

DMP6350SQ-13 Datasheet



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DiGi Electronics Part Number	DMP6350SQ-13-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DMP6350SQ-13
Description	MOSFET P-CH 60V 1.5A SOT23
Detailed Description	P-Channel 60 V 1.5A (Ta) 720mW Surface Mount SO T-23-3



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Purchase and inquiry

Manufacturer Product Number:

DMP6350SQ-13

Series:

-

FET Type:

P-Channel

Drain to Source Voltage (Vdss):

60 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 10V

Vgs(th) (Max) @ Id:

3V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Qualification:

AEC-Q101

Supplier Device Package:

SOT-23-3

Base Product Number:

DMP6350

Manufacturer:

Diodes Incorporated

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

1.5A (Ta)

Rds On (Max) @ Id, Vgs:

350mOhm @ 900mA, 10V

Gate Charge (Qg) (Max) @ Vgs:

4.1 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

206 pF @ 30 V

Power Dissipation (Max):

720mW

Grade:

Automotive

Mounting Type:

Surface Mount

Package / Case:

TO-236-3, SC-59, SOT-23-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



DMP6350SQ

60V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-60V	350mΩ @ V _{GS} = -10V	-1.5A
	550mΩ @ V _{GS} = -4.5V	-1.2A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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)**

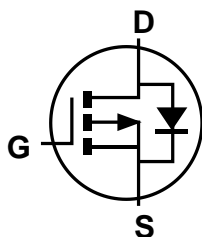
Description and Applications

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:

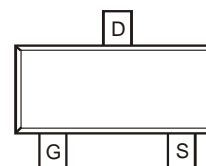
- Backlighting
- Power Management Functions
- DC-DC Converters



Top View



Internal Schematic



Top View

Mechanical Data

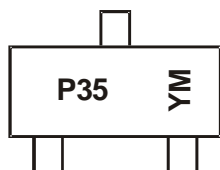
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram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

Ordering Information (Note 5)

Part Number	Case	Packaging
DMP6350SQ-7	SOT23	3000/Tape & Reel
DMP6350SQ-13	SOT23	10,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



P35 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: F = 2018)
 M = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021	2022
Code	C	D	E	F	G	H	I	J

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



DMP6350SQ

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V _{DSS}	-60	V	
Gate-Source Voltage	V _{GSS}	±20	V	
Continuous Drain Current (Note 7), V _{GS} = -10V	I _D	Steady State T _A = +25°C	-1.5	A
		T _A = +70°C	-1.2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-6	A	

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	0.72	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	R _{θJA}	176	°C/W
Power Dissipation (Note 7)	P _D	1.17	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	R _{θJA}	108	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	34	°C/W
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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1.0	µA	V _{DS} = -60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	-1.8	-3.0	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	257	350	mΩ	V _{GS} = -10V, I _D = -0.9A
		—	343	550	mΩ	V _{GS} = -4.5V, I _D = -0.8A
Diode Forward Voltage	V _{SD}	—	-0.8	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	206	—	pF	V _{DS} = -30V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	15	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	11	—	pF	
Gate Resistance	R _g	—	17	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	2.0	—	nC	V _{DS} = -30V, I _D = -0.9A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	4.1	—	nC	
Gate-Source Charge	Q _{gs}	—	0.5	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.8	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.6	—	ns	V _{DD} = -30V, V _{GS} = -10V, I _D = -1.0A, R _g = 6Ω
Turn-On Rise Time	t _R	—	3.8	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	12.3	—	ns	
Turn-Off Fall Time	t _F	—	7.3	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	8.2	—	ns	I _S = -1.0A, di/dt = -100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	2.7	—	nC	I _S = -1.0A, di/dt = -100A/µs

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.



DMP6350SQ

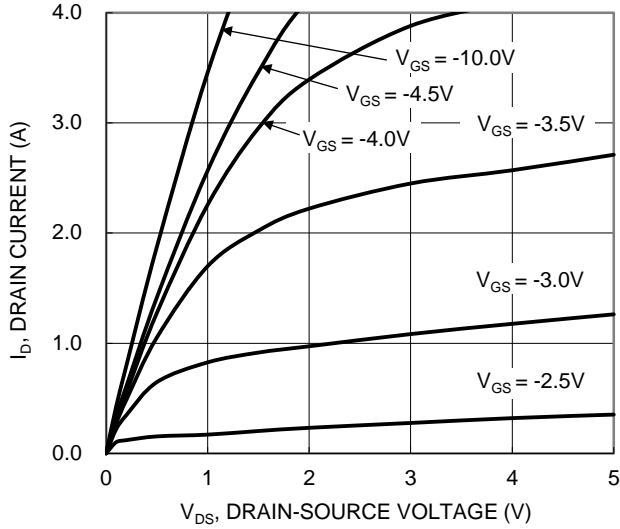


Figure 1. Typical Output Characteristic

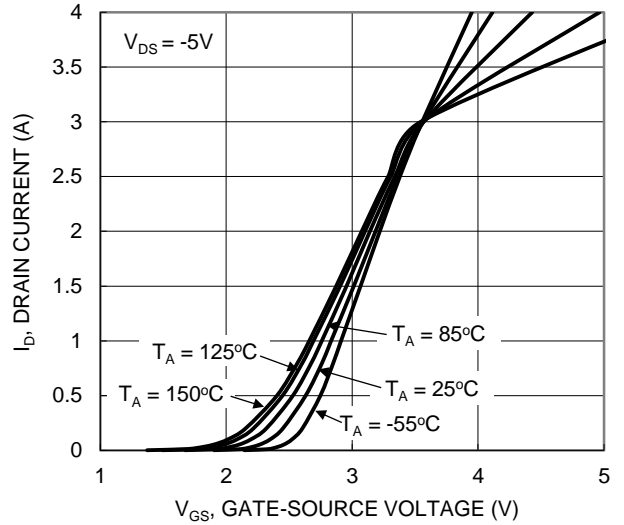


Figure 2. Typical Transfer Characteristic

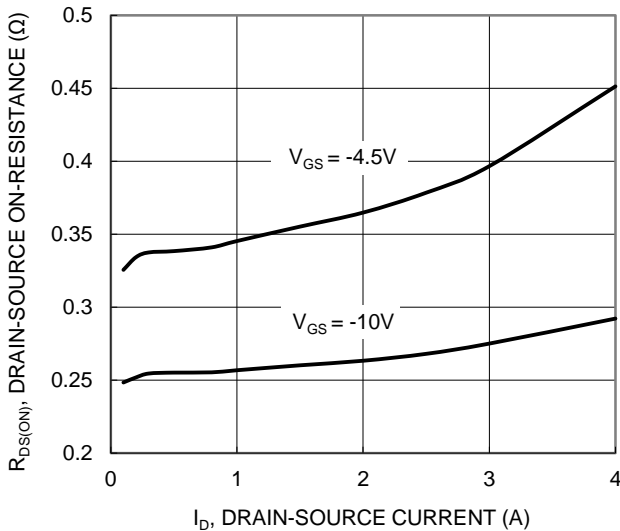


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

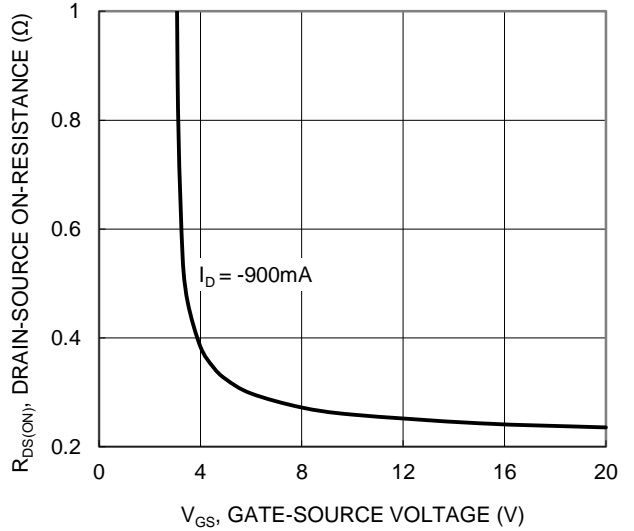


Figure 4. Typical Transfer Characteristic

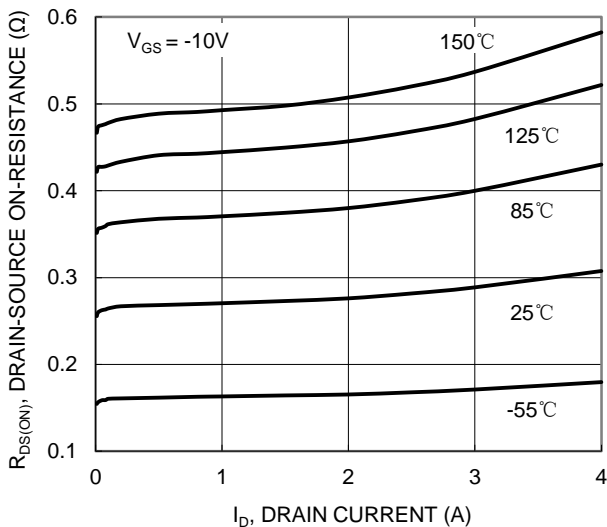


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

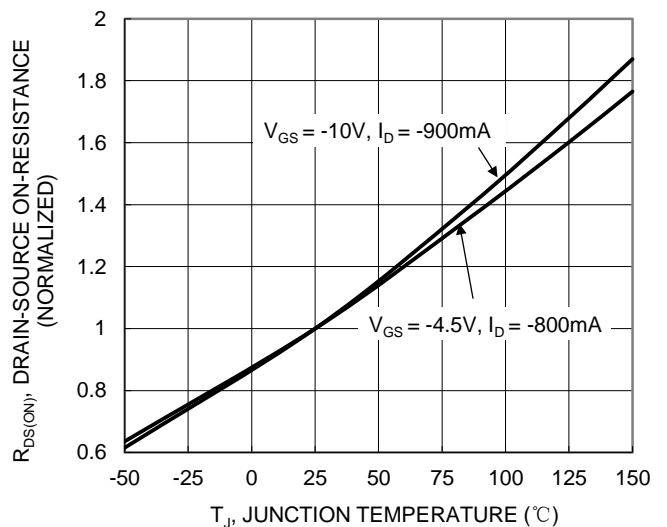


Figure 6. On-Resistance Variation with Junction Temperature



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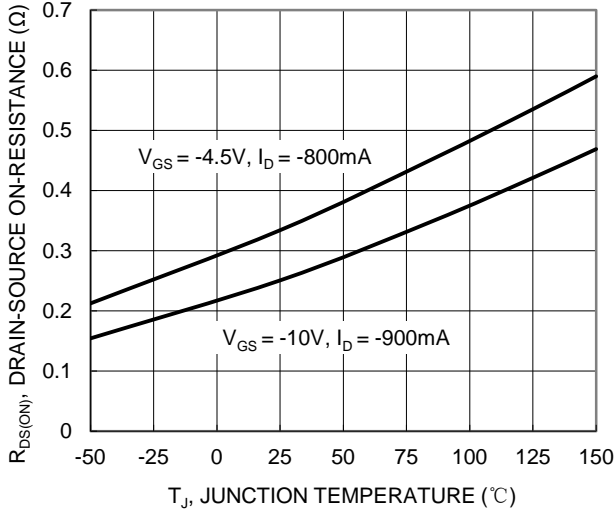


Figure 7. On-Resistance Variation with Junction Temperature

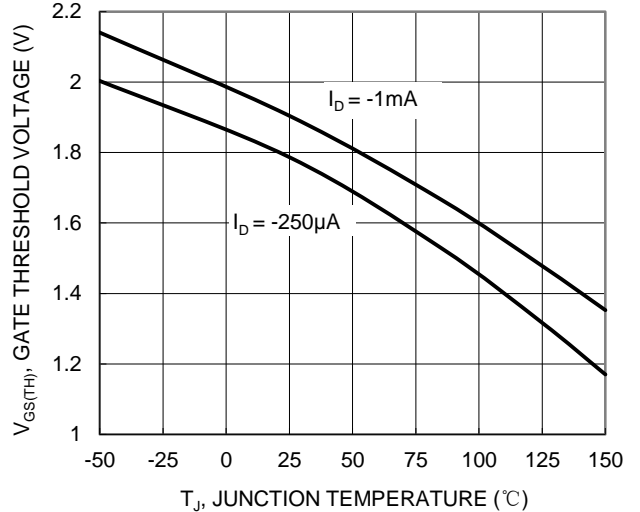


Figure 8. Gate Threshold Variation vs. Junction Temperature

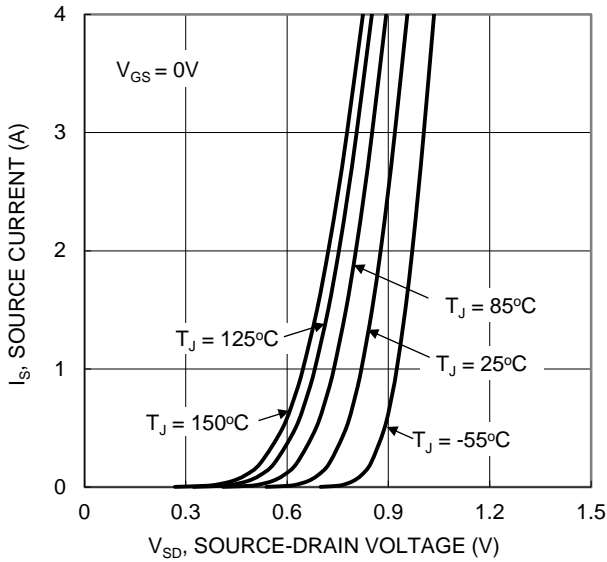


Figure 9. Diode Forward Voltage vs. Current

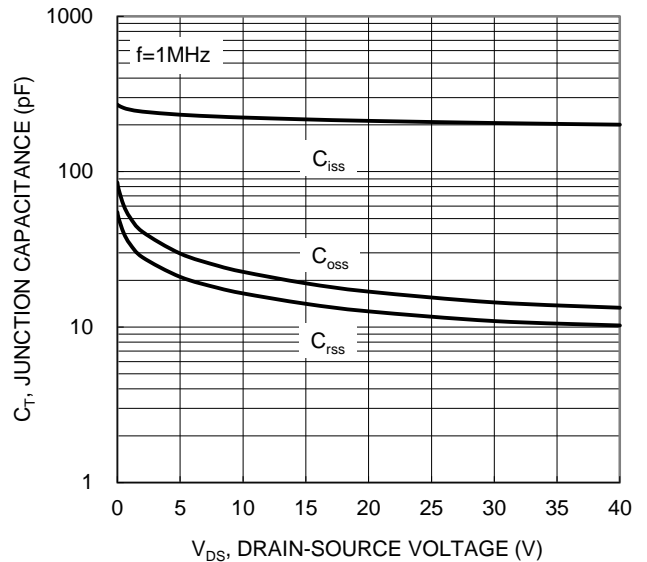


Figure 10. Typical Junction Capacitance

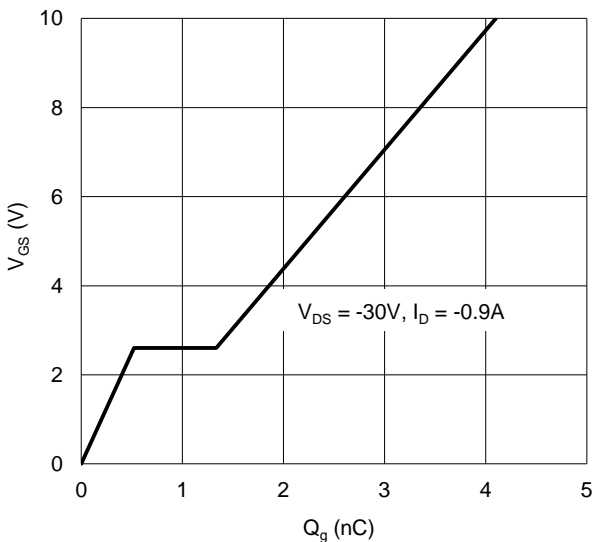


Figure 11. Gate Charge

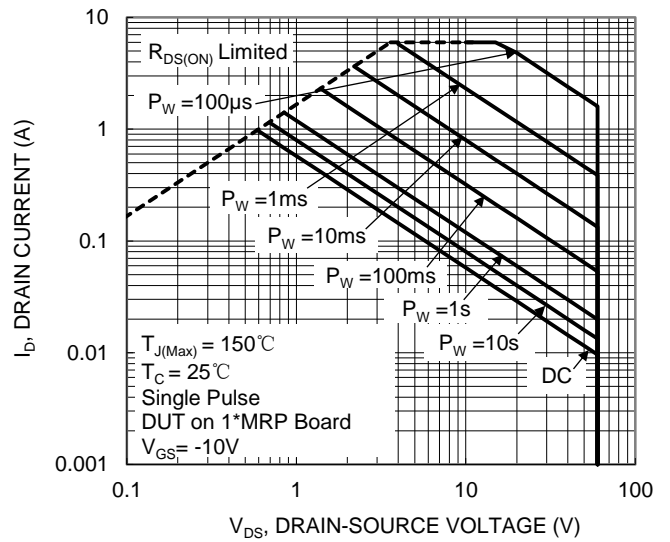


Figure 12. SOA, Safe Operation Area



DMP6350SQ

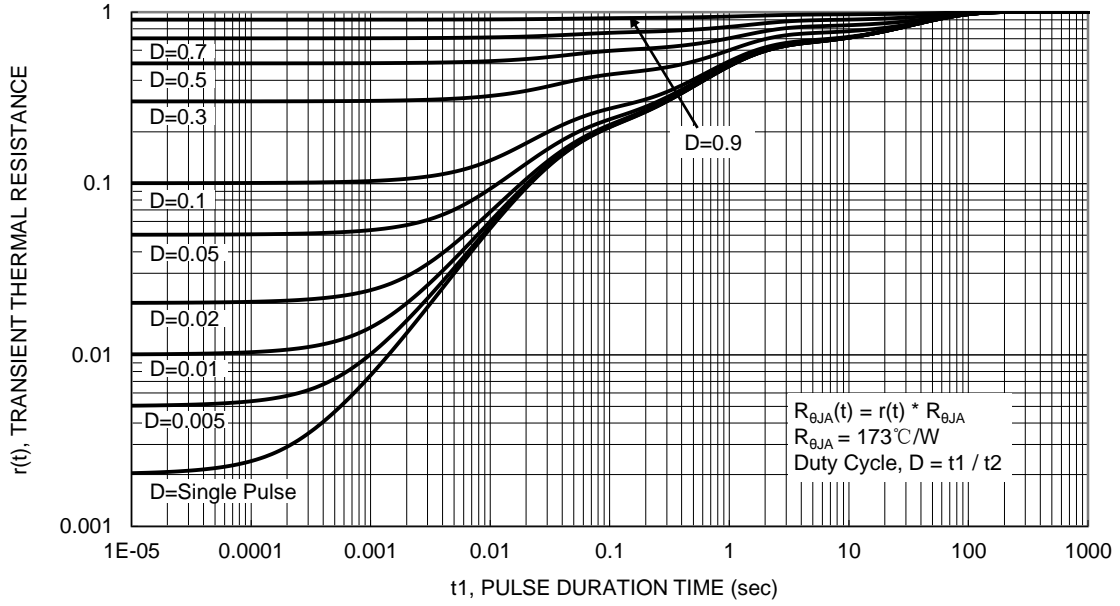
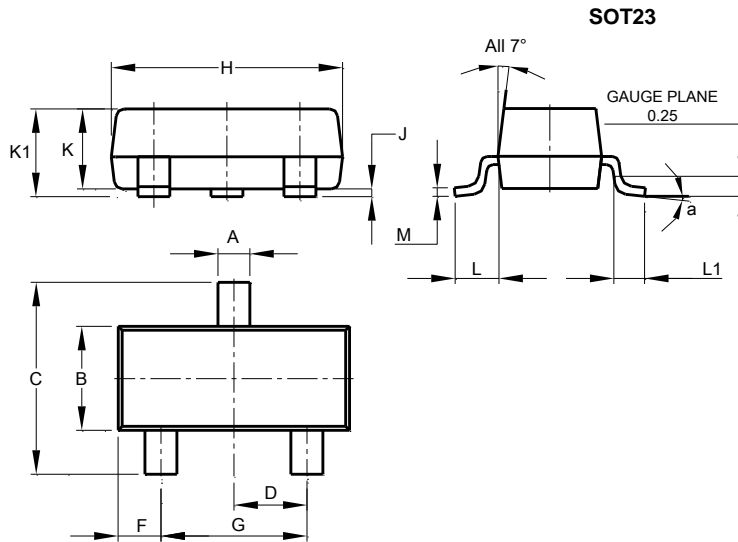


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

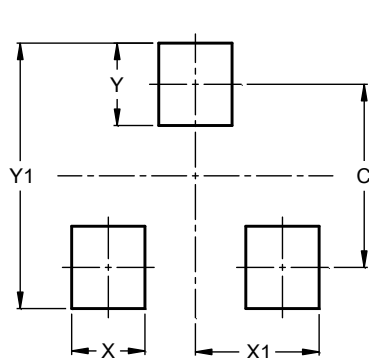
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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.



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



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