DMP21D0UT

20V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D Max @ T_A = 25°C (Note 4)
-20V	495mΩ @ V_{GS} = -4.5V	-0.59A
	690mΩ @ V_{GS} = -2.5V	-0.50A
	960mΩ @ V_{GS} = -1.8V	-0.42A

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.

- Portable electronics

Features and Benefits

- Footprint of just 3mm^2 – less than half the size of SOT23
- 0.8mm profile – ideal for low profile applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- **ESD Protected Gate 3KV**
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish ; Solderable per MIL-STD-202, Method 208
- Weight: 0.002 grams (approximate)

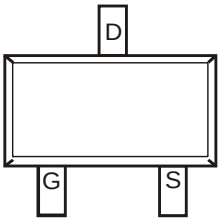


ESD PROTECTED TO 3kV

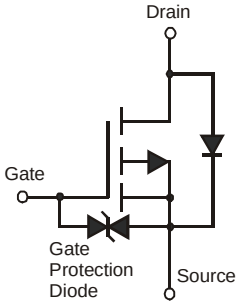
SOT523



Bottom View



Top View
Internal Schematic



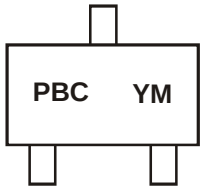
Equivalent Circuit

Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP21D0UT-7	PBC	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



PBC = 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

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Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current	Steady State	T_A = 25°C (Note 4) T_A = 85°C (Note 4) T_A = 25°C (Note 5)	I_D	-0.59 -0.42 -0.65	A
Pulsed Drain Current (Note 6)			I_{DM}	-5.0	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	0.24	W
Power Dissipation (Note 5)	P_D	0.33	W
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	525	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	383	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

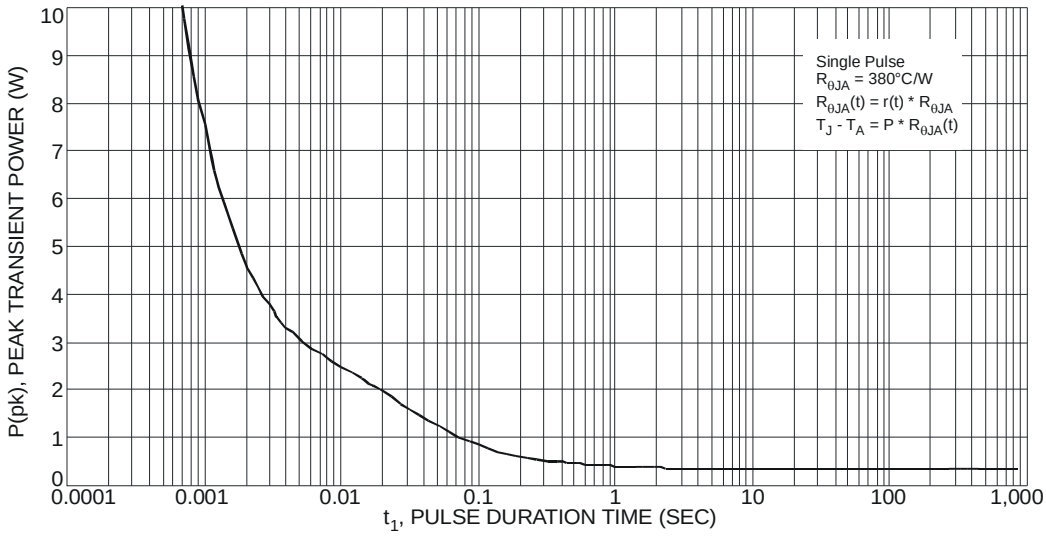

Fig. 1 Single Pulse Maximum Power Dissipation

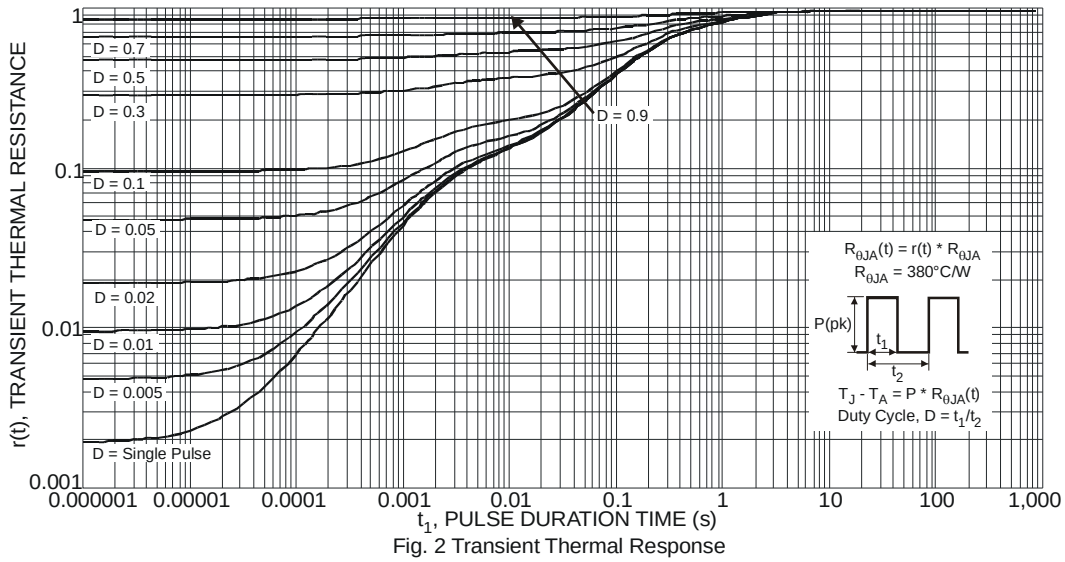

Fig. 2 Transient Thermal Response

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Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	-	-	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	-1	µA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-	-0.7	-	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	-	495	mΩ	V_{GS} = -4.5V, I_D = -400mA
				690		V_{GS} = -2.5V, I_D = -300mA
				960		V_{GS} = -1.8V, I_D = -100mA
Forward Transfer Admittance	$\|Y_{fs}\|$	50	-	-	mS	V_{DS} = -3V, I_D = -300mA
Diode Forward Voltage	V_{SD}	-	-	-1.2	V	V_{GS} = 0V, I_S = -300mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	-	76.5	-	pF	V_{DS} = -10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	13.7	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	10.7	-	pF	
Gate Resistance	R_g	-	195	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g		1.5	-	nC	V_{GS} = -8V,V_{DS} = -15V,I_D = -1A
Total Gate Charge	Q_g	-	1.0	-	nC	V_{GS} = -4.5V, V_{DS} = -15V, I_D = -1A
Gate-Source Charge	Q_{gs}	-	0.2	-	nC	
Gate-Drain Charge	Q_{gd}	-	0.3	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	7.1	-	ns	V_{DS} = -10V, -I_D = 1A V_{GS} = -4.5V, R_G = 6Ω
Turn-On Rise Time	t_r	-	8.0	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	31.7	-	ns	
Turn-Off Fall Time	t_f	-	18.5	-	ns	

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

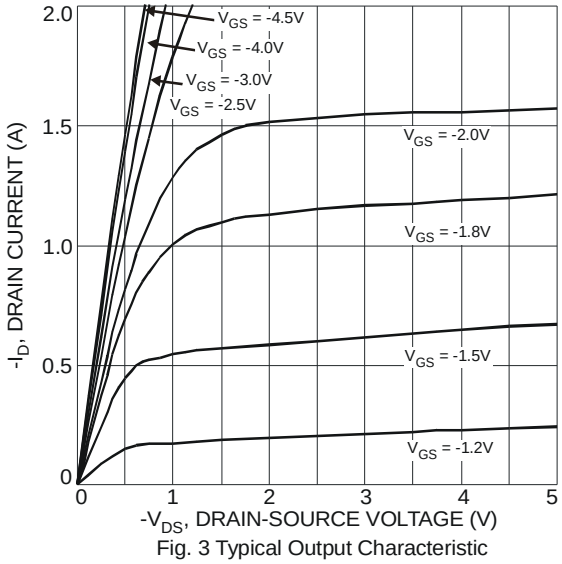

Fig. 3 Typical Output Characteristic

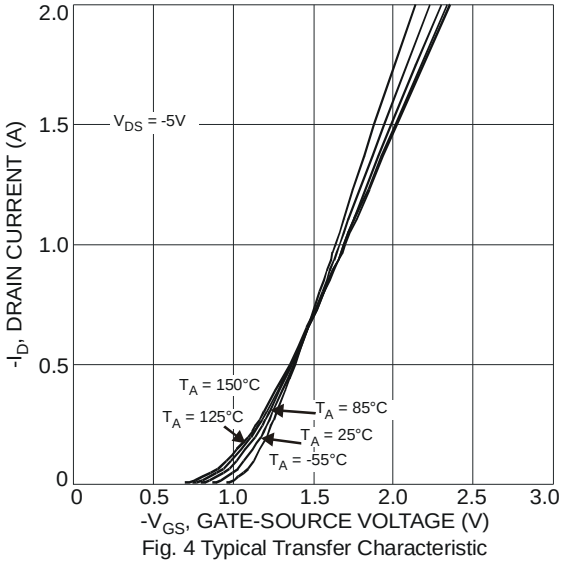

Fig. 4 Typical Transfer Characteristic

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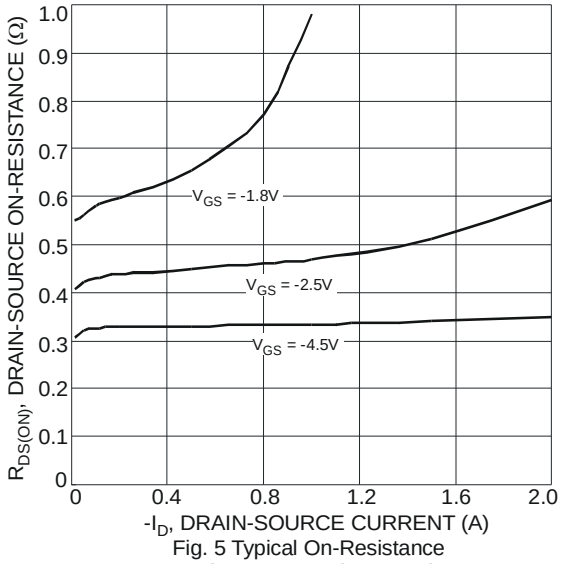

Fig. 5 Typical On-Resistance
vs. Drain Current and Gate Voltage

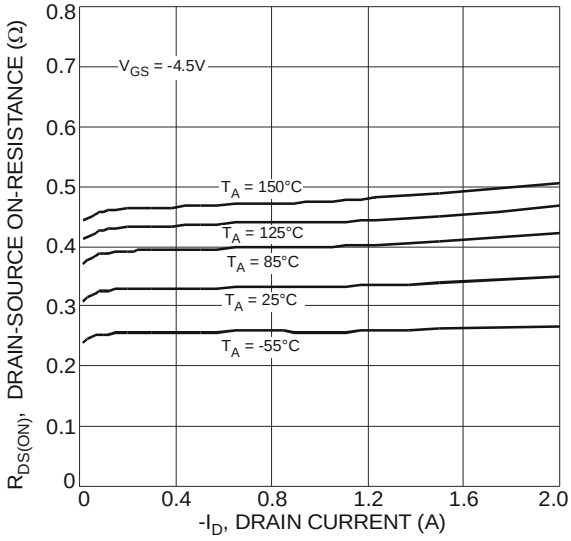

Fig. 6 Typical On-Resistance
vs. Drain Current and Temperature

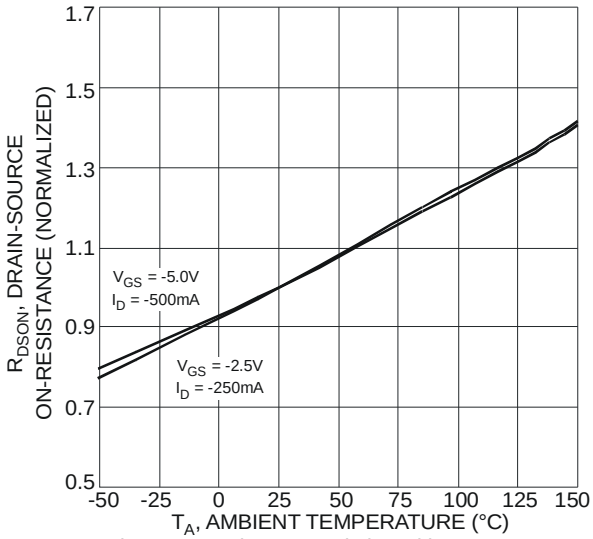

Fig. 7 On-Resistance Variation with Temperature

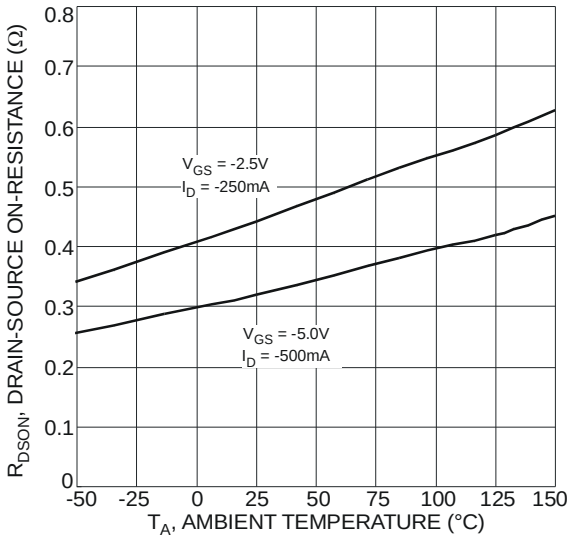

Fig. 8 On-Resistance Variation with Temperature

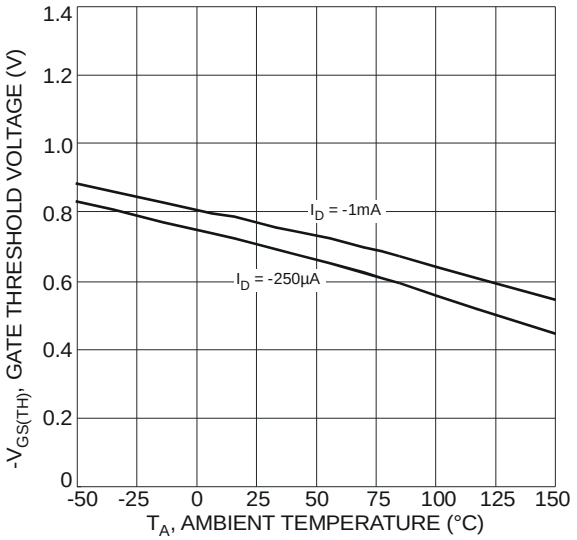

Fig. 9 Gate Threshold Variation vs. Ambient Temperature

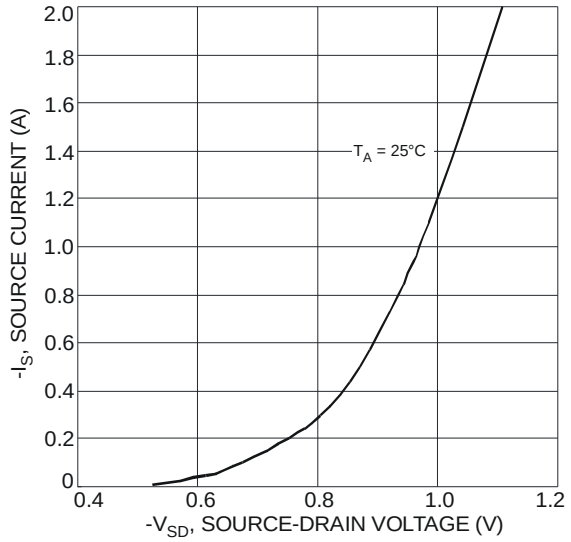

Fig. 10 Diode Forward Voltage vs. Current

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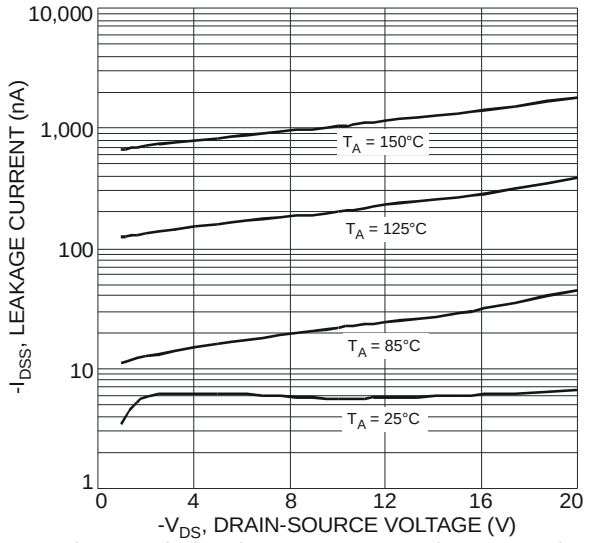

Fig. 11 Typical Leakage Current vs. Drain-Source Voltage

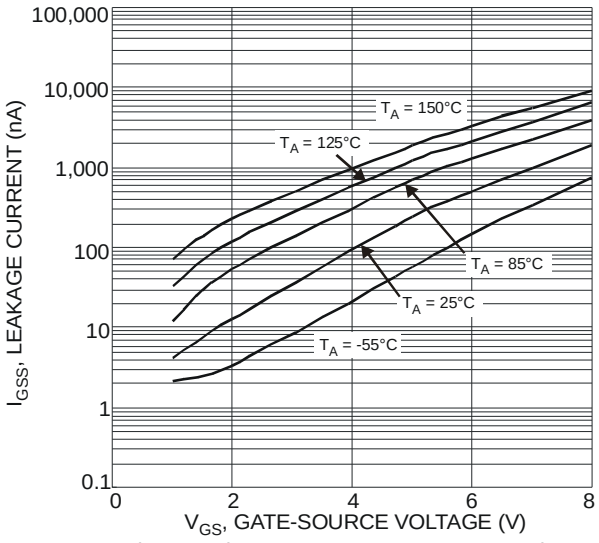

Fig.12 Leakage Current vs. Gate-Source Voltage

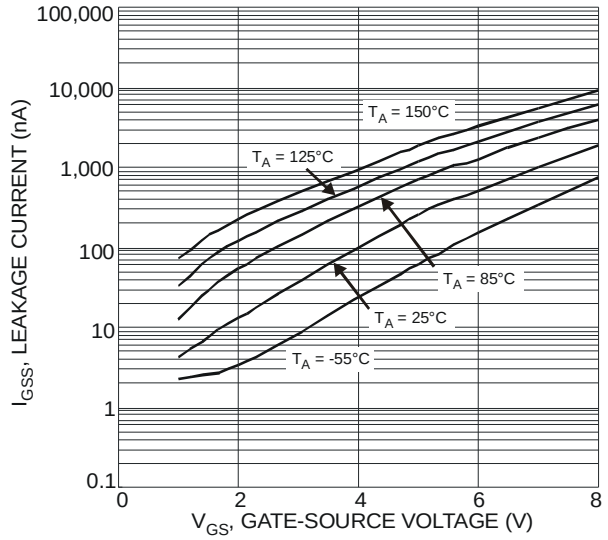

Fig.13 Leakage Current vs. Gate-Source Voltage

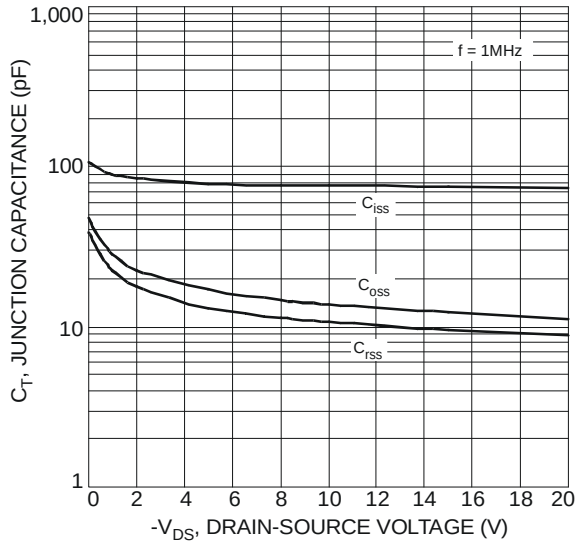

Fig. 14 Typical Junction Capacitance

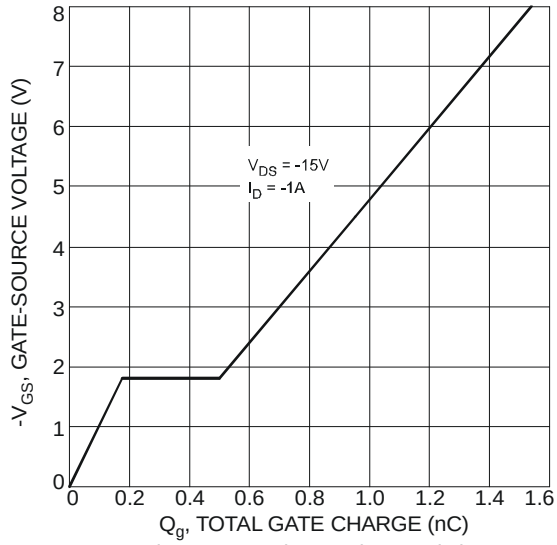

Fig. 15 Gate-Charge Characteristics

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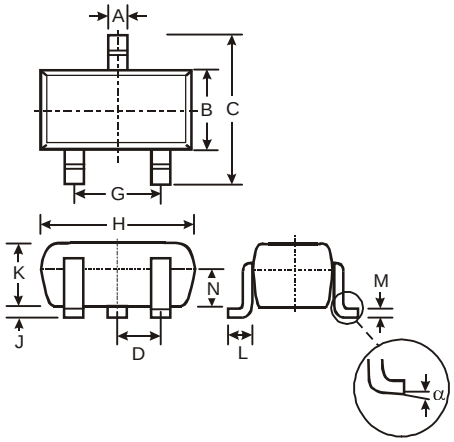
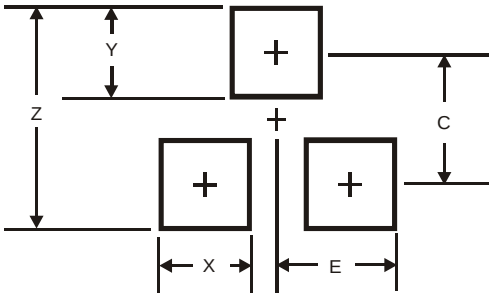
Package Outline Dimensions



SOT523			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.8
X	0.4
Y	0.51
C	1.3
E	0.7

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