

## Product Summary

BV <sub>DSS</sub>	Max R <sub>DS(ON)</sub>	Max I <sub>D</sub> @ T <sub>A</sub> = 25°C
-30V	1Ω @ V <sub>GS</sub> = -4.5V	-0.67A
	1.5Ω @ V <sub>GS</sub> = -2.5V	-0.54A
	2Ω @ V <sub>GS</sub> = -1.8V	-0.47A

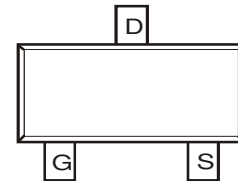
## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

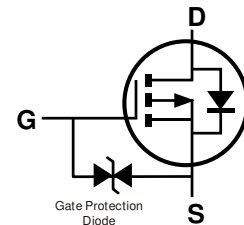
- Load Switch in Portable Electronics



Top View



Top View  
Internal Schematic



Equivalent Circuit

## Features and Benefits

- Low Gate Threshold Voltage
- Fast Switching Speed
- **ESD Protected Gate**
- **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**

## Mechanical Data

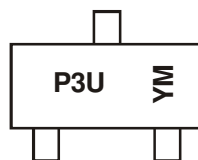
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (3)
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP31D0U-7	SOT23	3,000/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/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

## Marking Information



P3U = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Y = 2011)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2011	~	2016	2017	2018	2019	2020	2021	2022	2023
Code	Y	~	D	E	F	G	H	I	J	K

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	-30	V
Gate-Source Voltage		V <sub>GSS</sub>	±8	V
Continuous Drain Current	Steady State	T <sub>A</sub> = +25°C (Note 6)	-0.67	A
		T <sub>A</sub> = +85°C (Note 6)	-0.48	
		T <sub>A</sub> = +25°C (Note 5)	-0.53	
Pulsed Drain Current (Note 7)		I <sub>DM</sub>	2.5	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P <sub>D</sub>	0.45	W
	(Note 6)		0.71	W
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	275	°C/W
	(Note 6)		177	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout  
 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.  
 7. Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

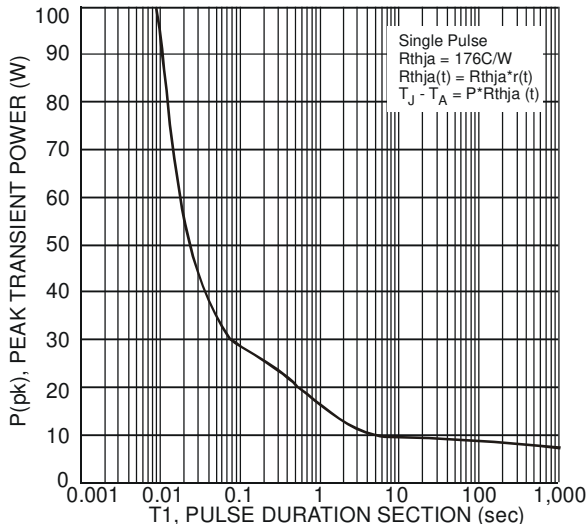


Fig. 1 Single Maximum Power Dissipation

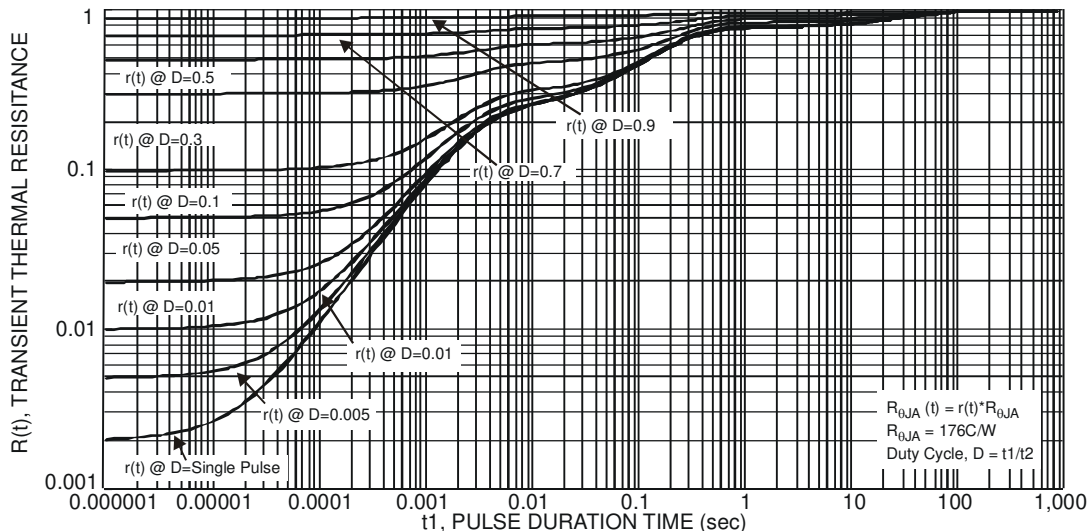


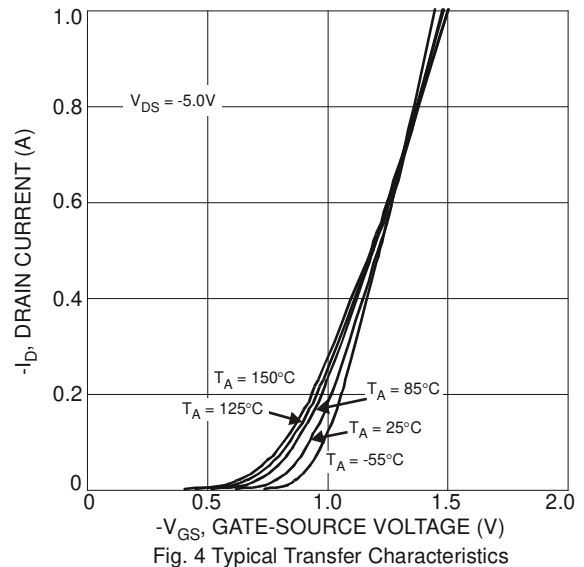
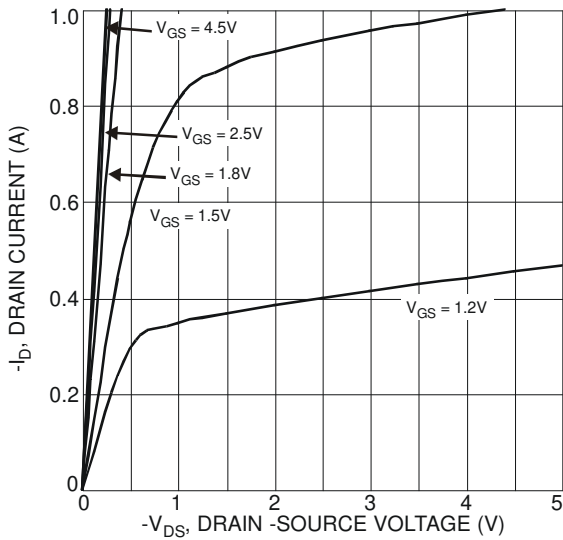
Fig. 2 Transient Thermal Resistance

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 8)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = 25°C	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±3	μA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 8)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.5	—	-1.1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	1	Ω	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -400mA
				1.5		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -200mA
				2		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -100mA
Forward Transfer Admittance	Y <sub>FS</sub>	50	—	—	mS	V <sub>DS</sub> = -3V, I <sub>D</sub> = -300mA
Diode Forward Voltage	V <sub>SD</sub>	—	—	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -300mA
<b>DYNAMIC CHARACTERISTICS</b> (Note 9)						
Input Capacitance	C <sub>ISS</sub>	—	76	150	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	9	—	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	6.43	—	pF	
Gate Resistance	R <sub>G</sub>	—	167	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>G</sub>	—	0.9	—	nC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -15V, I <sub>D</sub> = -1A
Total Gate Charge	Q <sub>G</sub>	—	1.5	—	nC	V <sub>GS</sub> = -8V, V <sub>DS</sub> = -15V, I <sub>D</sub> = -1A
Gate-Source Charge	Q <sub>GS</sub>	—	0.1	—	nC	
Gate-Drain Charge	Q <sub>GD</sub>	—	0.2	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	5.0	—	ns	V <sub>DD</sub> = -10V, R <sub>L</sub> = 10Ω V <sub>GS</sub> = -4.5V, R <sub>G</sub> = 6Ω
Turn-On Rise Time	t <sub>R</sub>	—	5.9	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	35.7	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	16.7	—	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.  
9. Guaranteed by design. Not subject to product testing.

**Typical Electrical Characteristics**



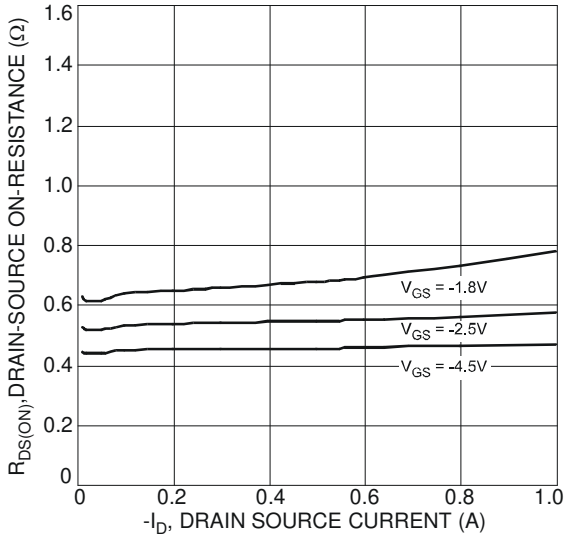


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

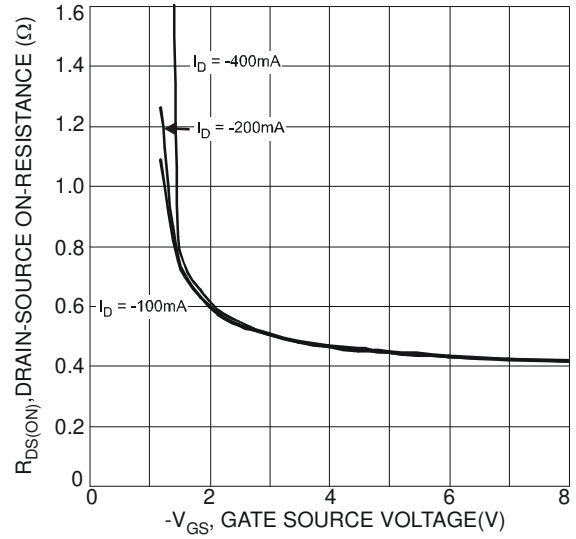


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

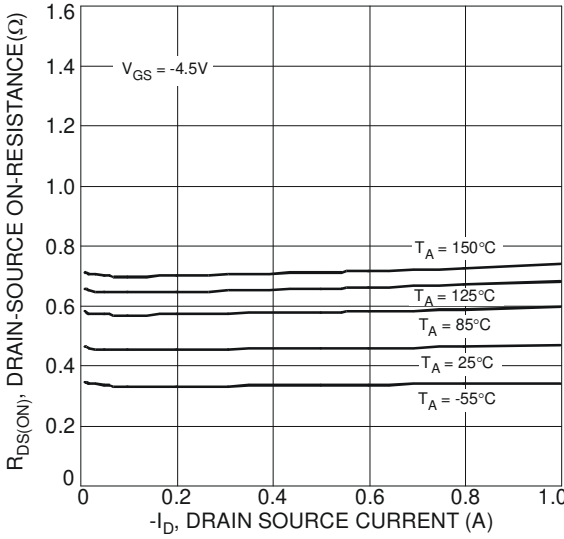


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

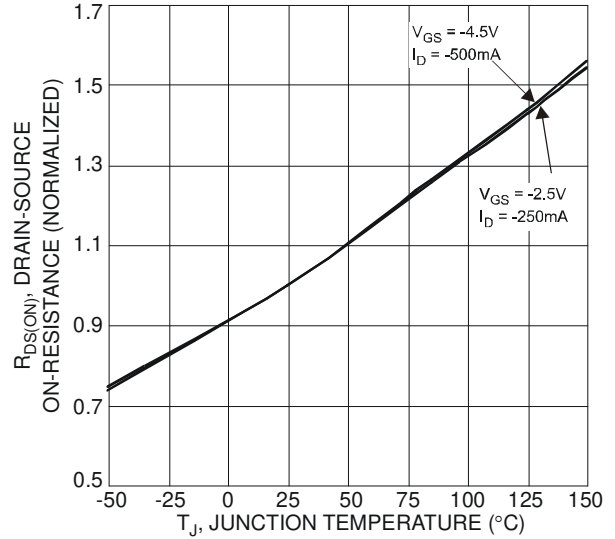


Fig. 8 On-Resistance Variation with Temperature

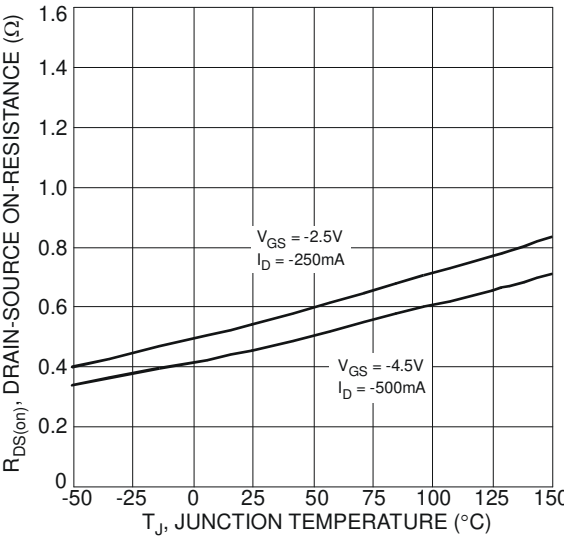


Fig. 9 On-Resistance Variation with Temperature

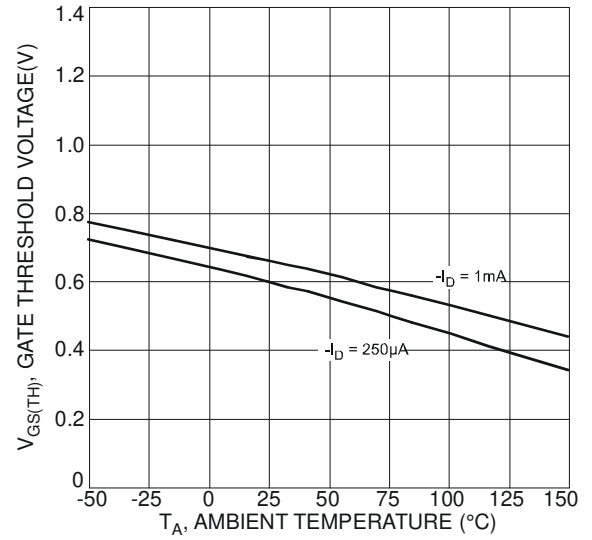


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

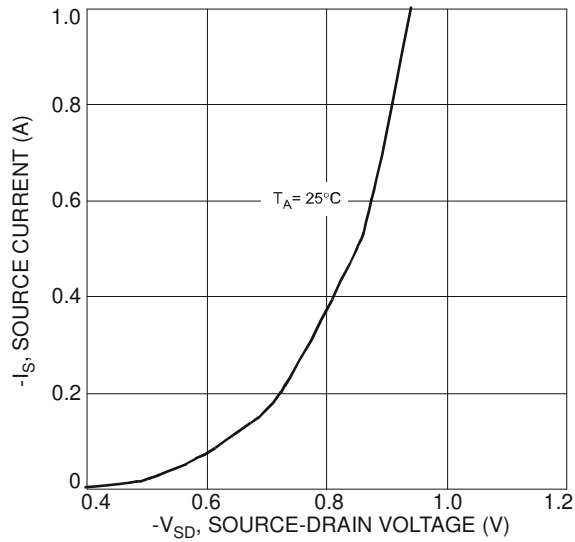


Fig. 11 Diode Forward Voltage vs. Current

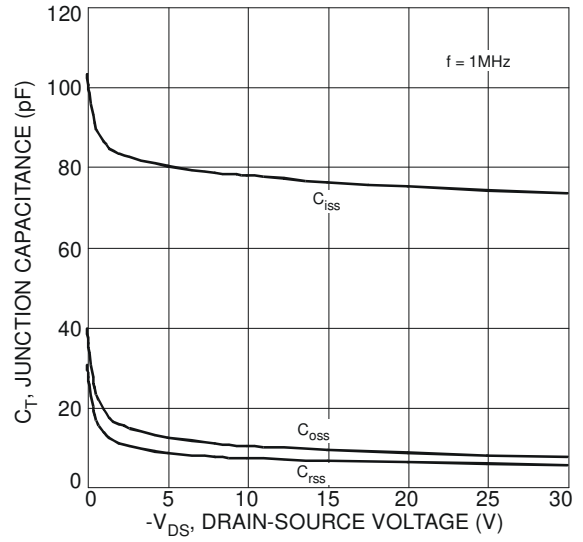


Fig. 12 Typical Junction Capacitance

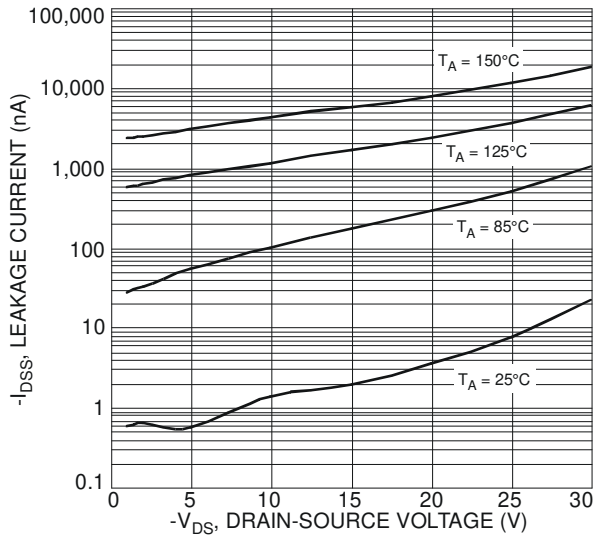


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

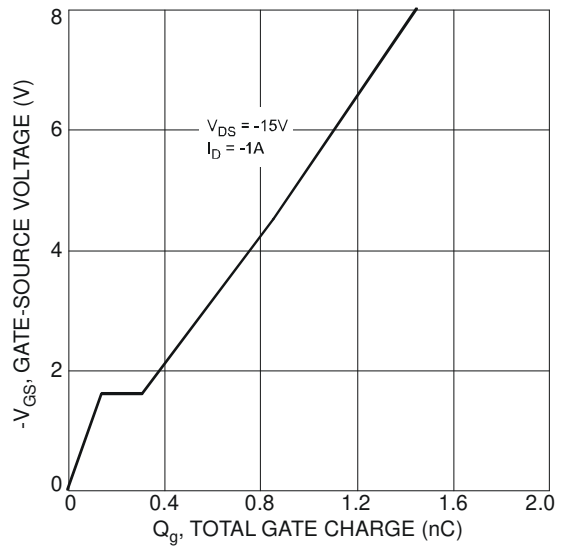
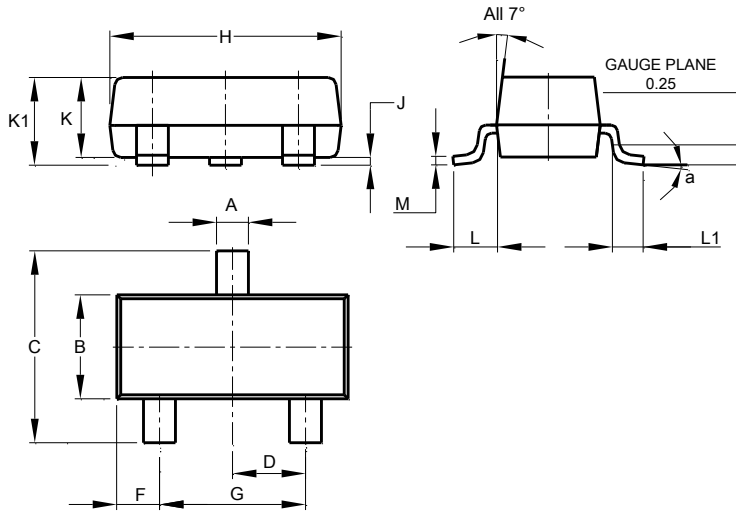


Fig. 14 Gate-Charge Characteristics

**Package Outline Dimensions**

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

**SOT23**

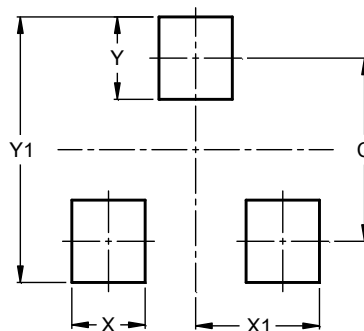


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	—
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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