NVC6S5A444NLZ

Power MOSFET
60 V, 78 mΩ, 4.5 A, N−Channel

Automotive Power MOSFET designed to minimize gate charge and low on resistance. AEC−Q101 qualified MOSFET and PPAP capable suitable for automotive applications.

Features

- 4.5 V Drive
- High ESD Protection
- Low On−Resistance
- CPH6 Package is Pin−Compatible with SOT−26
- Pb−Free, Halogen Free and RoHS Compliance

Typical Applications

- Load Switch
- Motor Drive

Specifications

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

Parameter	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC) (Note 1)	I_D	4.5	A
Drain Current (DC) (Note 2)		3.5	A
Drain Current (Pulse) PW ≤ 10 μs, duty cycle ≤ 1%	I_{DP}	18	A
Power Dissipation Ta = 25°C (Note 1)	P_D	1.9	W
Power Dissipation Ta = 25°C (Note 2)		0.97	W
Junction Temperature and Storage Temperature	Tj, Tstg	−55 to +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Junction to Ambient	(Note 1)	$R_{\theta JA}$	78.1	°C/W
	(Note 2)		153	°C/W

1. Surface mounted on ceramic substrate (900 $mm^2 \times 0.8$ mm).
2. Surface mounted on FR4 board using a 92 mm^2, 1 oz. Cu pad.

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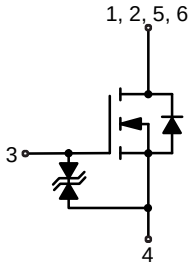
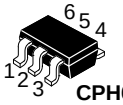
V_{DSS}	R_{DS}(on) MAX	I_D MAX
60 V	78 mΩ @ 10 V	4.5 A
	120 mΩ @ 4.5 V	

ELECTRICAL CONNECTION
N−Channel



1 : Drain
2 : Drain
3 : Gate
4 : Source
5 : Drain
6 : Drain

MARKING DIAGRAM



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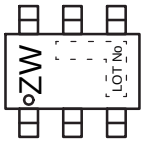

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

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ELECTRICAL CHARACTERISTICS (T_a = 25°C)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 1 mA, V_{GS} = 0 V	60	–	–	V
Zero−Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V	–	–	1.0	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V	–	–	±10	μA
Gate Threshold Voltage	V_{GS}(th)	V_{DS} = 10 V, I_D = 1 mA	1.2	–	2.6	V
Forward Transconductance	g_{FS}	V_{DS} = 10 V, I_D = 2 A	–	3.0	–	S
Static Drain to Source On−State Resistance	R_{DS}(on)	I_D = 2 A, V_{GS} = 10 V	–	60	78	mΩ
		I_D = 1 A, V_{GS} = 4.5 V	–	84	120	mΩ
Input Capacitance	Ciss	V_{DS} = 20 V, f = 1 MHz	–	505	–	pF
Output Capacitance	Coss		–	57	–	pF
Reverse Transfer Capacitance	Crss		–	37	–	pF
Turn−ON Delay Time	t_d(on)	See Figure 1	–	7.3	–	ns
Rise Time	t_r		–	9.8	–	ns
Turn−OFF Delay Time	t_d(off)		–	40	–	ns
Fall Time	t_f		–	24	–	ns
Total Gate Charge	Qg	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 4.5 A	–	10	–	nC
Gate to Source Charge	Qgs		–	1.6	–	nC
Gate to Drain “Miller” Charge	Qgd		–	2.1	–	nC
Forward Diode Voltage	V_{SD}	I_S = 4.5 A, V_{GS} = 0 V	–	0.86	1.2	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

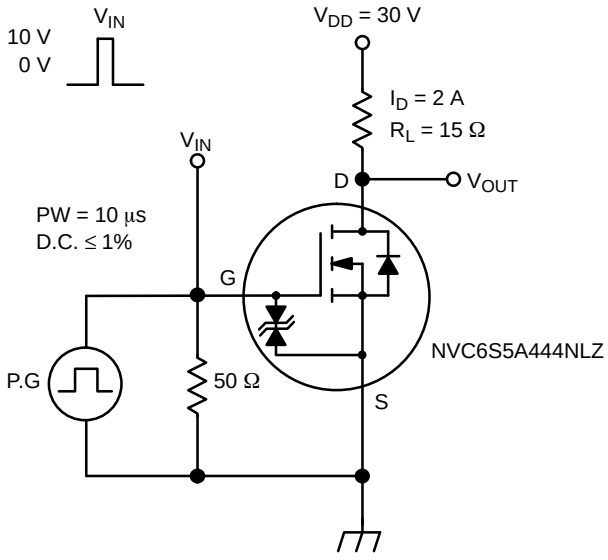


Figure 1. Switching Time Test Circuit

TYPICAL CHARACTERISTICS

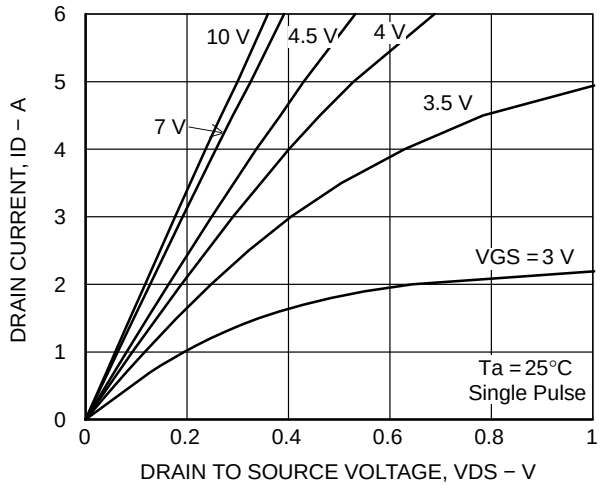


Figure 2. $I_D - V_{DS}$

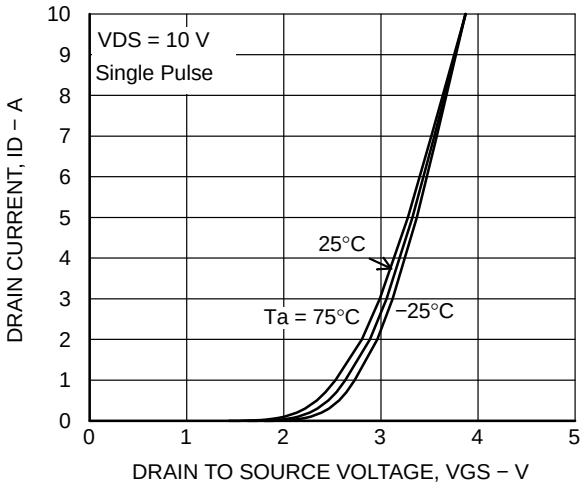


Figure 3. $I_D - V_{GS}$

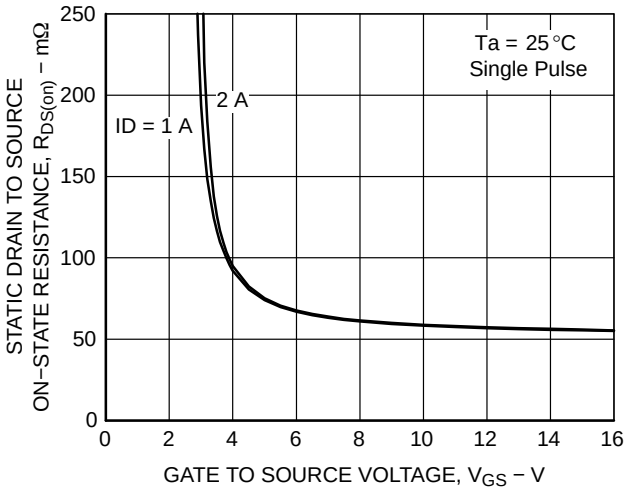


Figure 4. $R_{DS}(on) - V_{GS}$

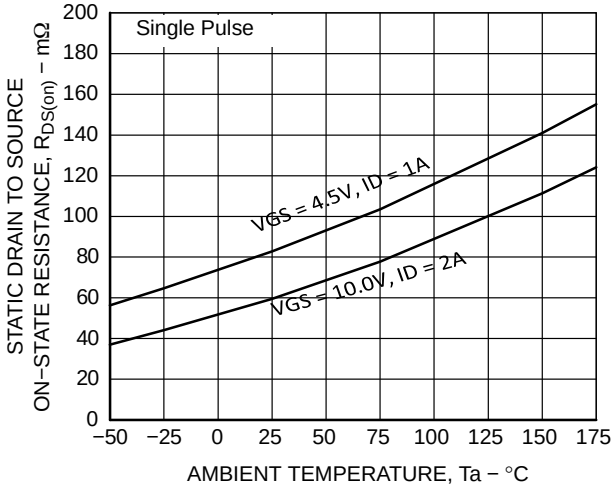


Figure 5. $R_{DS}(on) - Ta$

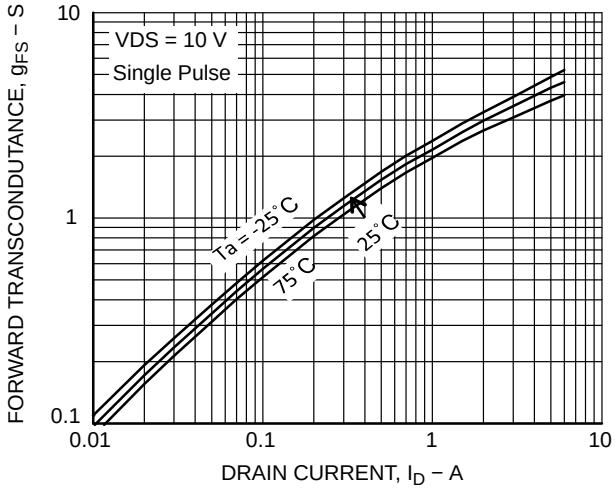


Figure 6. $g_{FS} - I_D$

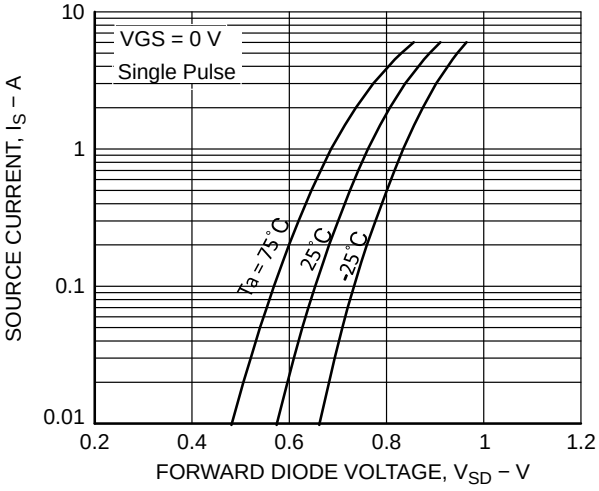


Figure 7. $I_S - V_{SD}$

TYPICAL CHARACTERISTICS

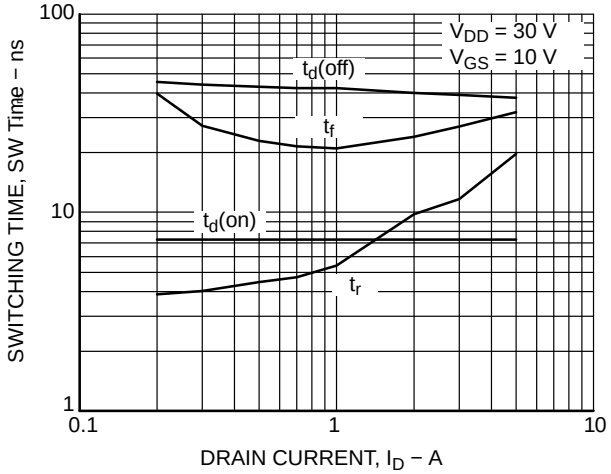


Figure 8. SW TIME − I_D

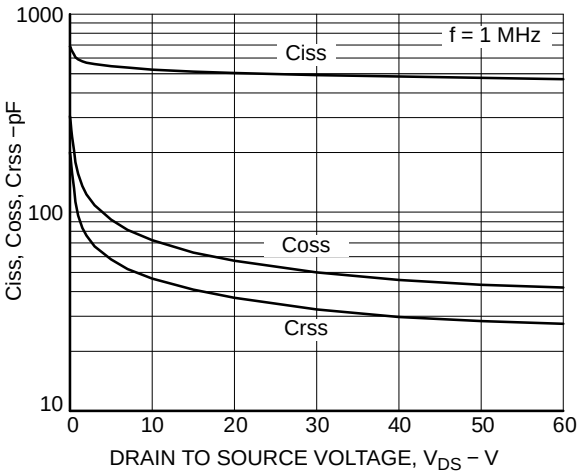


Figure 9. Ciss, Coss, Crss − V_{DS}

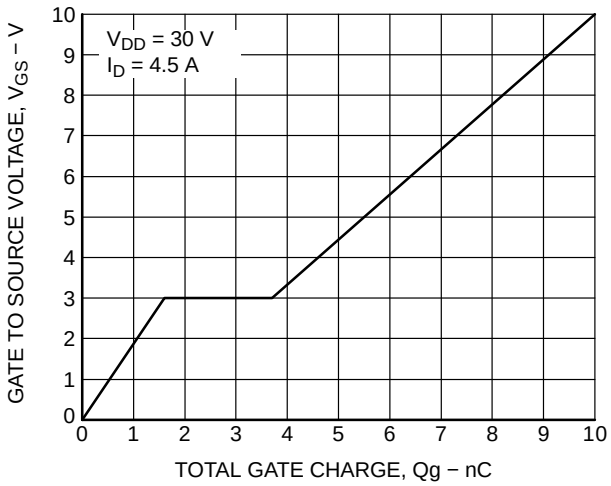


Figure 10. V_{GS} − Qg

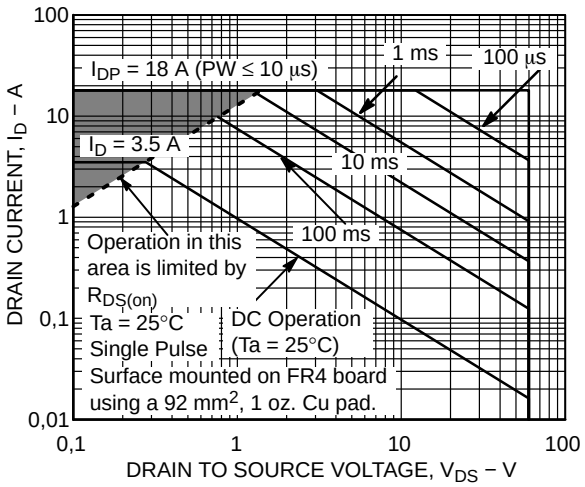


Figure 11. SOA

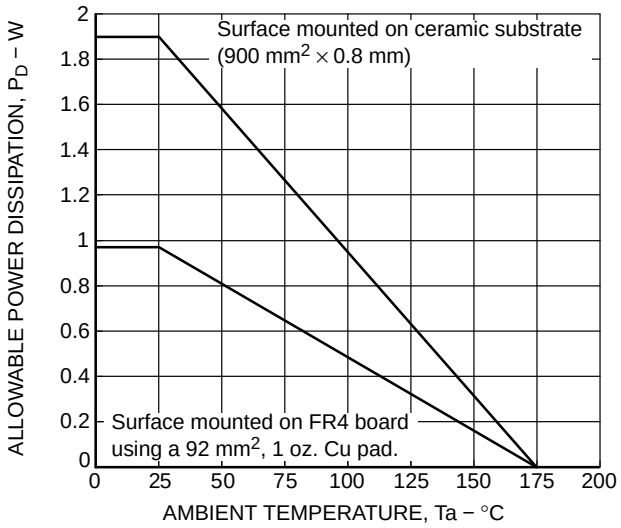


Figure 12. P_D − Ta

TYPICAL CHARACTERISTICS

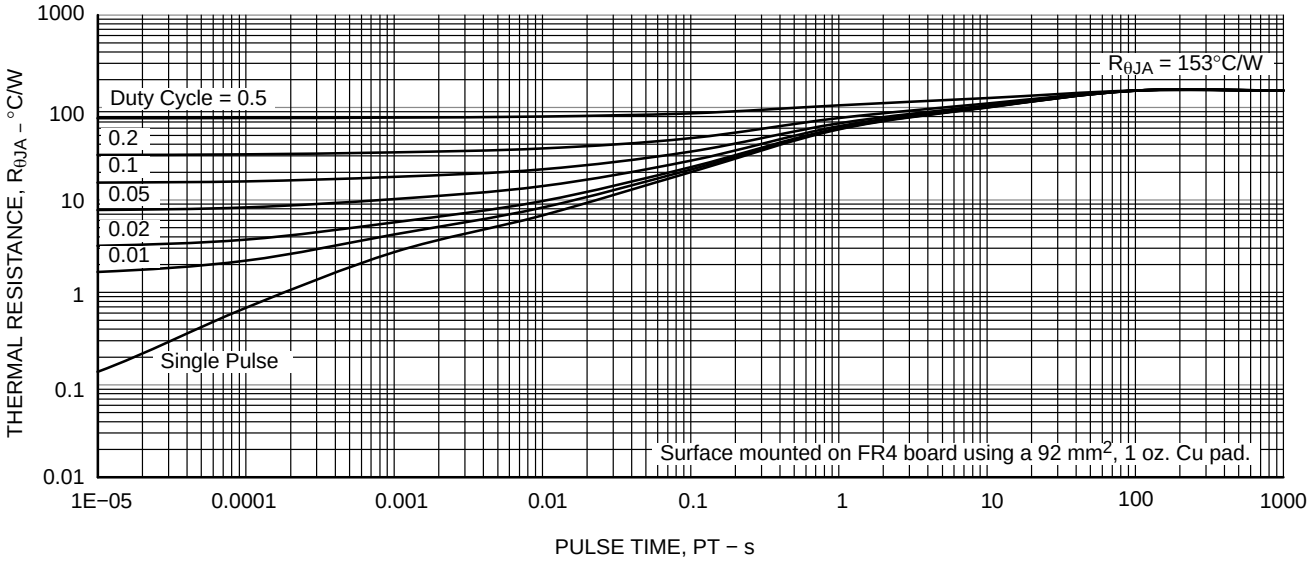


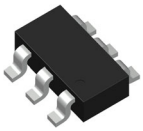
Figure 13. $R_{\theta JA}$ − PULSE TIME

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NVC6S5A444NLZT1G	ZW	CPH6 (Pb−Free / Halogen Free)	3,000 / Tape & Reel
NVC6S5A444NLZT2G			

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Since the NVC6S5A444NLZ is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.



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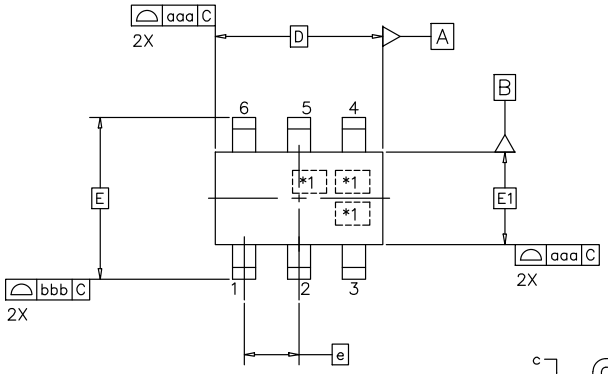
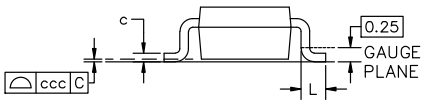
ISSUE A

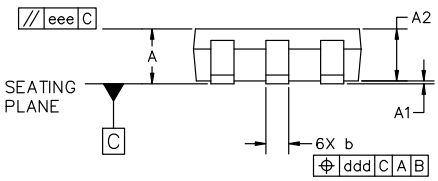
DATE 20 SEPT 2024



TOP VIEW



END VIEW

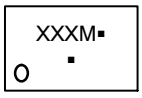


SIDE VIEW

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.85	0.95	1.05
A1	0.00	0.05	0.10
A2	0.85	0.90	0.95
b	0.30	0.40	0.50
c	0.10	0.15	0.25
D	2.90 BSC		
E	2.80 BSC		
E1	1.60 BSC		
e	0.95 BSC		
L	0.10	0.20	0.30
TOLERANCE FORM AND POSITION			
aaa	0.10		
bbb	0.15		
ccc	0.05		
ddd	0.10		
eee	0.10		

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS
3. *1 IS FOR LOT INDICATION

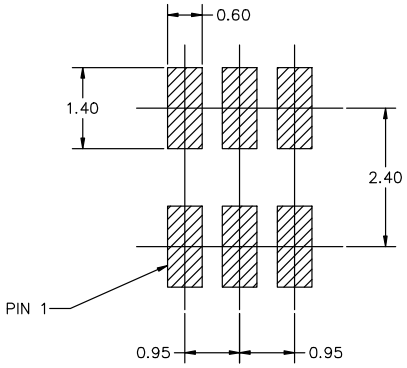
GENERIC
MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present. Some products may not follow the Generic Marking.



RECOMMENDED MOUNTING FOOTPRINT

* For additional information on our Pb−Free strategy and soldering details, please downloadd the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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DESCRIPTION:	**CPH6 2.90x1.60x0.90, 0.95P**		**PAGE 1 OF 1**

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