

DMP21D0UT
20V P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ Max	I_D Max @ $T_A = 25^\circ\text{C}$ (Note 4)
-20V	495m Ω @ $V_{GS} = -4.5\text{V}$	-0.59A
	690m Ω @ $V_{GS} = -2.5\text{V}$	-0.50A
	960m Ω @ $V_{GS} = -1.8\text{V}$	-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 3mm² – 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)

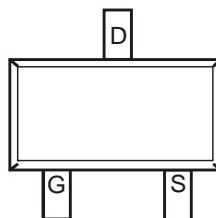
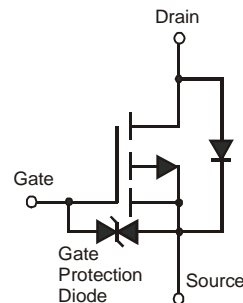


ESD PROTECTED TO 3kV

SOT523



Bottom View

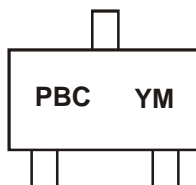

 Top View
 Internal Schematic


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

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)	I _D	-0.59	A
		T _A = 85°C (Note 4)		-0.42	
		T _A = 25°C (Note 5)		-0.65	
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 _{θJA}	525	°C/W
Thermal Resistance, Junction to Ambient (Note 5)			R _{θJA}	383	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-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 FR-4 PCB with high coverage of 2oz copper
 - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.

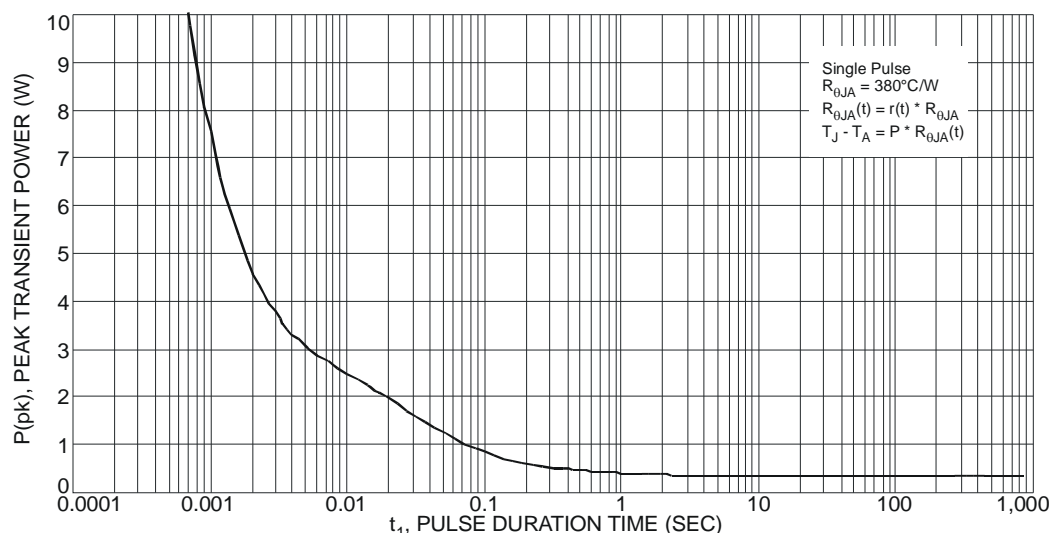


Fig. 1 Single Pulse Maximum Power Dissipation

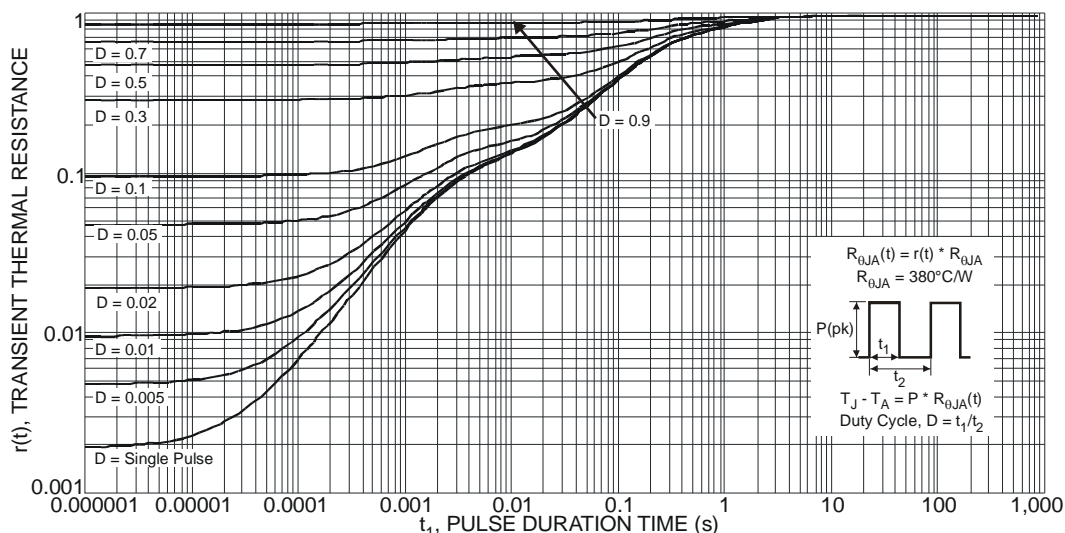


Fig. 2 Transient Thermal Response

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.

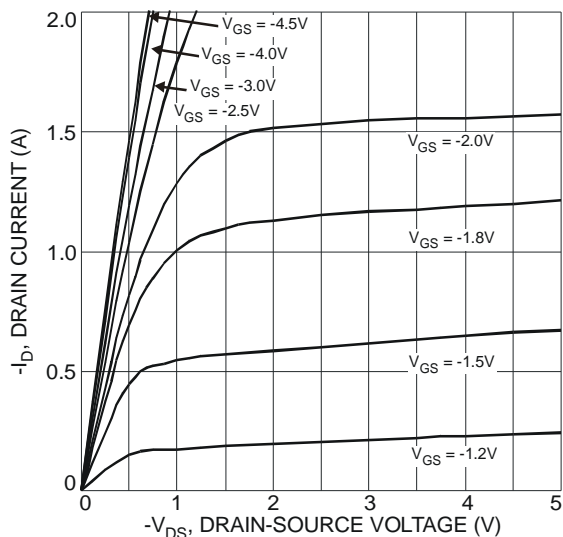


Fig. 3 Typical Output Characteristic

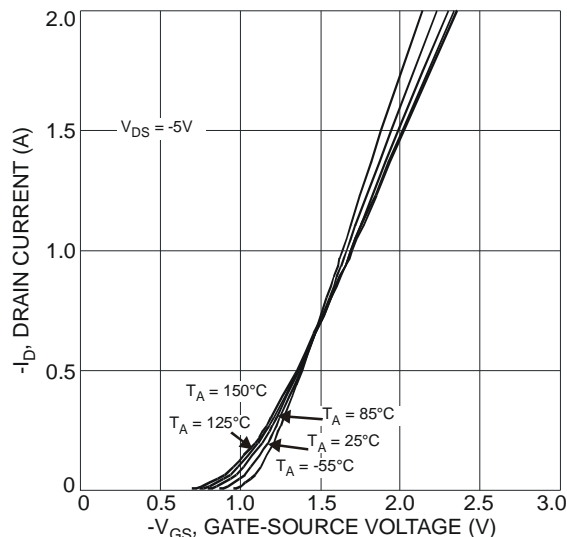
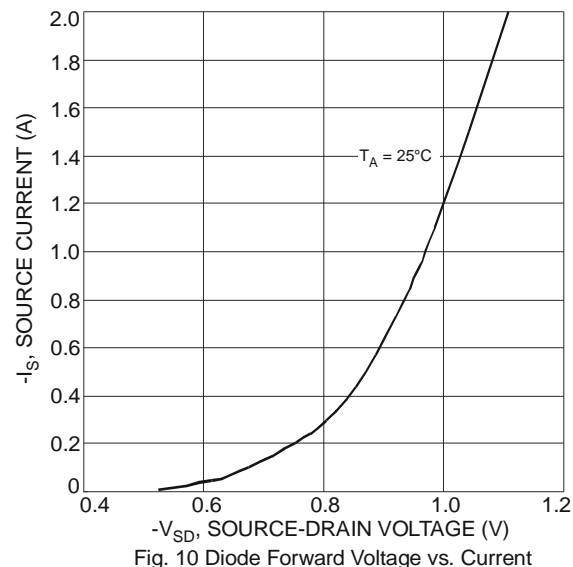
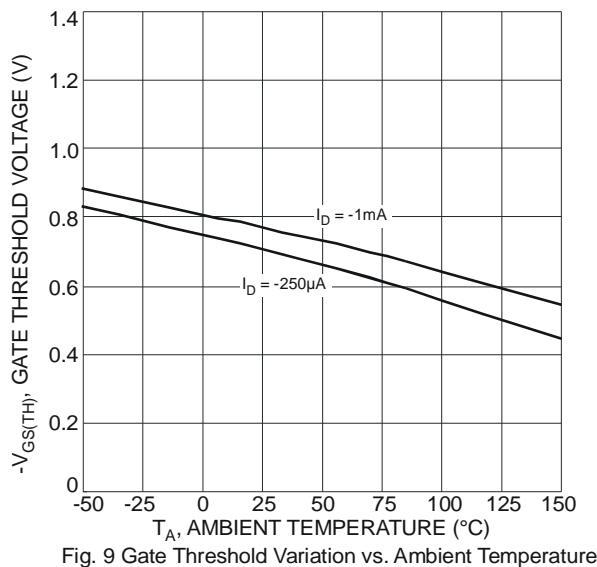
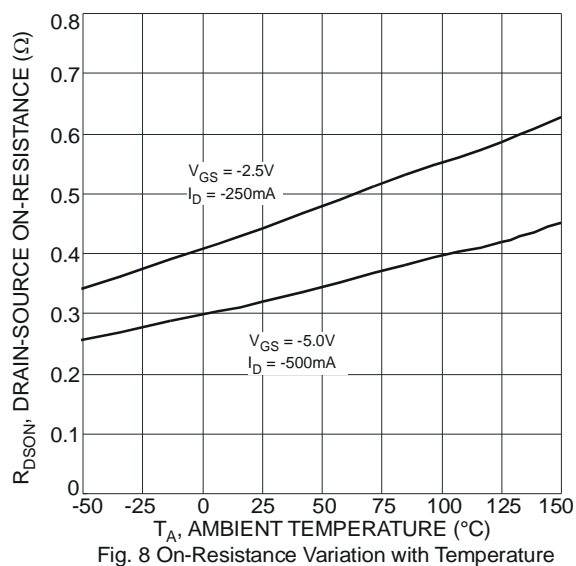
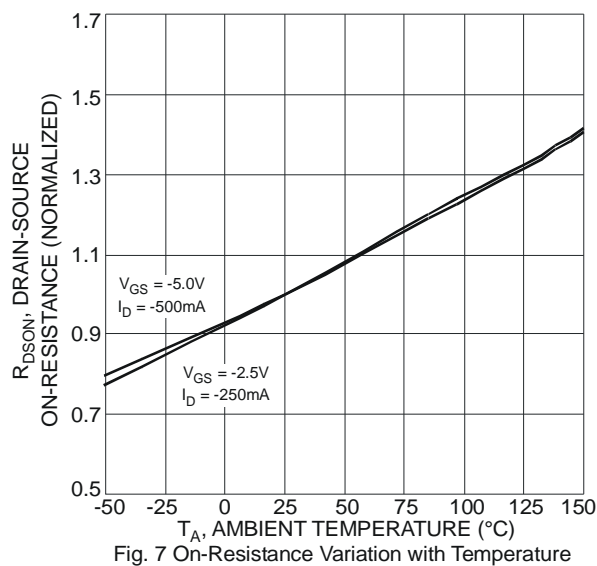
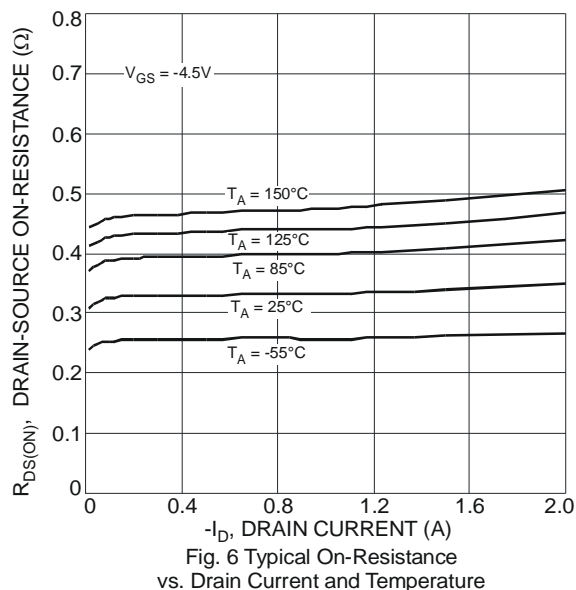
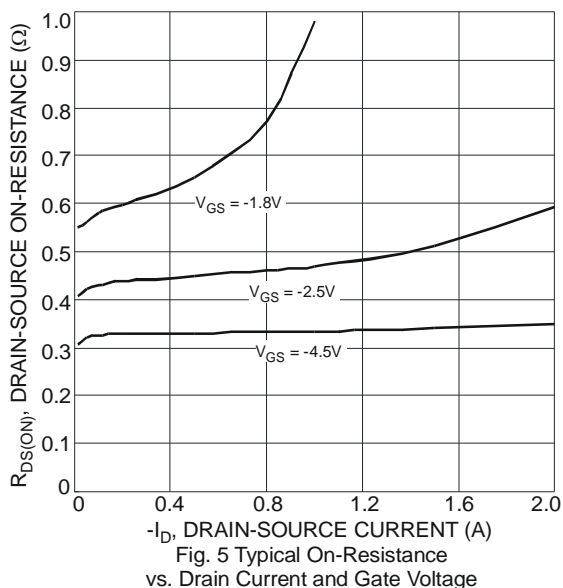


Fig. 4 Typical Transfer Characteristic



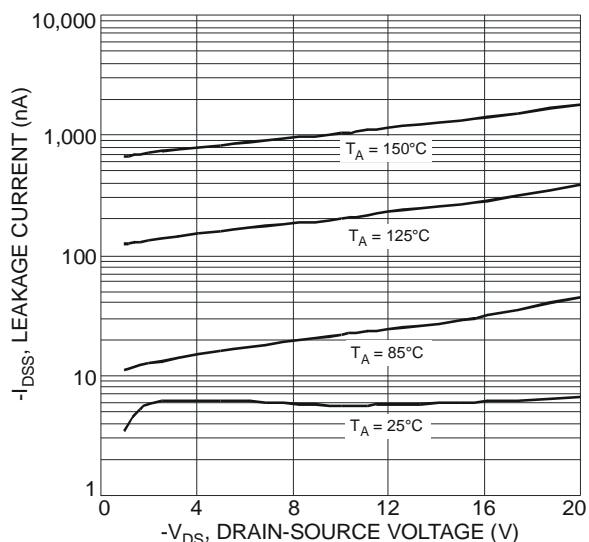


Fig. 11 Typical Leakage Current vs. Drain-Source Voltage

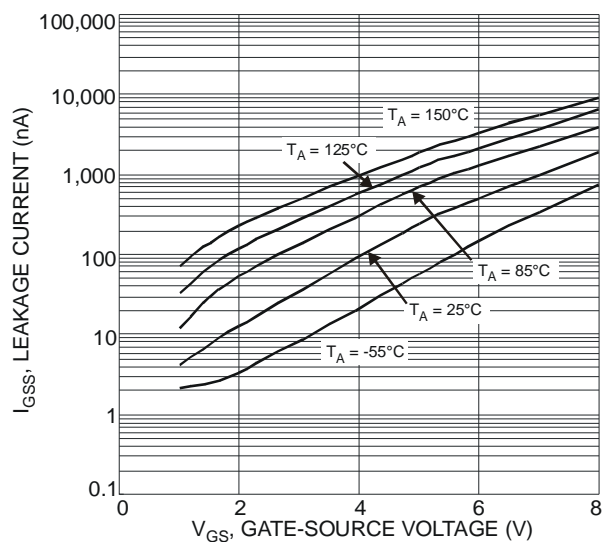


Fig. 12 Leakage Current vs. Gate-Source Voltage

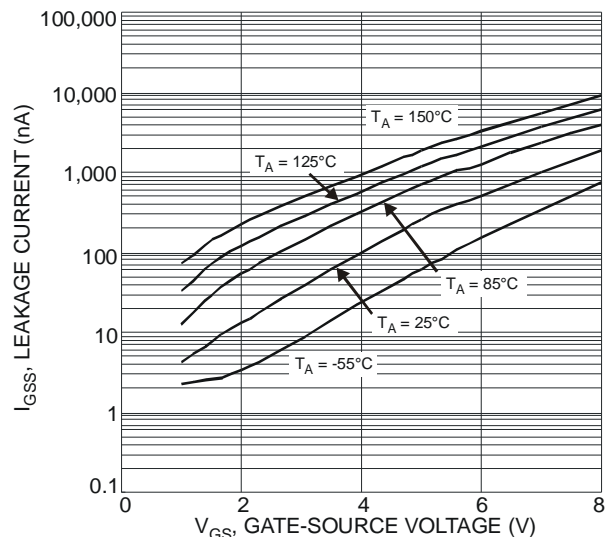


Fig. 13 Leakage Current vs. Gate-Source Voltage

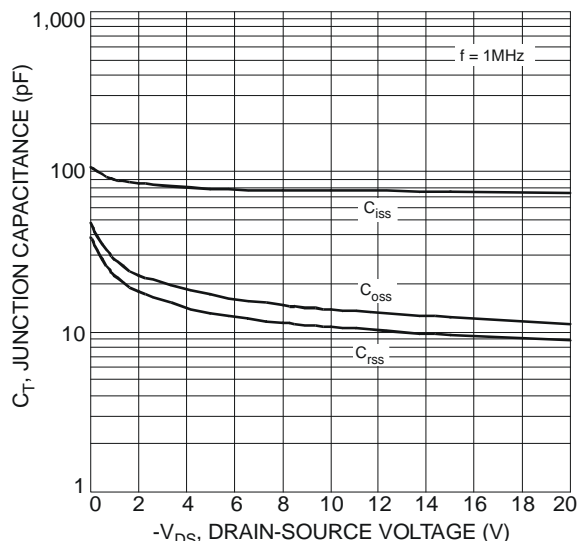


Fig. 14 Typical Junction Capacitance

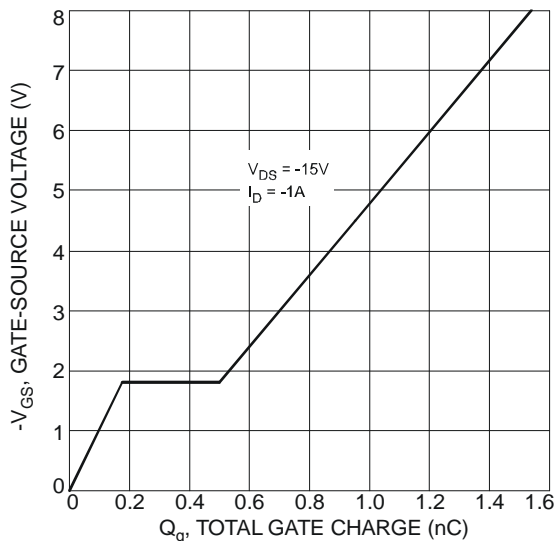
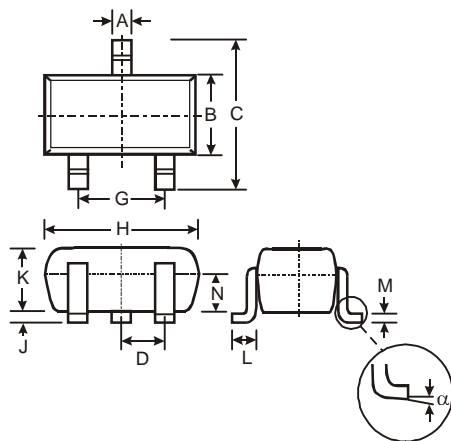


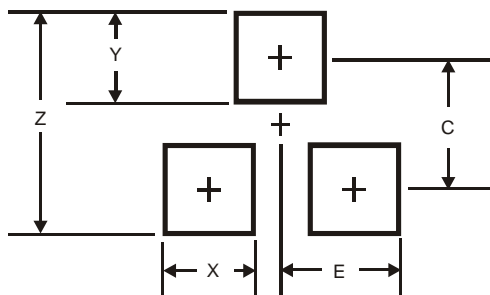
Fig. 15 Gate-Charge Characteristics

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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