

**DMP31D0U**

**30V P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max $I_D$ @ $T_A = 25^\circ C$
-30V	1Ω @ $V_{GS} = -4.5V$	-0.67A
	1.5Ω @ $V_{GS} = -2.5V$	-0.54A
	2Ω @ $V_{GS} = -1.8V$	-0.47A

**Description and Applications**

This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(on)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

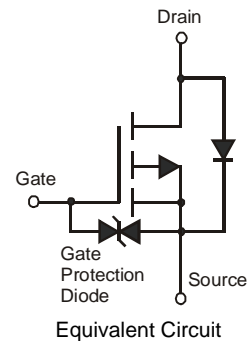
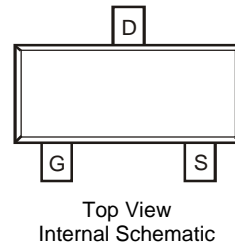
- Load Switch in portable electronics

**Features and Benefits**

- Low Gate Threshold Voltage
- Fast Switching Speed
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD Protected Gate 2KV
- 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
- Weight: 0.08 grams (approximate)

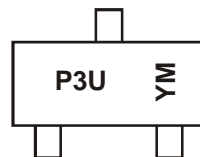


**Ordering Information** (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP31D0U-7	P3U	7	8	3,000

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
  2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>.

**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	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

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 5)	I <sub>D</sub>	-0.67	A
		T <sub>A</sub> = 85°C (Note 5)		-0.48	
		T <sub>A</sub> = 25°C (Note 4)		-0.53	
Pulsed Drain Current (Note 6)			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 4)	P <sub>D</sub>	0.45	W
	(Note 5)		0.71	W
Thermal Resistance, Junction to Ambient	(Note 4)	R <sub>θJA</sub>	275	°C/W
	(Note 5)		177	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
  - Device mounted on 25mm X 25mm square copper plate with FR-4 substrate PC board, 2oz copper
  - Device mounted on minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

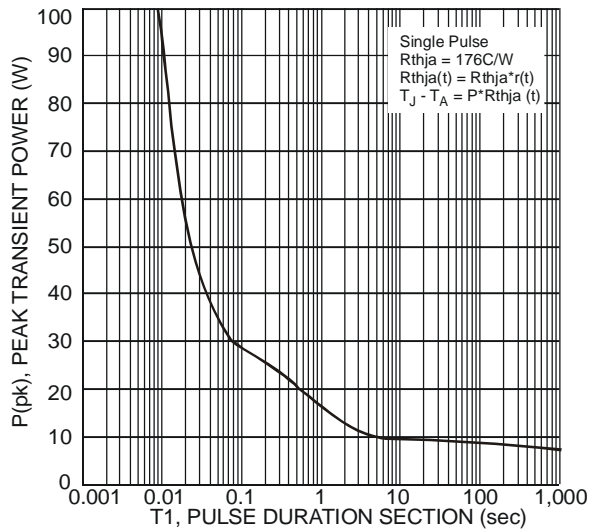


Fig. 1 Single Maximum Power Dissipation

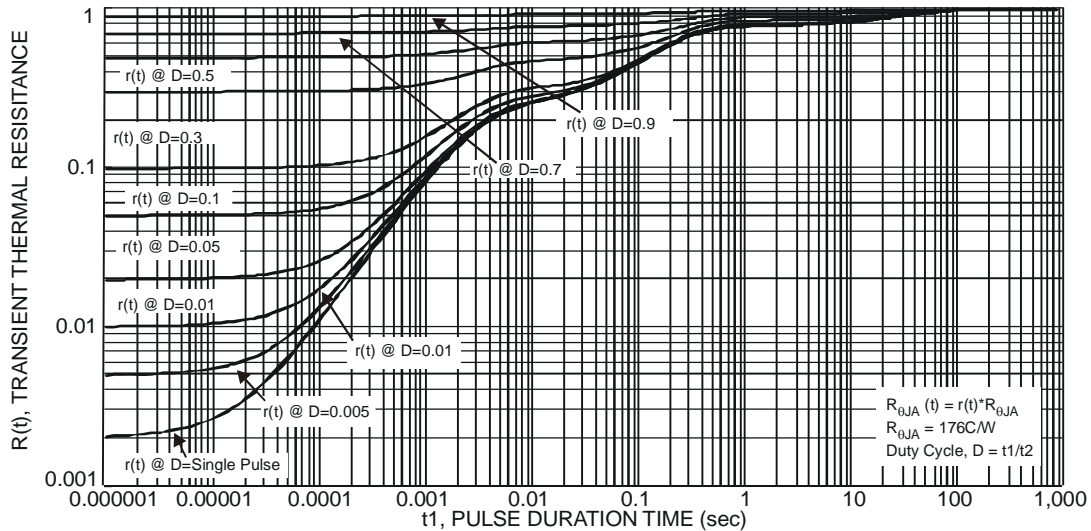


Fig. 2 Transient Thermal Resistance

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
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 (Note 7)</b>						
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>						
Input Capacitance	C <sub>iss</sub>	-	76	-	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>	-	166.9	-	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>	-	4.98	-	ns	V <sub>DD</sub> = -10V, R <sub>L</sub> = 10 Ω V <sub>GS</sub> = -4.5V, R <sub>G</sub> = 6 Ω
Turn-On Rise Time	t <sub>r</sub>	-	5.85	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	35.71	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	16.64	-	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.

**Typical Electrical Characteristics**

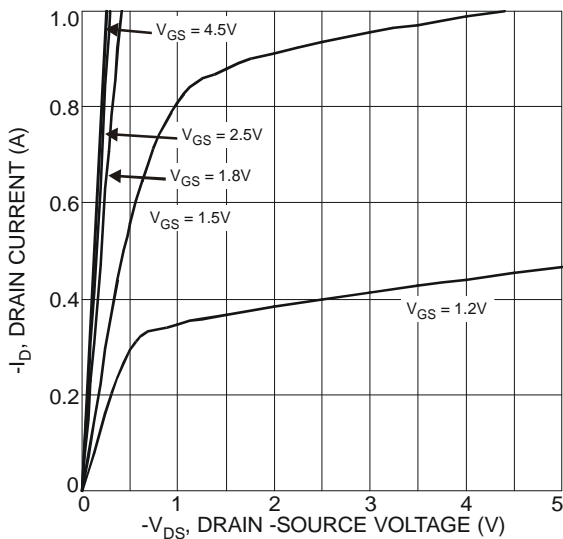


Fig. 3 Typical Output Characteristics

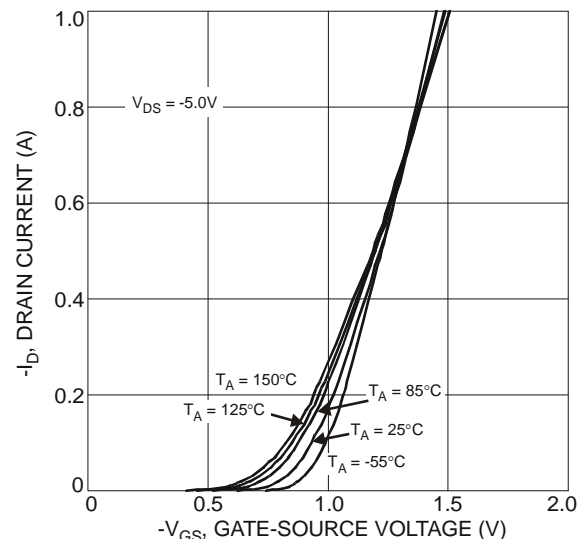


Fig. 4 Typical Transfer Characteristics

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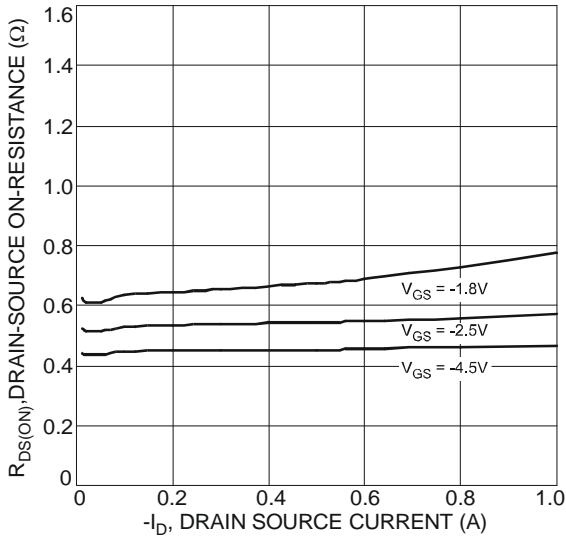


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

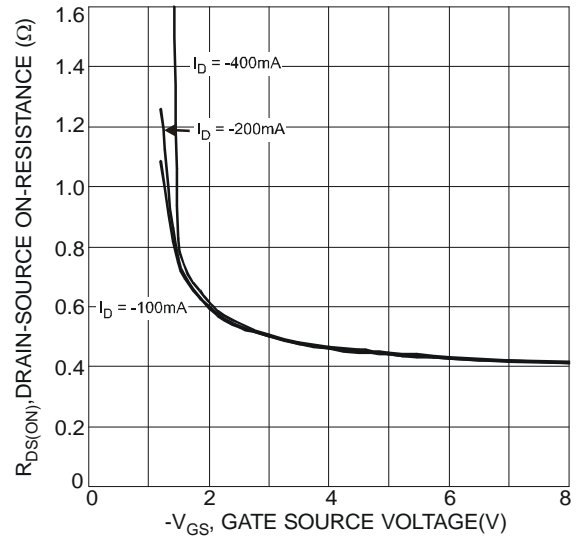


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

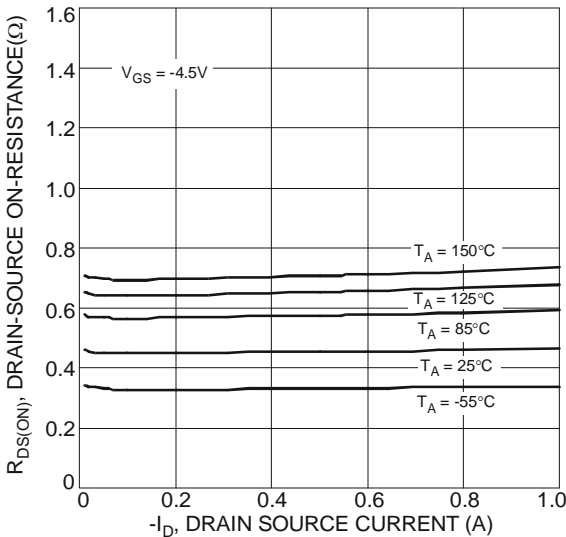


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

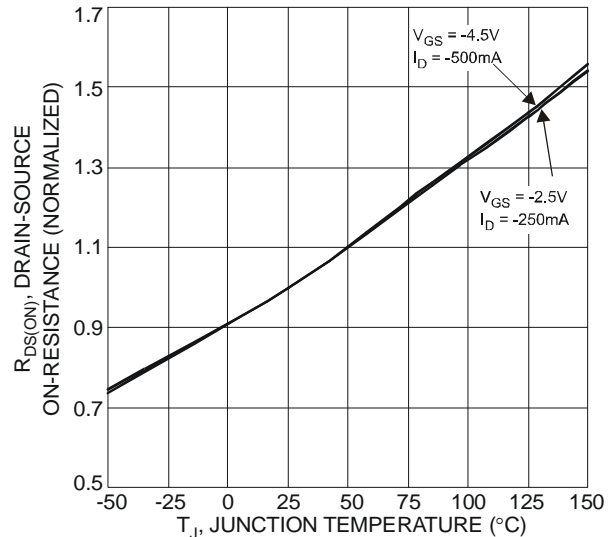


Fig. 8 On-Resistance Variation with Temperature

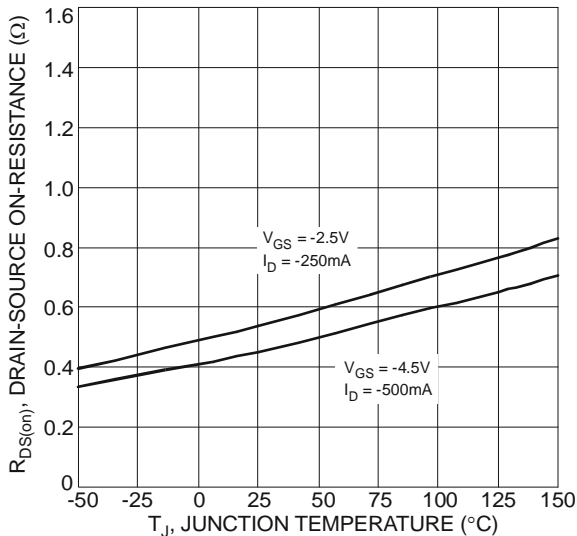


Fig. 9 On-Resistance Variation with Temperature

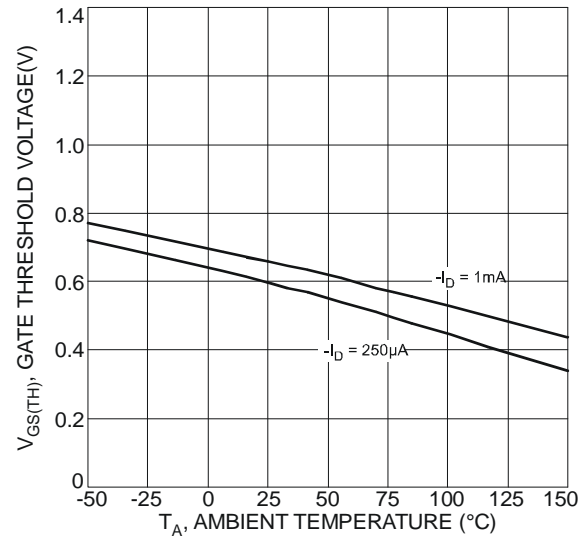


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

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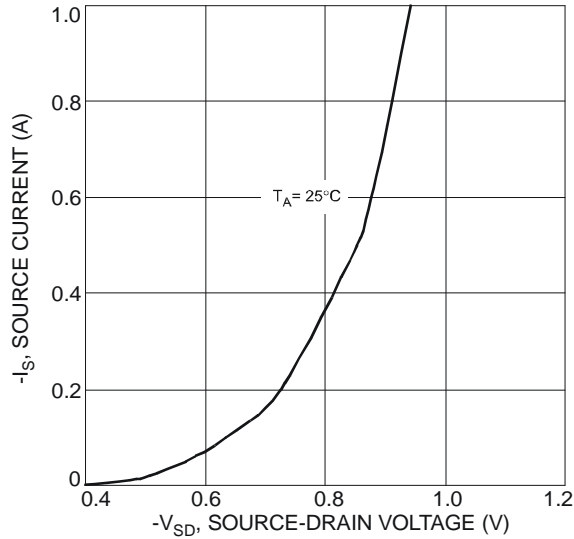


Fig. 11 Diode Forward Voltage vs. Current

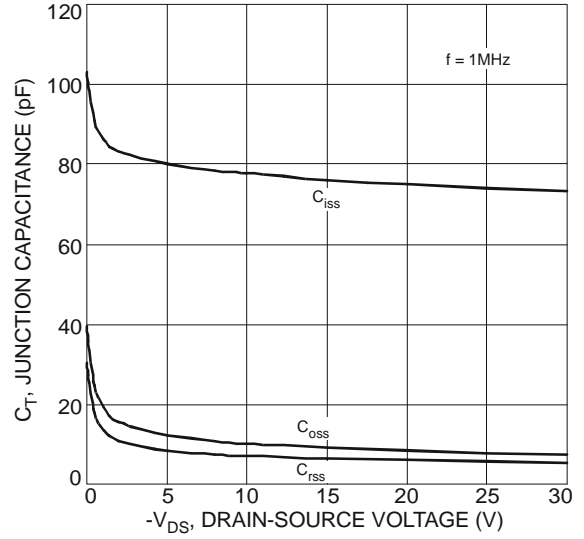


Fig. 12 Typical Junction Capacitance

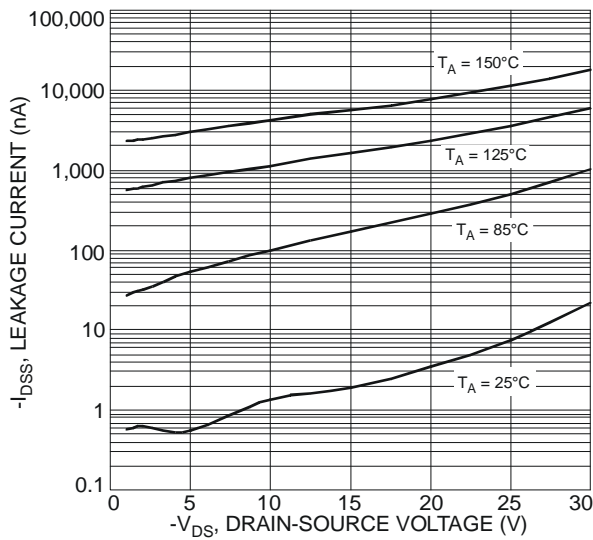


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

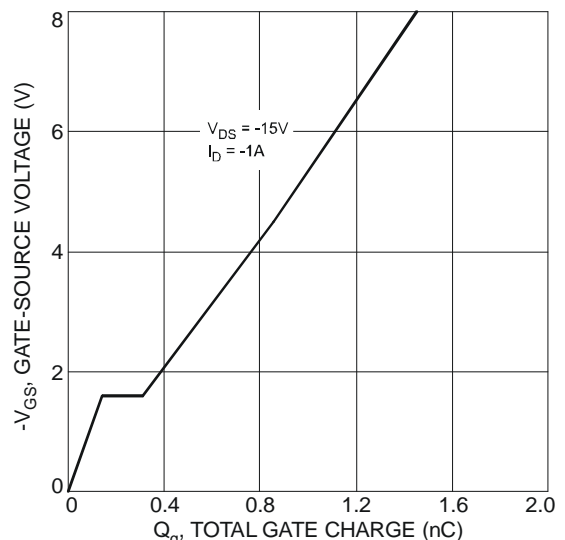
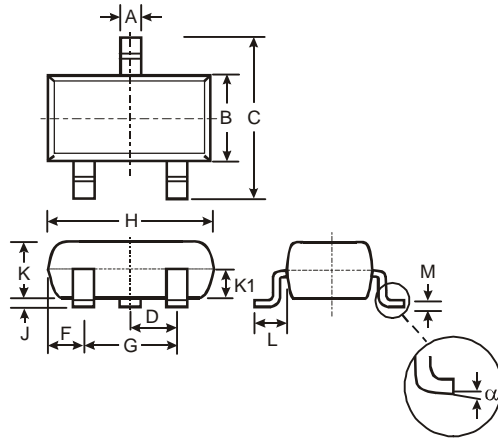


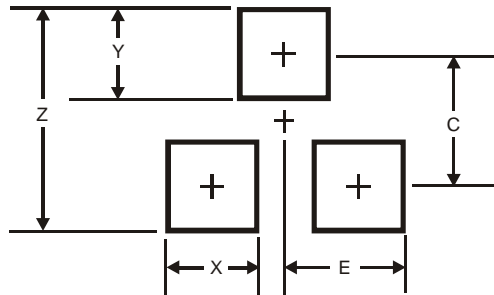
Fig. 14 Gate-Charge Characteristics

**Package Outline Dimensions**



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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