DMP2305U-7 Datasheet

DiGi Electronics Part Number	DMP2305U-7-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DMP2305U-7
Description	MOSFET P-CH 20V 4.2A SOT23-3
Detailed Description	P-Channel 20 V 4.2A (Ta) 1.4W (Ta) Surface Mount SOT-23-3

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
DMP2305U-7	Diodes Incorporated
Series:	Product Status:
-	Active
FET Type:	Technology:
P-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
20 V	4.2A (Ta)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
1.8V, 4.5V	60mOhm @ 4.2A, 4.5V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
900mV @ 250µA	7.6 nC @ 4.5 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±8V	727 pF @ 20 V
FET Feature:	Power Dissipation (Max):
-	1.4W (Ta)
Operating Temperature:	Mounting Type:
-55°C ~ 150°C (TJ)	Surface Mount
Supplier Device Package:	Package / Case:
SOT-23-3	TO-236-3, SC-59, SOT-23-3
Base Product Number:	
DMP2305	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

Lead-free Green

DMP2305U

P-CHANNEL ENHANCEMENT MODE MOSFET

Features

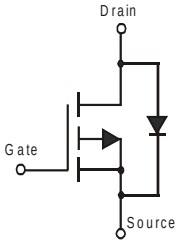
- Low On-Resistance
  - 60mΩ @ V_{GS} = -4.5V
  - 90mΩ @ V_{GS} = -2.5V
  - 113mΩ @ V_{GS} = -1.8V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

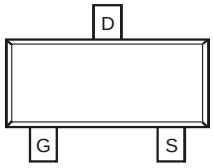
- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

SOT23 (Standard)

Top View



Internal Schematic



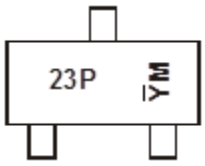
Top View

Ordering Information (Note 4)

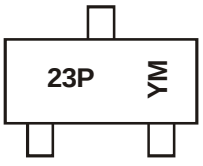
Part Number	Qualification	Package	Packing	
			Qty.	Carrier
DMP2305U-7	Standard	SOT23 (Standard)	3000	Tape & Reel

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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



Chengdu A/T Site



Shanghai A/T Site

23P = Product Type Marking Code
YM = Date Code Marking for SAT (Shanghai Assembly/ Test Site)
$\overline{Y}$M = Date Code Marking for CAT (Chengdu Assembly/ Test Site)
Y or $\overline{Y}$ = Year (ex: J = 2022)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	…	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	W	…	J	K	L	M	N	O	P	R	S	T

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

DIODES INCORPORATED

DMP2305U

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 (Note 5)	Steady State	T_A = +25°C T_A = +70°C	I_D	-4.2 -3.4	A
Pulsed Drain Current (Note 6)			I_{DM}	-10	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.4	W
Thermal Resistance, Junction to Ambient @T_A = +25°C	$R_{\theta JA}$	90	°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 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}	—	—	-1.0	µA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage		I_{GSS}	—	—	±100	nA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage		$V_{GS(TH)}$	-0.5	—	-0.9	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance		$R_{DS\ (ON)}$	—	45	60	mΩ	V_{GS} = -4.5V, I_D = -4.2A
				60	90		V_{GS} = -2.5V, I_D = -3.4A
				87	113		V_{GS} = -1.8V, I_D = -2.0A
Forward Transfer Admittance		$\|Y_{FS}\|$	—	9	—	S	V_{DS} = -5V, I_D = -4A
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance		C_{iss}	—	727	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	69	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	64	—	pF	
Gate Resistance		R_g	—	23	—	Ω	V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q_g	—	7.6	—	nC	V_{GS} = -4.5V, V_{DS} = -4V, I_D = -3.5A
Gate-Source Charge		Q_{gs}	—	1.4	—	nC	
Gate-Drain Charge		Q_{gd}	—	1.2	—	nC	
Turn-On Delay Time		$t_{D(ON)}$	—	14.0	—	ns	V_{DS} = -4V, V_{GS} = -4.5V, R_L = 4Ω, R_G = 6Ω, I_D = -1A
Turn-On Rise Time		t_R	—	13.0	—	ns	
Turn-Off Delay Time		$t_{D(OFF)}$	—	53.8	—	ns	
Turn-Off Fall Time		t_F	—	23.2	—	ns	

Notes:
5. Device mounted on FR-4 PCB with 2oz. copper and test pulse width t ≤ 10s.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

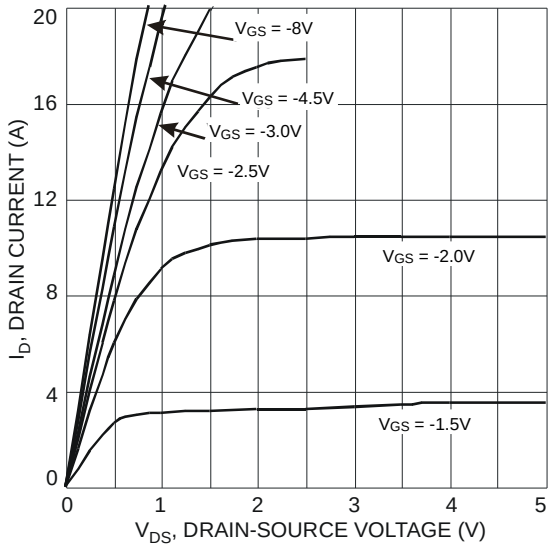


Fig. 1 Typical Output Characteristic

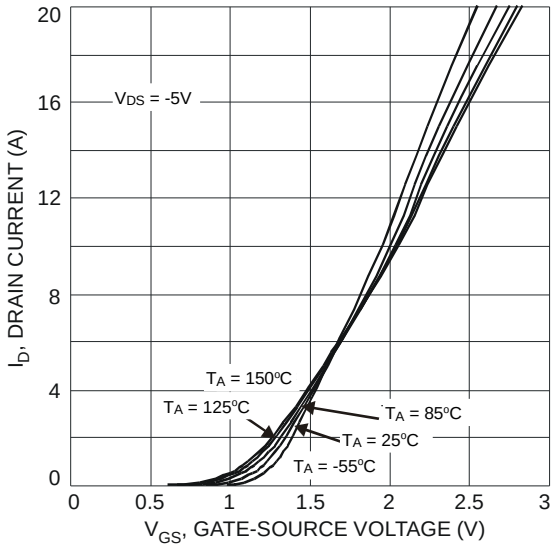


Fig. 2 Typical Transfer Characteristic

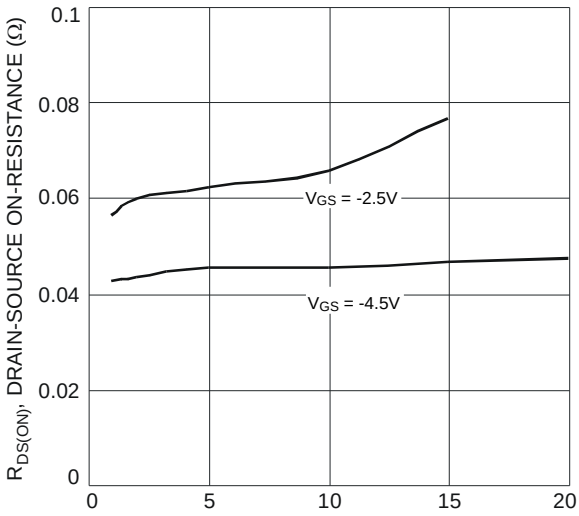


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

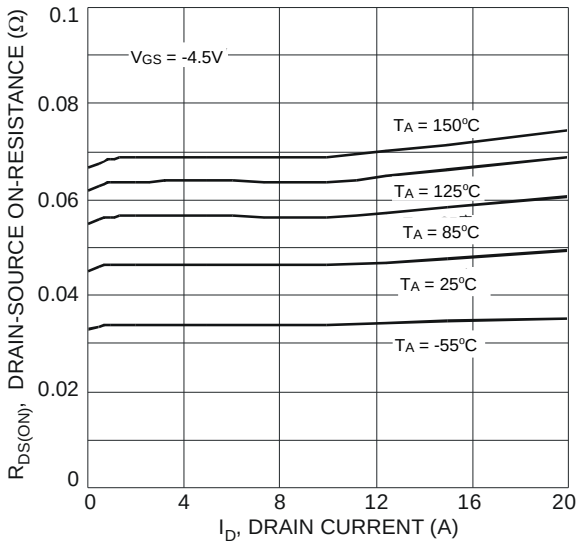


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

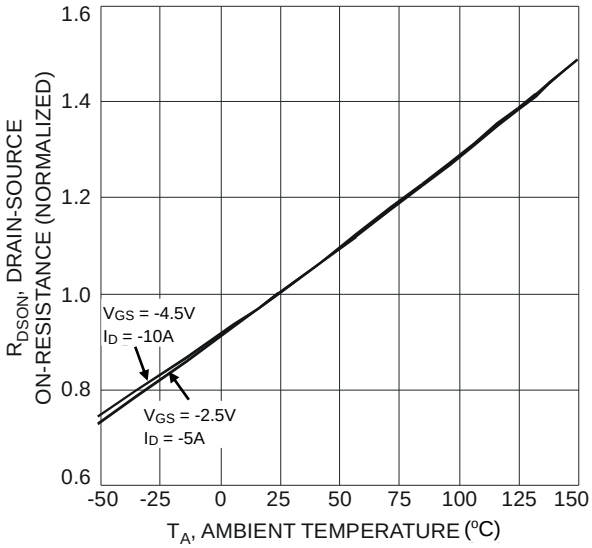


Fig. 5 On-Resistance Variation with Temperature

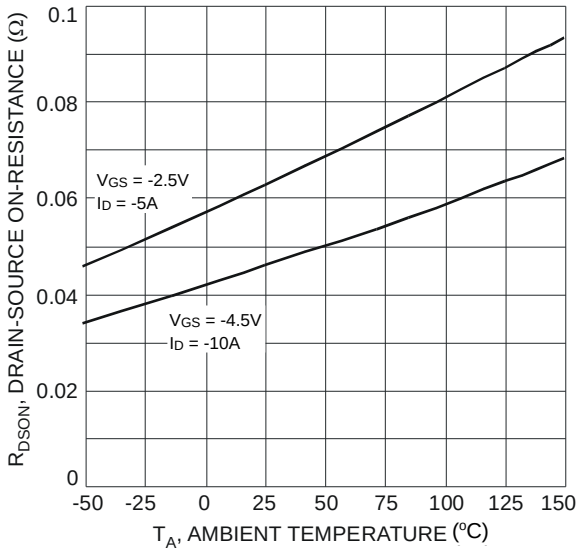


Fig. 6 On-Resistance Variation with Temperature

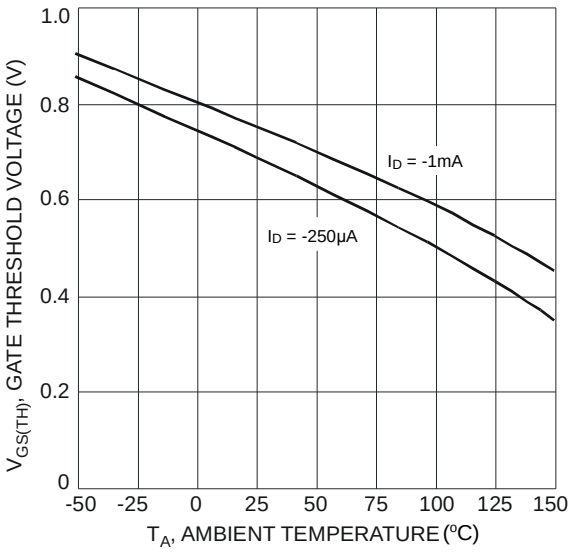


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

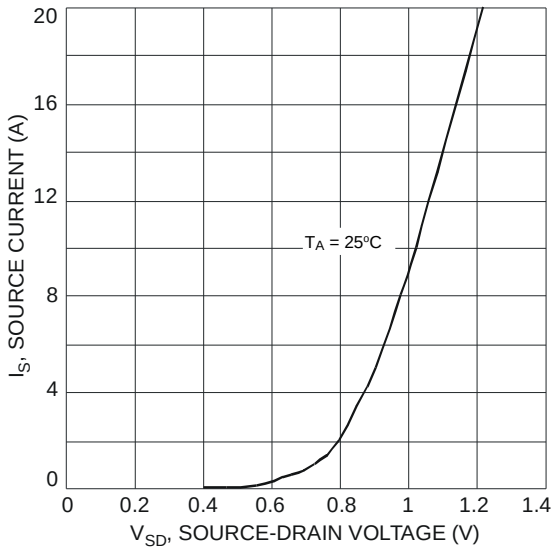


Fig. 8 Diode Forward Voltage vs. Current

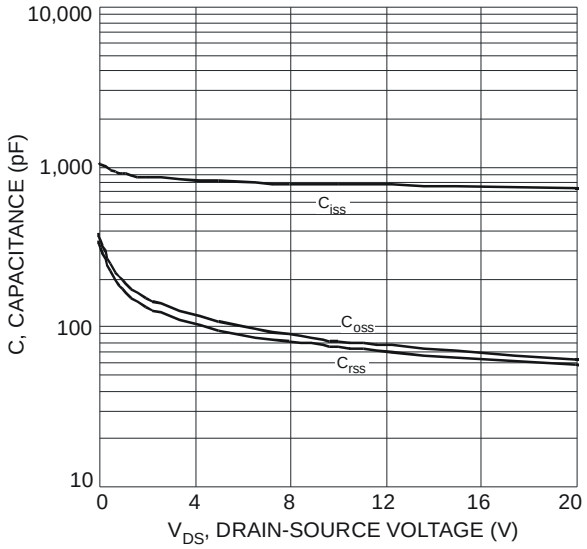


Fig. 9 Typical Total Capacitance

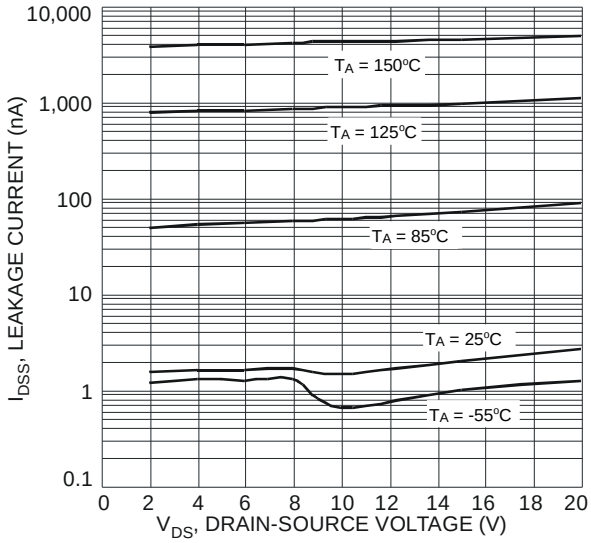


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

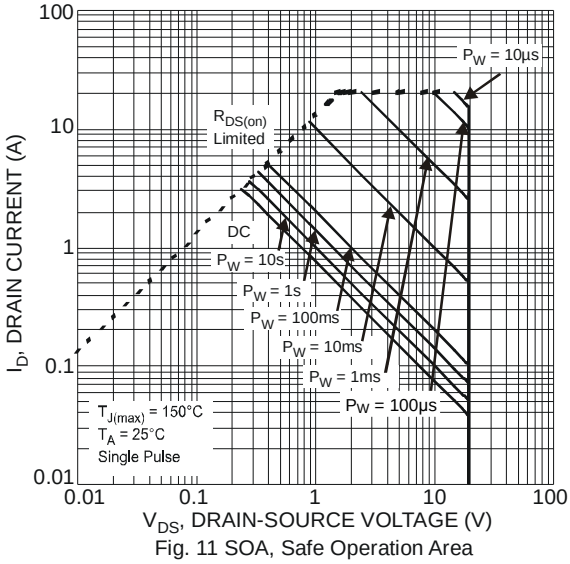


Fig. 11 SOA, Safe Operation Area

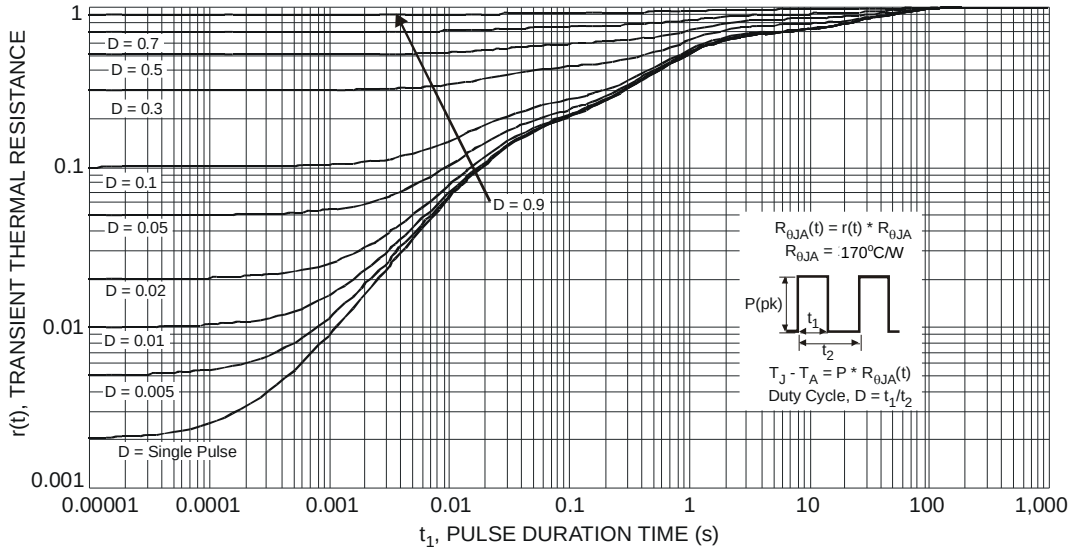
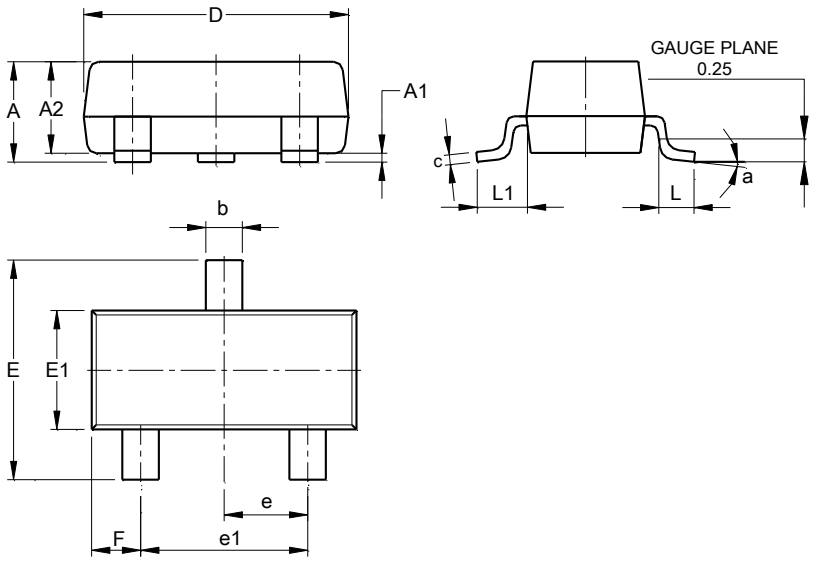


Fig. 12 Transient Thermal Response

Package Outline Dimensions

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

SOT23 (Standard)

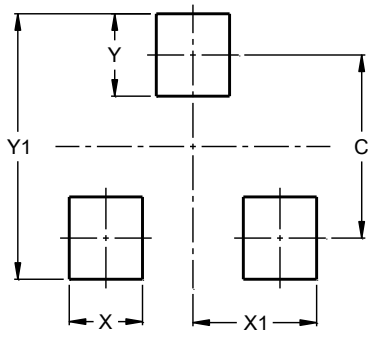


SOT23 (Standard)			
Dim	**Min**	**Max**	**Typ**
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23 (Standard)



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

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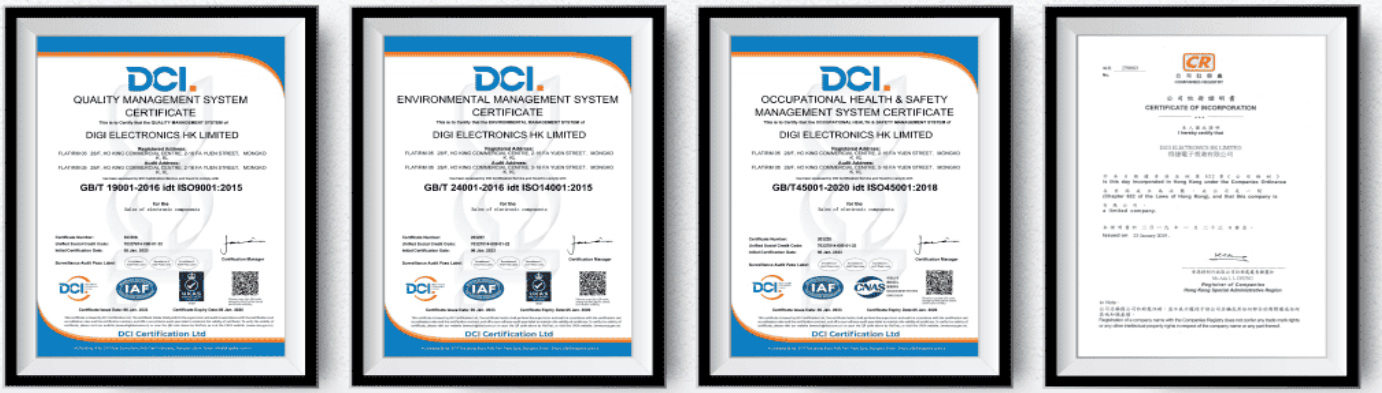

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