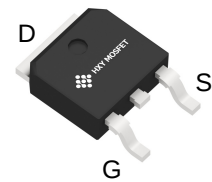




Description

The NVATS5A302PLZT4G uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

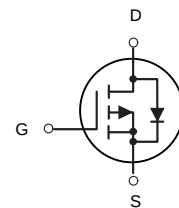


TO-252-2L

General Features

$V_{DS} = -60V$ $I_D = -80A$

$R_{DS(ON)} < 13m\Omega$ @ $V_{GS} = -10V$



P-Channel MOSFET

Application

Battery protection

Load switch

Uninterruptible power supply

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
NVATS5A302PLZT4G	TO-252-2L	HXY MOSFET	2500

Absolute Maximum Ratings ($T_c=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-60	V
VGS	Gate-Source Voltage	± 20	V
$I_D@T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	-80	A
$I_D@T_c=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	-50	A
I_D	Pulsed Drain Current ¹	-320	A
ESA	Single Pulse Avalanche Energy ²	450	mJ
$P_D@T_c=25^\circ C$	Total Power Dissipation ⁴	110	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.1	$^\circ C/W$



Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.035	---	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V, I_D=-20A$	---	11	13	$m\Omega$
		$V_{GS}=-4.5V, I_D=-15A$	---	12	14	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.3	---	-2.3	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.28	---	$mV/^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-48V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=-48V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-20A$	---	60	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	2	---	Ω
Q_g	Total Gate Charge (-4.5V)	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-12A$	---	56	---	nC
Q_{gs}	Gate-Source Charge		---	11	---	
Q_{gd}	Gate-Drain Charge		---	9	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-30V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-20A$	---	4.5	---	ns
T_r	Rise Time		---	2.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	14.5	---	
T_f	Fall Time		---	3.5	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	3060	---	pF
C_{oss}	Output Capacitance		---	620	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-80	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	-320	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=-1A, T_J=25^{\circ}\text{C}$	---	---	-1	V

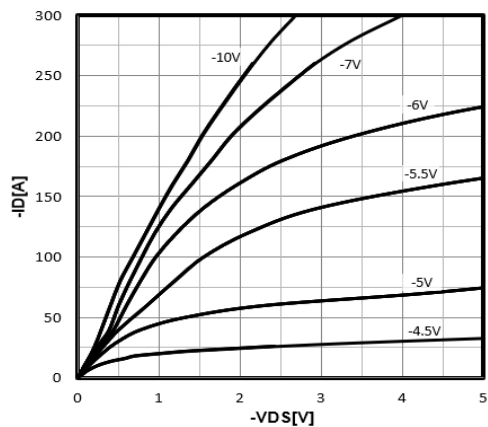
Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-47.6A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

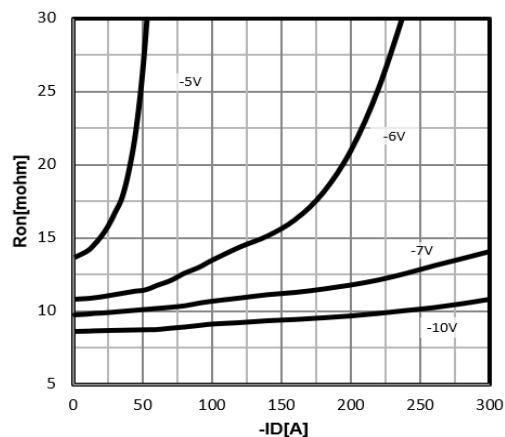


Characteristics Curve

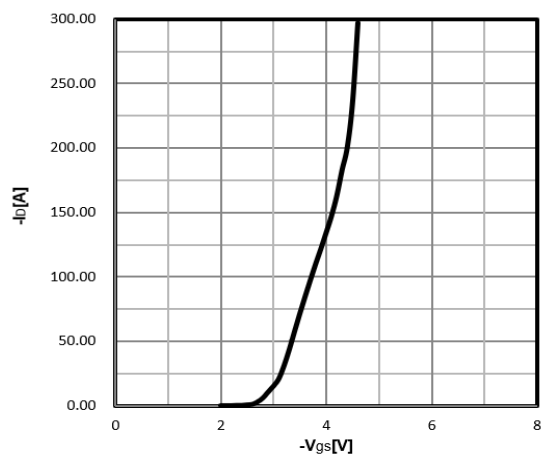
Typ. output characteristics
 $I_D = f(V_{DS})$



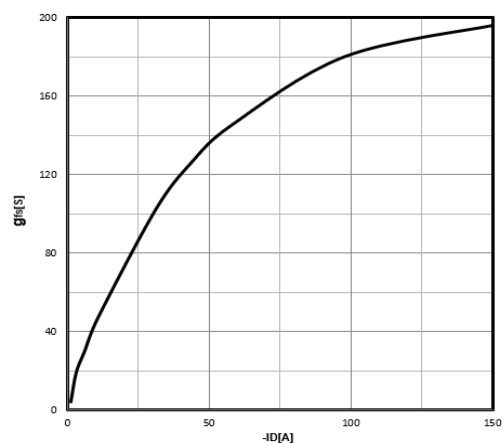
Typ. drain-source on resistance
 $R_{DS(on)} = f(I_D)$



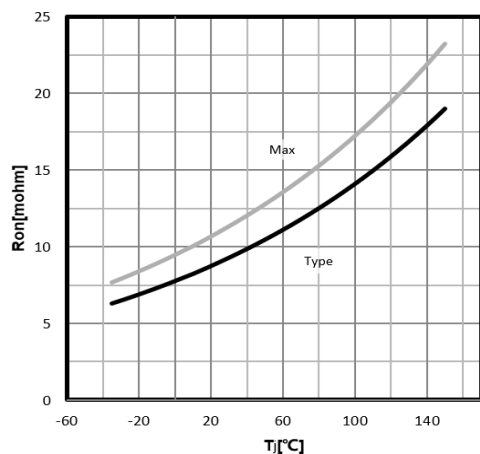
Typ. transfer characteristics
 $I_D = f(V_{GS})$



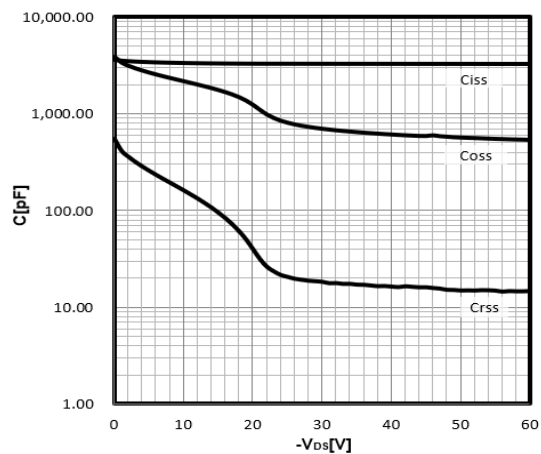
Typ. forward transconductance
 $g_{fs} = f(I_D)$



Drain-source on-state resistance
 $R_{DS(on)} = f(T_j); I_D = 20A; V_{GS} = -10V$

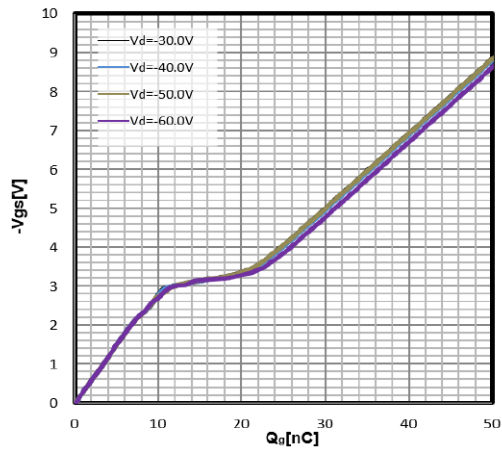


Typ. capacitances
 $C = f(V_{DS}); V_{GS} = 0V; f = 1MHz$

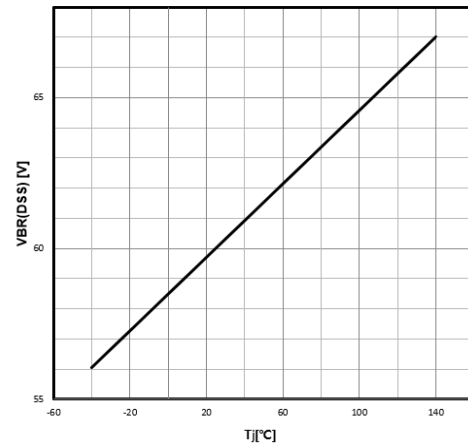




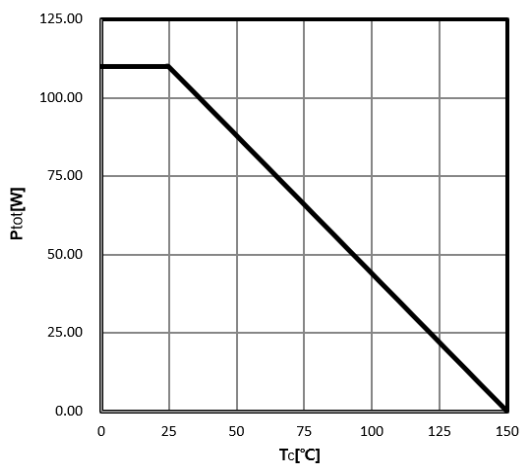
Typ. gate charge
 $V_{GS}=f(Q_{gate}) ; I_D=-20A$



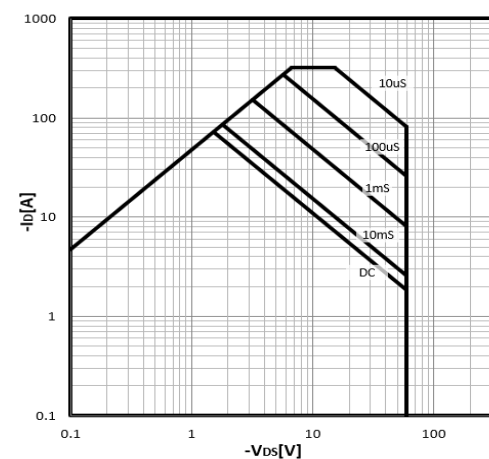
Drain-source breakdown voltage
 $V_{BR(DSS)}=f(T_j) ; I_D=-250\mu A$



Power Dissipation
 $P_{tot}=f(T_C)$

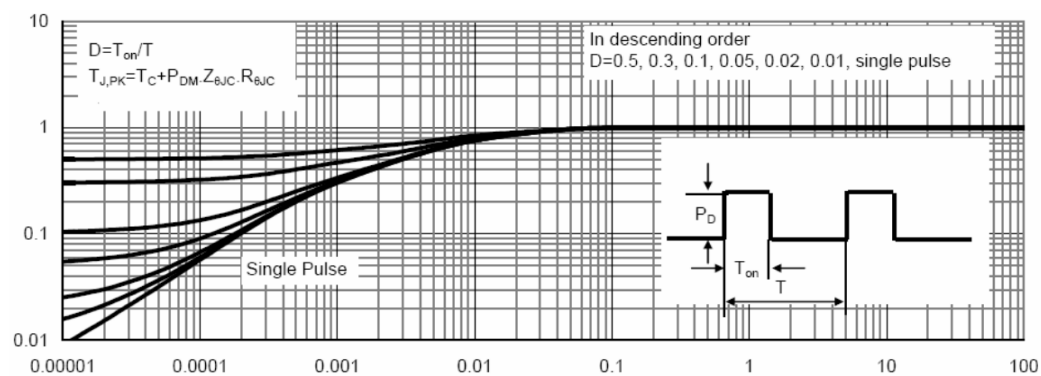


$I_D=f(V_{DS})$



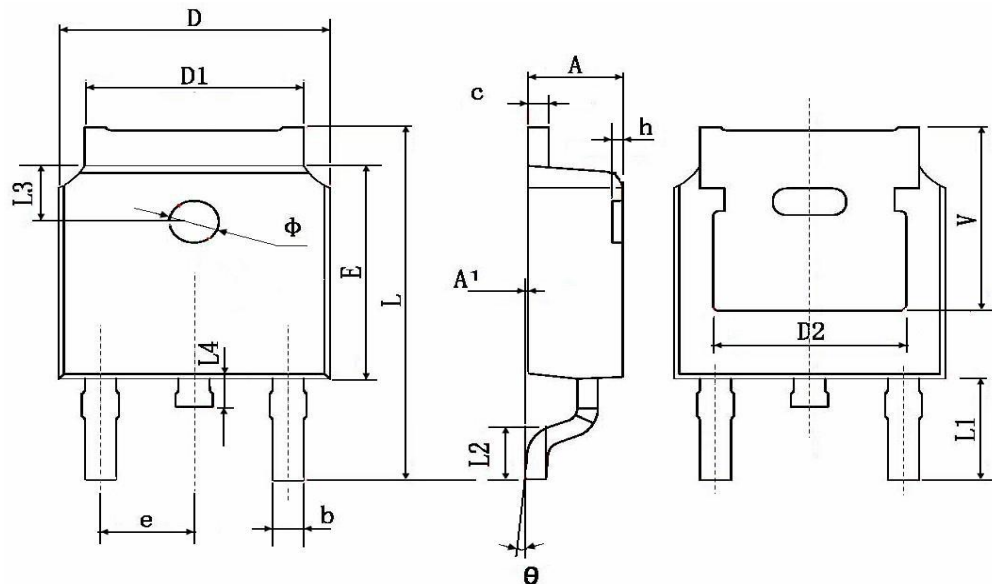
Max. transient thermal impedance

$$Z_{thJC}=f(t_p)$$





TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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