

40V N-Channel MOSFET

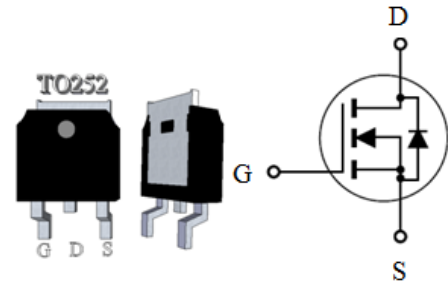
Applications:

- Power Supply
- DC-DC Converters
- DC-AC Inverters

V_{DS}	$R_{DS(ON)}(MAX)$	I_D
40V	3.9m Ω	116A

Features:

- Lead Free
- Low $R_{DS(ON)}$ to Minimize Conductive Loss
- Low Gate Charge for Fast Switching Application
- Optimized $V_{(BR)DSS}$ Ruggedness



Ordering Information

Park Number	Package	Brand
MXP43P9AD	TO252	MXP

Pin Definition and Inner Circuit

Absolute Maximum Ratings

$T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	40	V
I_D	Continuous Drain Current	Silicon Limited ^①	A
		Bond Wire Limited	
I_{DM}	Pulsed Drain Current @ $V_{GS}=10\text{V}$	465	
P_D	Power Dissipation	100	W
V_{GS}	Gate-to-Source Voltage	+/-20	V
T_J and T_{stg}	Operating Junction and Storage Temperature Range	-55 to 175	$^\circ\text{C}$

Avalanche Characteristics

$T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Unit
$E_{AS}^{\text{②}}$	Single Pulse Avalanche Energy ($V_{DS}=20\text{V}$, $V_{GS}=10\text{V}$, $R_g=25\Omega$, $L=1\text{mH}$)	200	mJ
I_{AS}	Single Pulse Avalanche Current	Figure 9	A

Thermal Resistance

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	110	$^\circ\text{C}/\text{W}$

① : Current limitations arising from heating of the device leads may occur with some lead mounting arrangements.

② : Guarantee number.

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OFF Characteristics
 $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40	-	-	V	$V_{GS}=0V, I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	μA	$V_{DS}=32V, V_{GS}=0V$
		-	-	100		$V_{DS}=32V, V_{GS}=0V, T_J=125^{\circ}\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	-	-	100	nA	$V_{GS}=+20V$
	Gate-to-Source Reverse Leakage	-	-	100		$V_{GS}=-20V$

ON Characteristics
 $T_J=25^{\circ}\text{C}$ unless otherwise specified

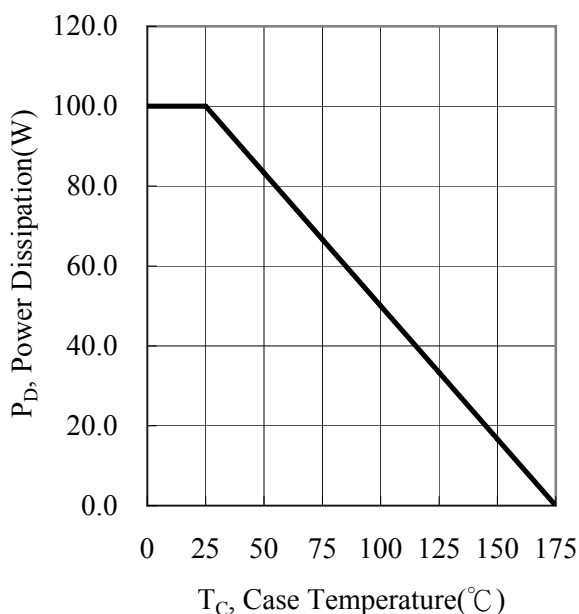
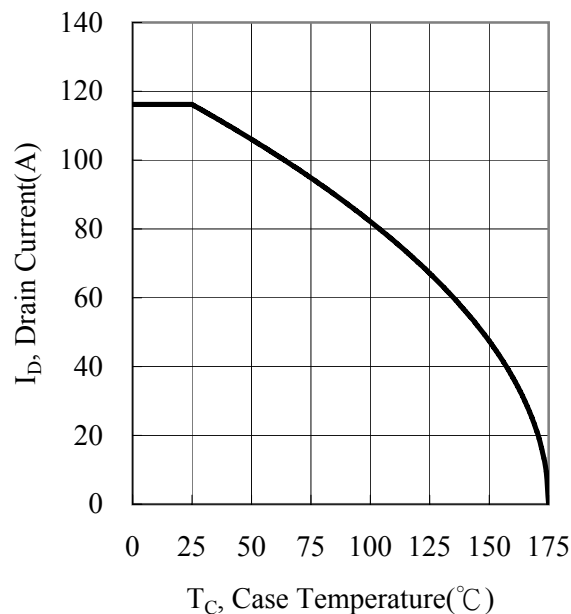
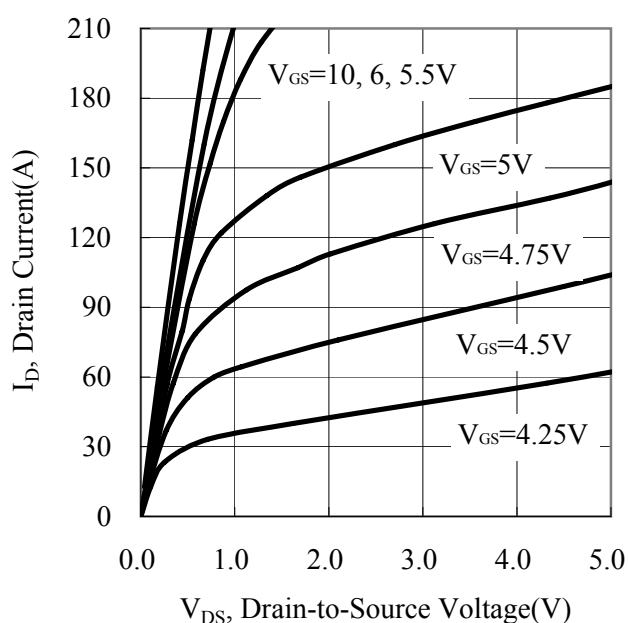
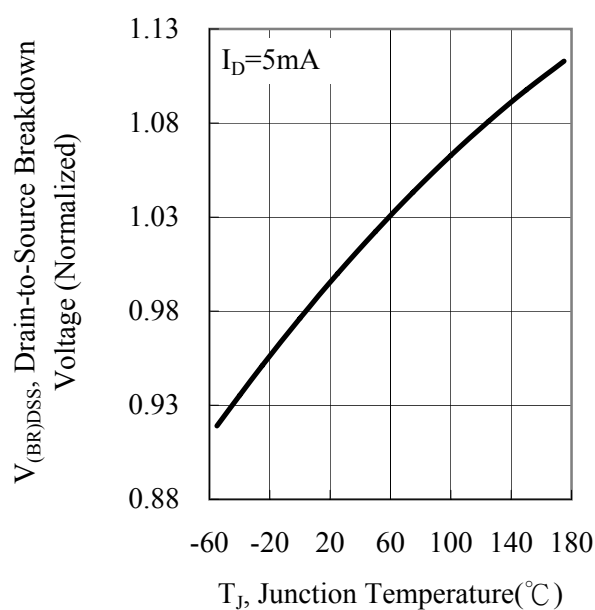
Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	3.1	3.9	$m\Omega$	$V_{GS}=10V, I_D=70A$
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	$V_{GS}=V_{DS}, I_D=250\mu A$

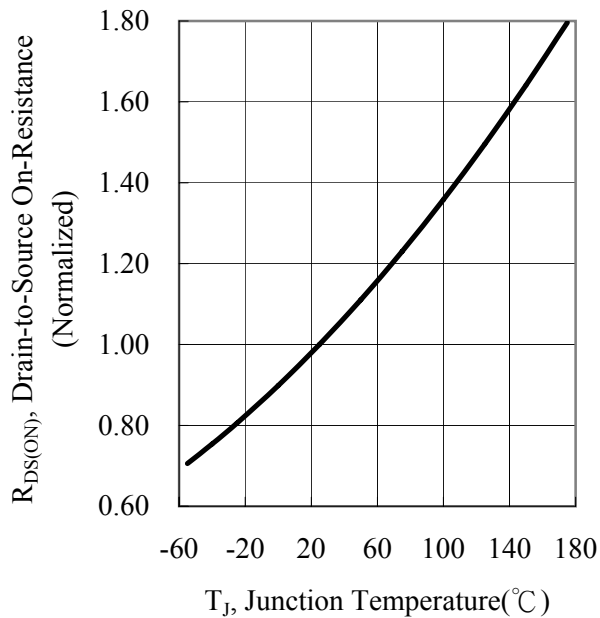
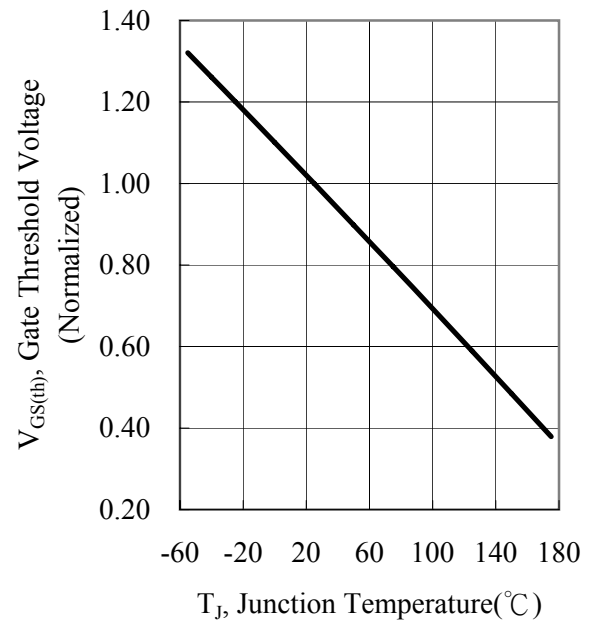
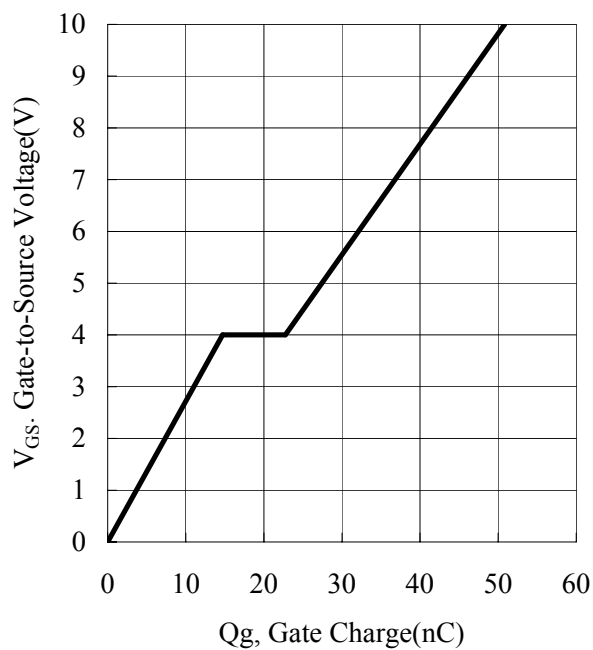
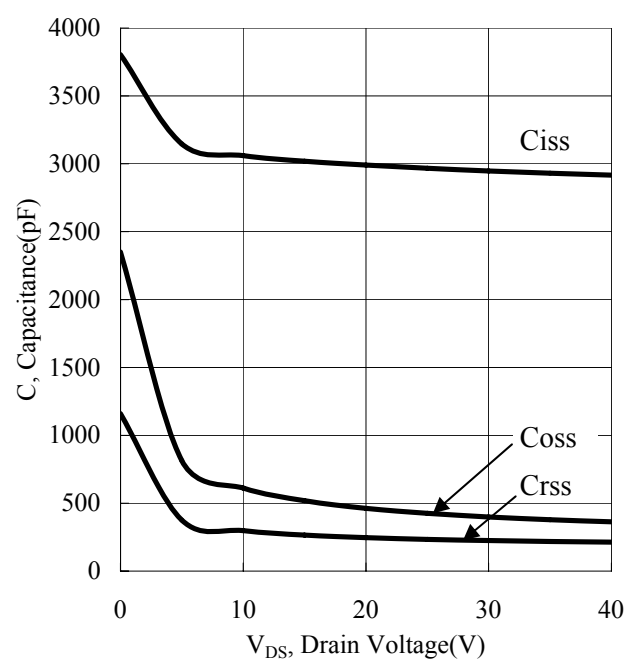
Dynamic Characteristics
 $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
C_{iss}	Input Capacitance	-	2990	-	pF	$V_{GS}=0V, V_{DS}=20V,$ $f=1.0MHz$
C_{oss}	Output Capacitance	-	462	-		
C_{rss}	Reverse Transfer Capacitance	-	246	-		
Q_g	Total Gate Charge	-	51	-	nC	$V_{DD}=20V, I_D=70A, V_{GS}=10V$
Q_{gs}	Gate-to-Source Charge	-	15	-		
Q_{gd}	Gate-to-Drain ("Miller") Charge	-	8	-		
$T_d(on)$	Turn-on Delay Time	-	16	-	ns	$V_{DD}=20V, I_D=35A,$ $V_{GS}=10V, R_G=10\Omega, R_L=0.6\Omega$
T_r	Rise Time	-	59	-		
$T_d(off)$	Turn-off Delay Time	-	74	-		
T_f	Fall Time	-	41	-		

Source-Drain Diode Characteristics
 $T_J=25^{\circ}\text{C}$ unless otherwise specified

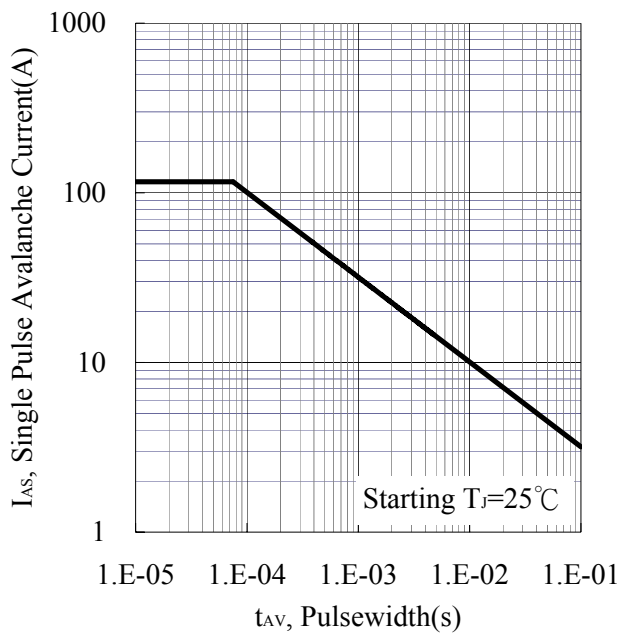
Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	-	-	1.2	V	$I_S=70A, V_{GS}=0V$
T_{rr}	Reverse Recovery Time	-	49.2	-	ns	$I_S=70A, di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	-	35.9	-	nC	

40V N-Channel MOSFET
1. Power Dissipation

2. Drain Current

3. Output Characteristics $T_C=25^\circ\text{C}$

4. Drain-to-Source Breakdown Voltage


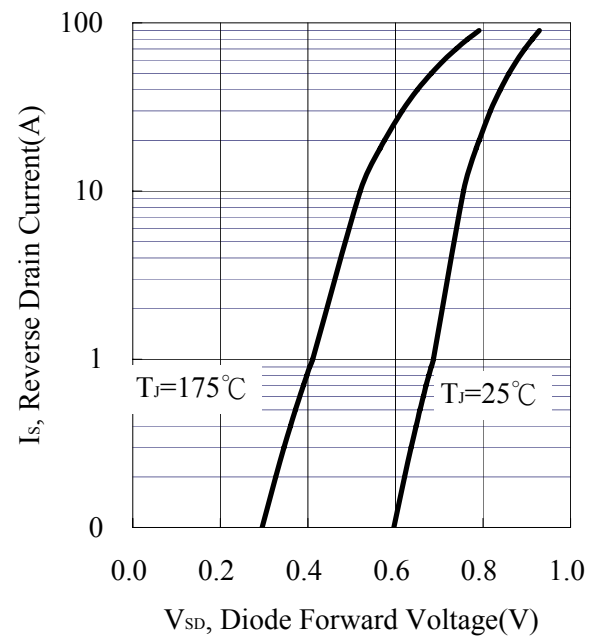
40V N-Channel MOSFET
5. Drain-to-Source On-Resistance

6. Gate Threshold Voltage

7. Typ. Gate Charge

8. Typ. Capacitance


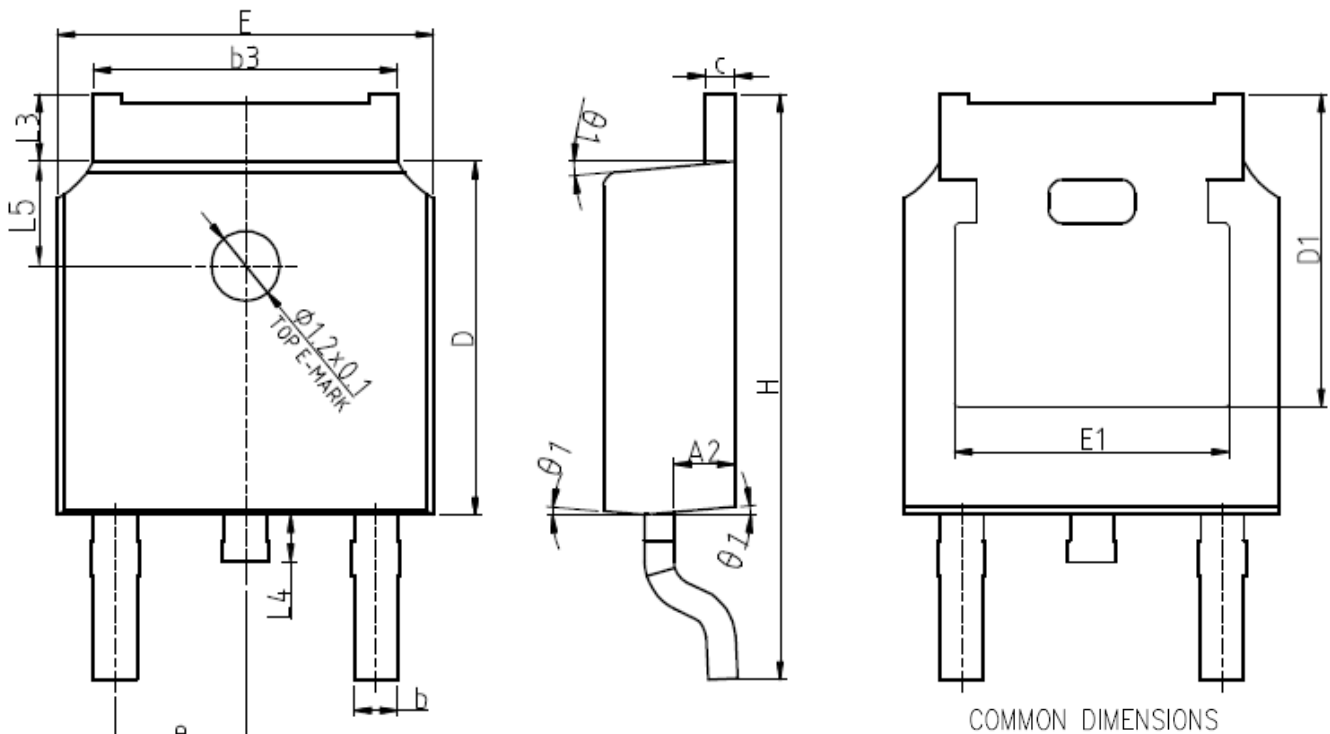
40V N-Channel MOSFET

9. Avalanche Characteristics



10. Forward Characteristics of reverse diode



TO252
1. Outline Dimension

COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	-	0.10
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1	5.30REF		
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e	2.286BSC		
H	9.90	10.10	10.30
L	1.40	1.50	1.70
L1	2.90REF		
L2	0.51BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
θ	0°	-	8°
$\theta 1$	5°	7°	9°
$\theta 2$	5°	7°	9°

NOTES

1. ALL DIMENSIONS REFER TO JEDEC STANDARD TO-252 AA, DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

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