100V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D T_C = +25°C
-100V	240mΩ @ V_{GS} = -10V	-9A
	300mΩ @ V_{GS} = -4.5V	-8A

Features

- Low On-Resistance
- Low Input Capacitance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description

This new generation 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.

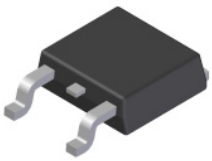
Mechanical Data

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.33 grams (approximate)

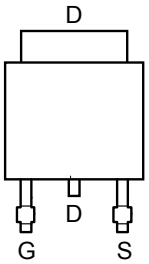
Applications

- DC-DC Converters
- Power management functions
- Analog Switch

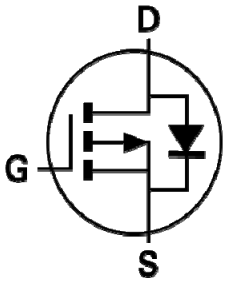
TO252



Top View



Top View



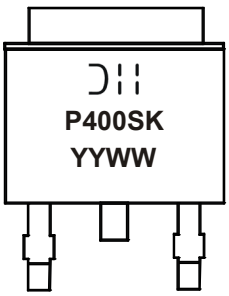
Internal Schematic

Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMP10H400SK3-13	Standard	TO252	2,500/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html

Marking Information



= Manufacturer's Marking
P400SK = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 13 = 2013)
WW = Week (01 - 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-100	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 4) V_{GS} = -10V	Steady State	T_C = +25°C	I_D	-9	A
		T_C = +100°C		-5.5	
Maximum Body Diode Forward Current (Note 4)			I_S	-4	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	-15	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 4)	T_C = +25°C	P_D	42	W
	T_C = +100°C		17	
Thermal Resistance, Junction to Ambient (Note 4)		$R_{\theta JA}$	44	°C/W
Thermal Resistance, Junction to Case (Note 4)		$R_{\theta JC}$	3	
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 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	-100	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -80V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	-1	—	-3	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	190	240	mΩ	V_{GS} = -10V, I_D = -5A
		—	210	300		V_{GS} = -4.5V, I_D =-5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -5A
DYNAMIC CHARACTERISTICS (Note 6)						
Input Capacitance	C_{iss}	—	1239	—	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	42	—		
Reverse Transfer Capacitance	C_{rss}	—	28	—		
Gate Resistance	R_G	—	13	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	8.4	—	nC	V_{DS} = -60V, I_D = -5A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	17.5	—		
Gate-Source Charge	Q_{gs}	—	2.8	—		
Gate-Drain Charge	Q_{gd}	—	3.2	—		
Turn-On Delay Time	$t_{D(on)}$	—	9.1	—	ns	V_{DD} = -50V, R_G = 9.1Ω, I_D = -5A
Turn-On Rise Time	t_r	—	14.9	—		
Turn-Off Delay Time	$t_{D(off)}$	—	57.4	—		
Turn-Off Fall Time	t_f	—	34.4	—		
Body Diode Reverse Recovery Time	t_{rr}	—	25.2	—	ns	V_{GS} = 0V, I_S = -5A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	24.5	—	nC	V_{GS} = 0V, I_S = -5A, dI/dt = 100A/µs

Notes: 4. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
5. Short duration pulse test used to minimize self-heating effect
6. Guaranteed by design; not subject to production testing

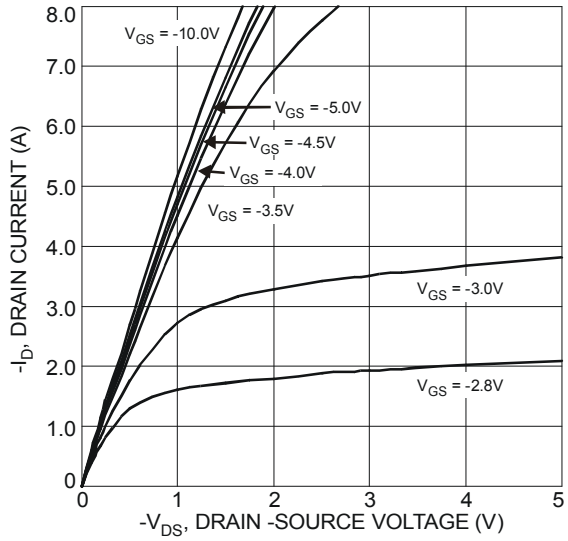


Fig. 1 Typical Output Characteristics

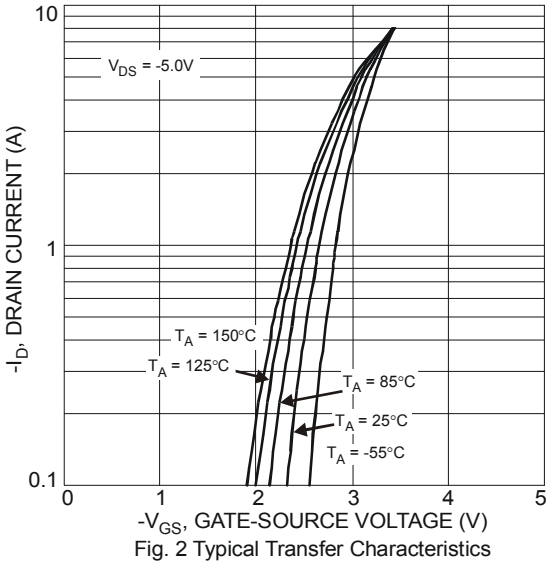


Fig. 2 Typical Transfer Characteristics

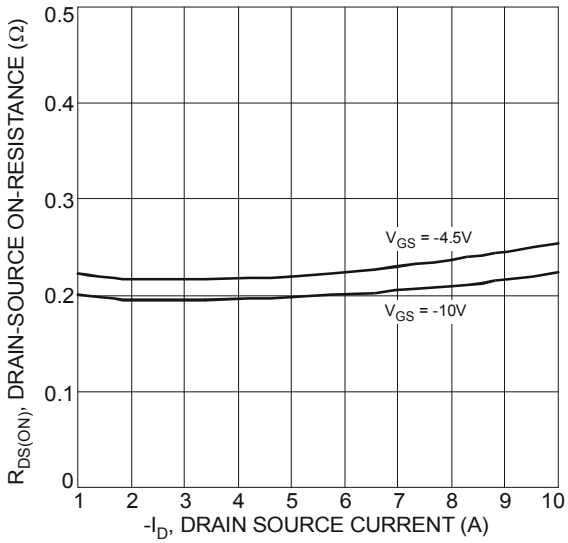


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

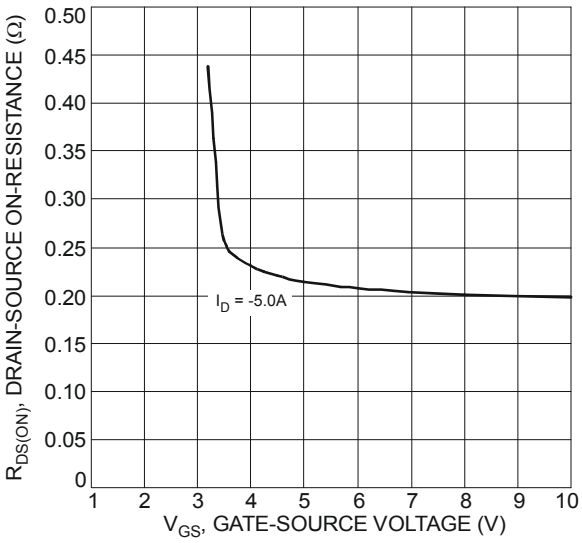


Fig. 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

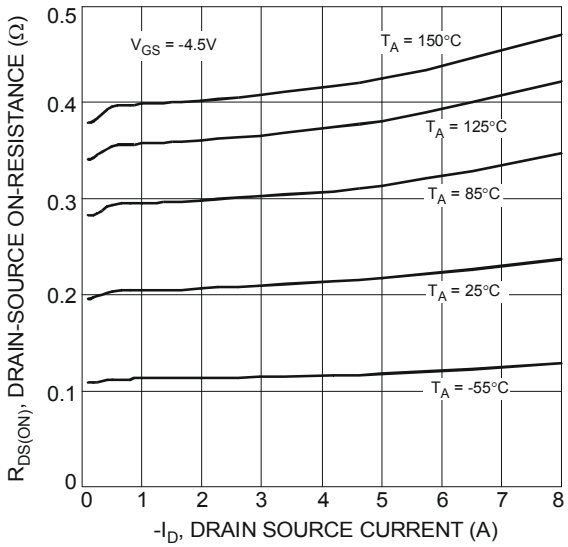


Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

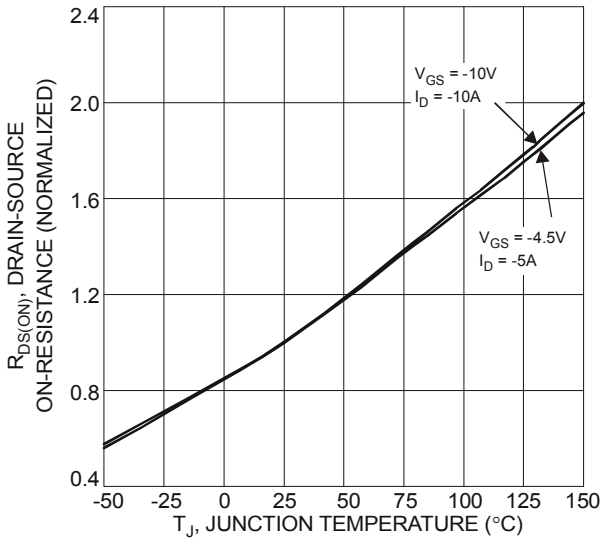


Fig. 6 On-Resistance Variation with Temperature

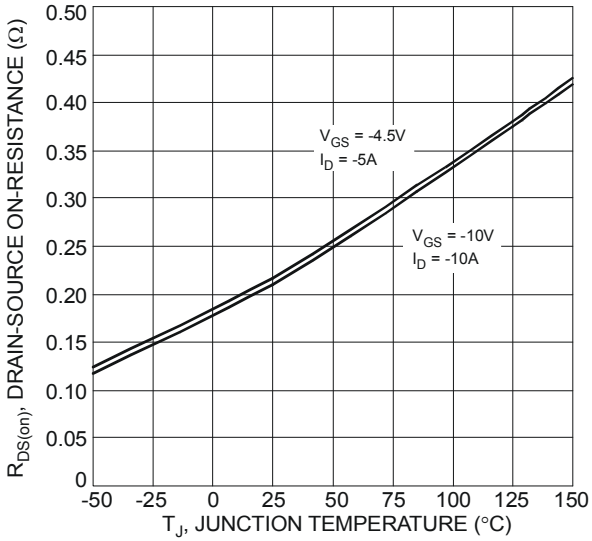


Fig. 7 On-Resistance Variation with Temperature

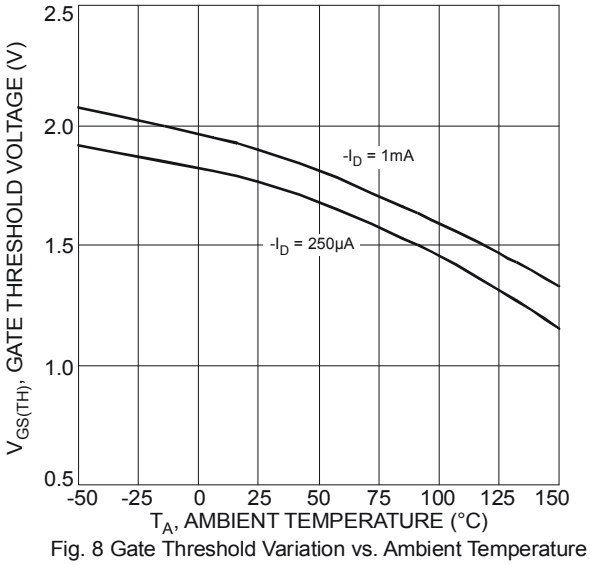


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

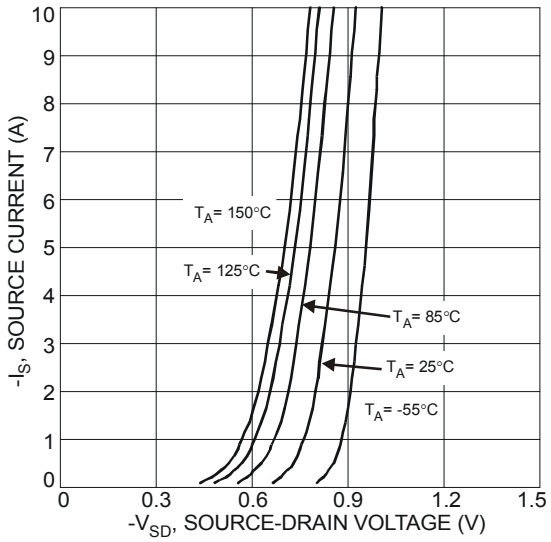


Fig. 9 Diode Forward Voltage vs. Current

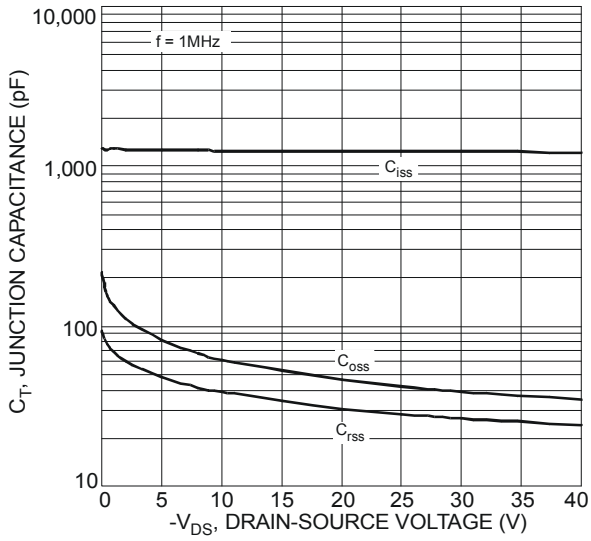


Fig. 10 Typical Junction Capacitance

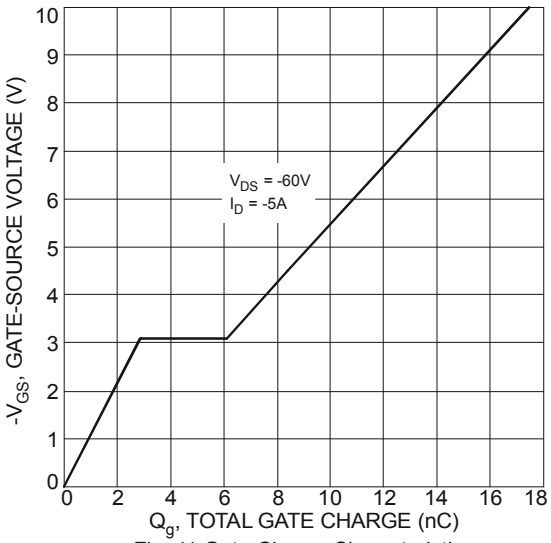


Fig. 11 Gate-Charge Characteristics

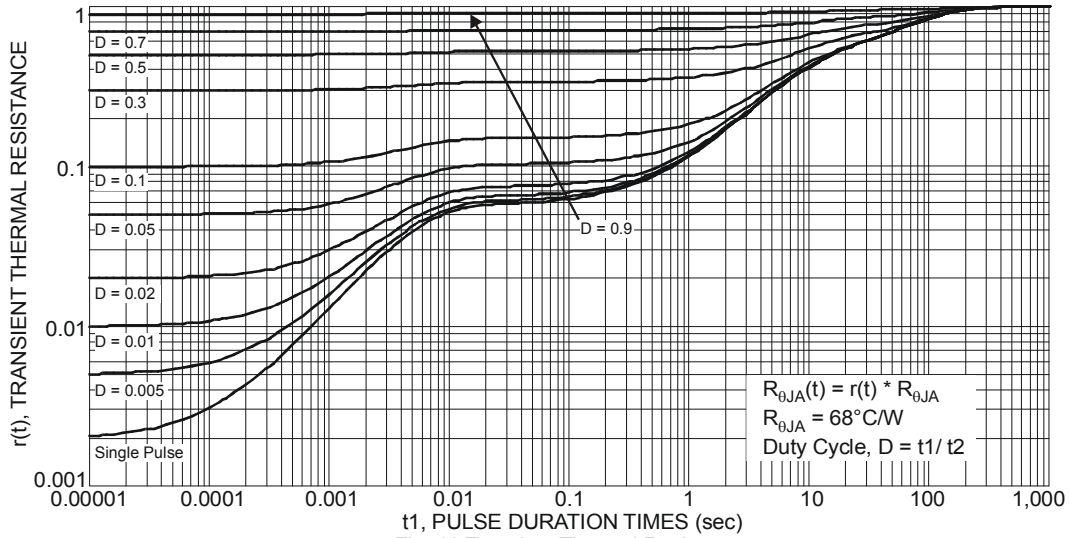
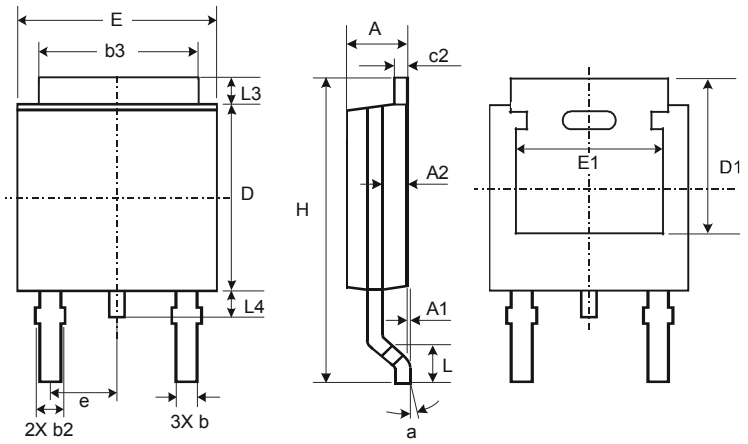


Fig. 12 Transient Thermal Resistance

Package Outline Dimensions

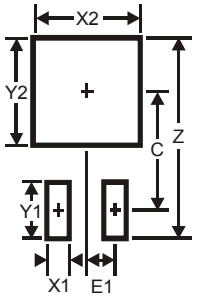
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



TO252			
Dim	**Min**	**Max**	**Typ**
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	–	–
e	–	–	2.286
E	6.45	6.70	6.58
E1	4.32	–	–
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	–
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	2.3

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