typical On-Resistance
vs. Drain Current and Gate Voltage

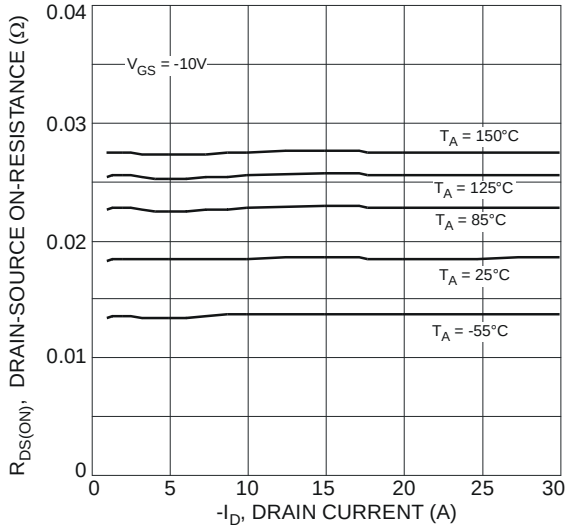

Fig. 6 Typical On-Resistance
vs. Drain Current and Temperature

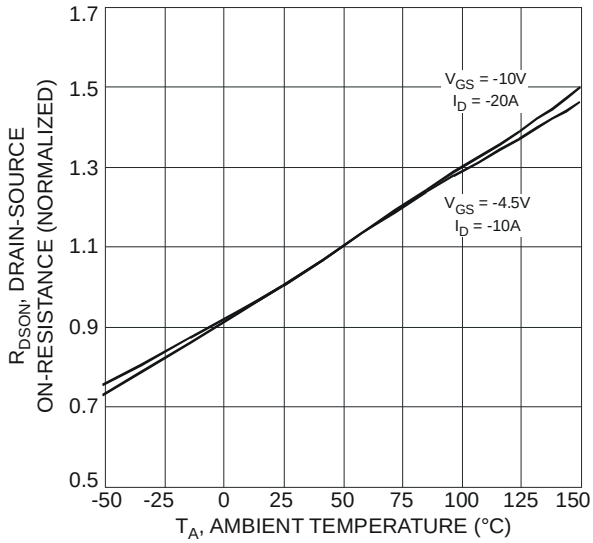

Fig. 7 On-Resistance Variation with Temperature

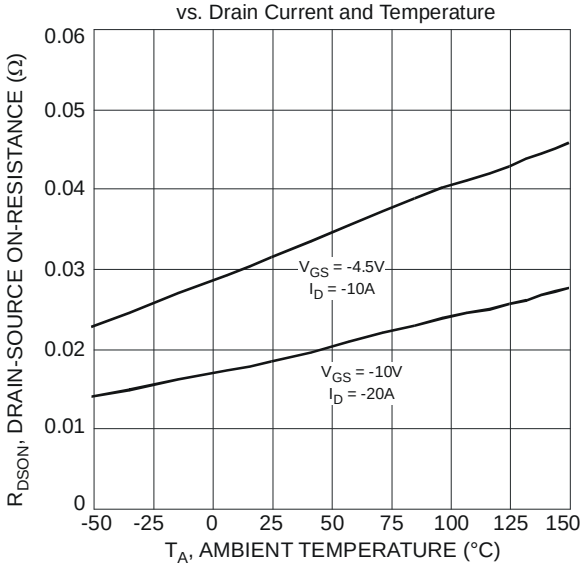

Fig. 8 On-Resistance Variation with Temperature

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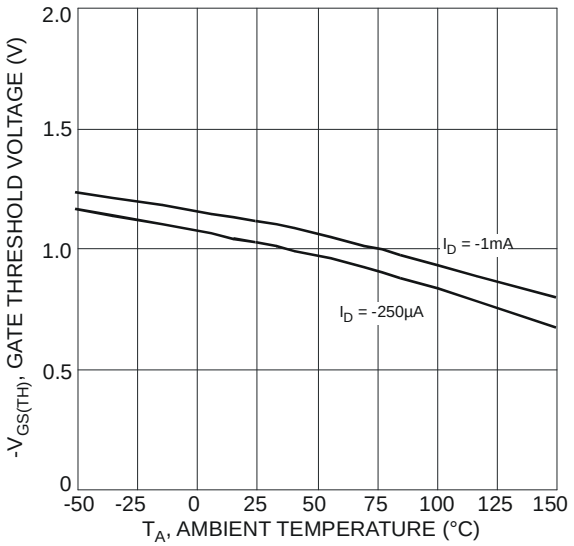

Fig. 9 Gate Threshold Variation vs. Ambient Temperature

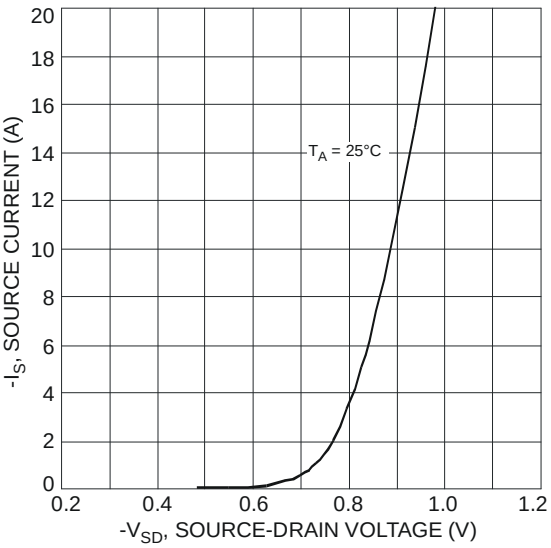

Fig. 10 Diode Forward Voltage vs. Current

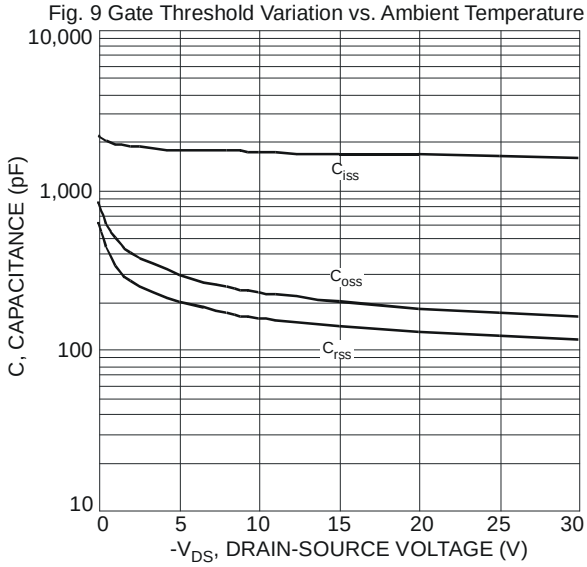

Fig. 11 Typical Total Capacitance

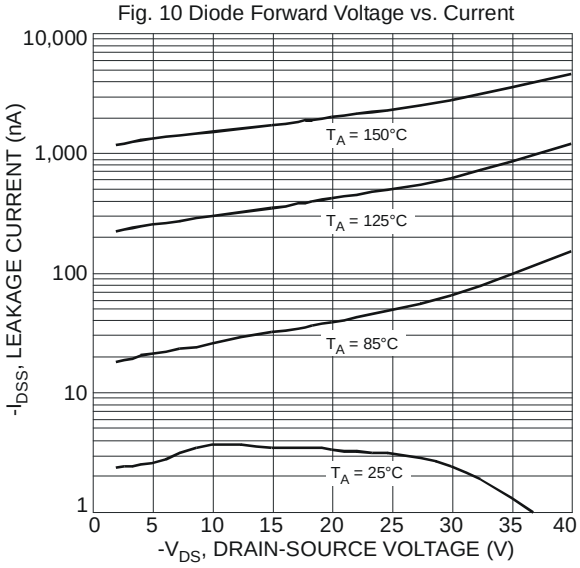

Fig. 12 Typical Leakage Current vs. Drain-Source Voltage

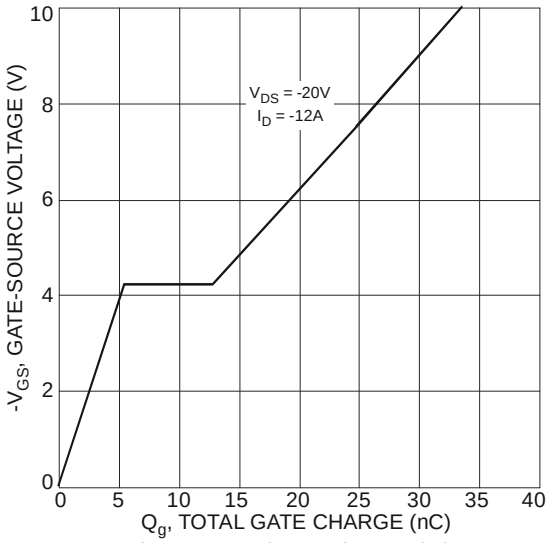

Fig. 13 Gate-Charge Characteristics

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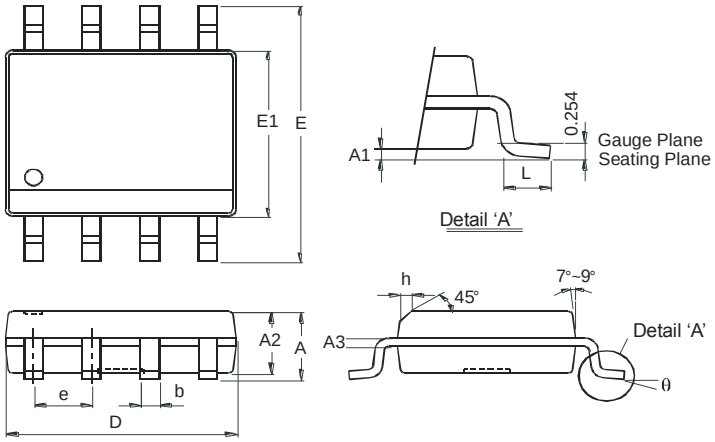
Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-8

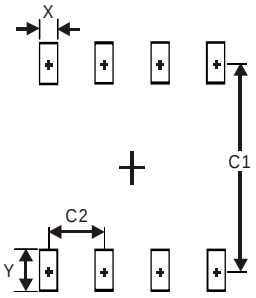


SO-8		
Dim	**Min**	**Max**
A	–	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	–	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-8



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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