



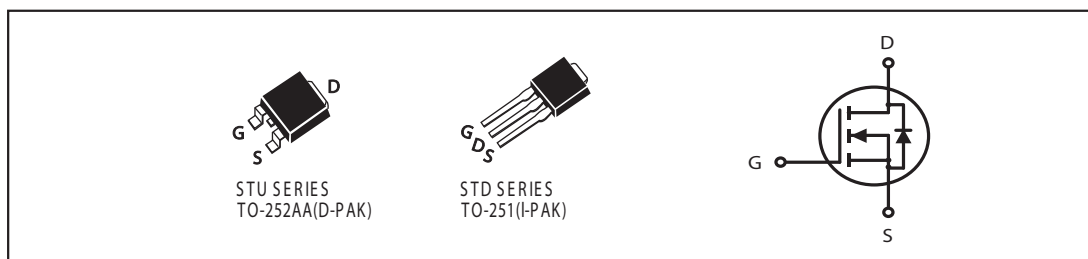
STU/D1224N

N-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
24V	12A	80 @ V _{GS} = 4.5V
		130 @ V _{GS} = 2.5V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- TO-252 and TO-251 Package.



ABSOLUTE MAXIMUM RATINGS (T_A=25 °C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	24	V
Gate-Source Voltage	V _{GS}	±12	V
Drain Current-Continuous ^a @ T _J =25°C -Pulsed ^b	I _D	12	A
	I _{DM}	25	A
Drain-Source Diode Forward Current ^a	I _S	10	A
Maximum Power Dissipation ^a	P _D	50	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	R _{θJC}	3	°C/W
Thermal Resistance, Junction-to-Ambient	R _{θJA}	50	°C/W

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ELECTRICAL CHARACTERISTICS (T_A =25 °C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	24			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =18V, V _{GS} =0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} =±12V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	0.7	1.2	1.8	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =6.0A		60	80	m-ohm
		V _{GS} =2.5V, I _D =5.2A		90	130	m-ohm
On-State Drain Current	I _{D(ON)}	V _{DS} =5V, V _{GS} =4.5V	15			A
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =6.0A		10		S
DYNAMIC CHARACTERISTICS^c						
Input Capacitance	C _{ISS}	V _{DS} =8V, V _{GS} =0V f=1.0MHz		528		pF
Output Capacitance	C _{OSS}			139		pF
Reverse Transfer Capacitance	C _{RSS}			107		pF
SWITCHING CHARACTERISTICS^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} =10V I _D =1A V _{GEN} =4.5V R _L =10 ohm R _{GEN} =6 ohm		13.7		ns
Rise Time	t _r			8.9		ns
Turn-Off Delay Time	t _{D(OFF)}			25.4		ns
Fall Time	t _f			14.1		ns
Total Gate Charge	Q _g	V _{DS} =10V, I _D =6A, V _{GS} =10V		14.5		nC
		V _{DS} =10V, I _D =6A, V _{GS} =4.5V		7.2		nC
Gate-Source Charge	Q _{gs}	V _{DS} =10V, I _D =6A		1.3		nC
Gate-Drain Charge	Q _{gd}	V _{GS} =10V		2.1		nC

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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ ^c	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS^b						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_s = 10A$		1	1.3	V

Notes

- a. Surface Mounted on FR4 Board, $t \leq 10\text{sec}$.
- b. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
- c. Guaranteed by design, not subject to production testing.

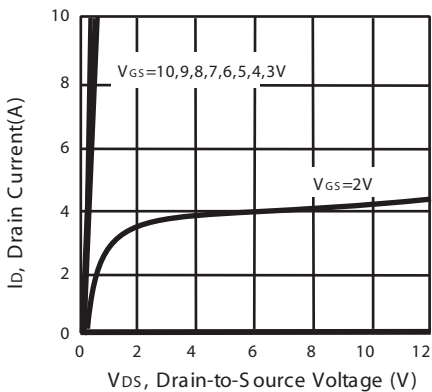


Figure 1. Output Characteristics

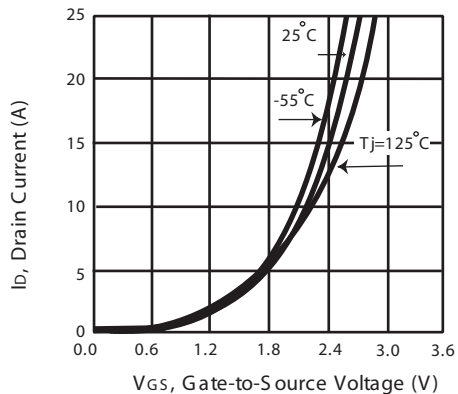


Figure 2. Transfer Characteristics

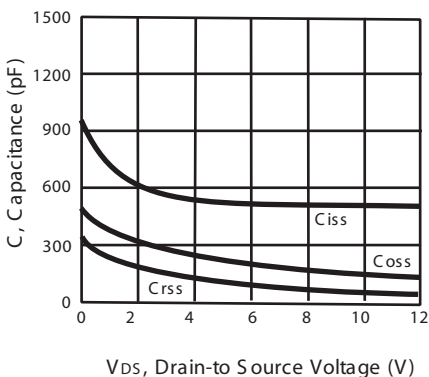


Figure 3. Capacitance

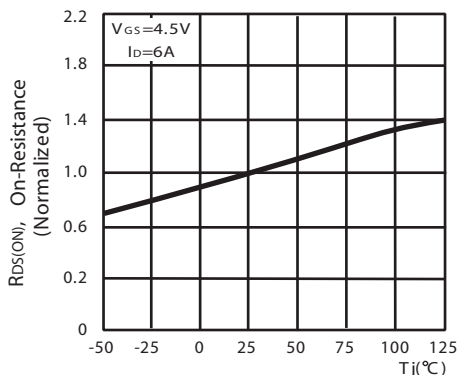


Figure 4. On-Resistance Variation with Temperature

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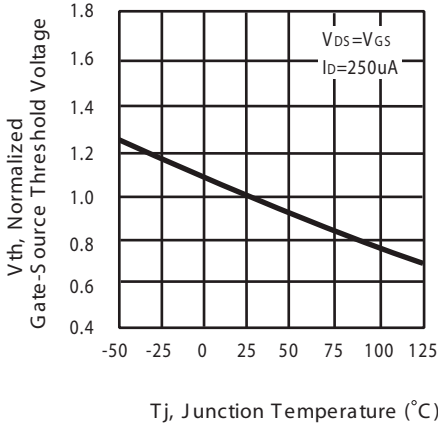


Figure 5. Gate Threshold Variation with Temperature

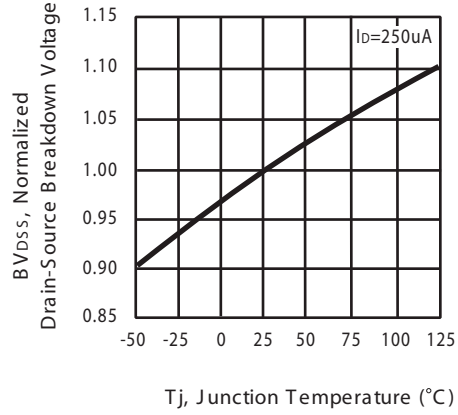


Figure 6. Breakdown Voltage Variation with Temperature

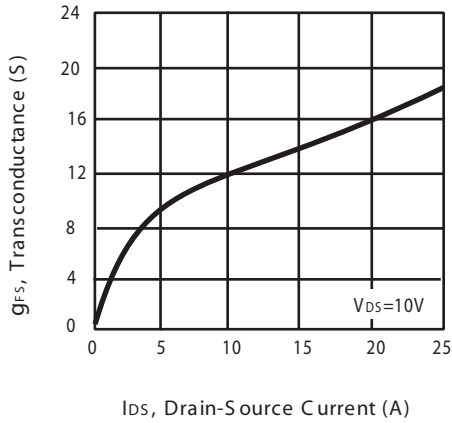


Figure 7. Transconductance Variation with Drain Current

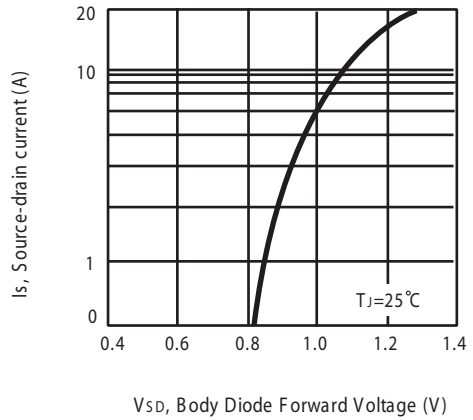


Figure 8. Body Diode Forward Voltage Variation with Source Current

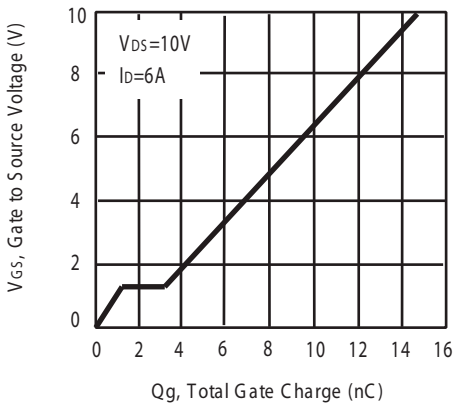


Figure 9. Gate Charge

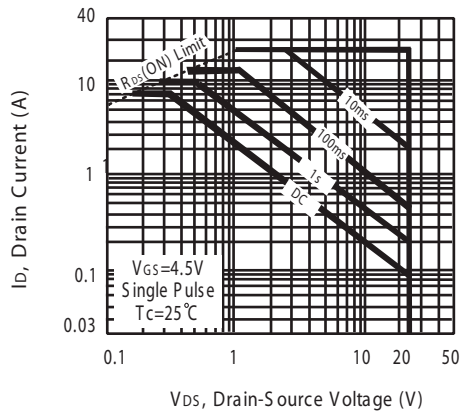


Figure 10. Maximum Safe Operating Area

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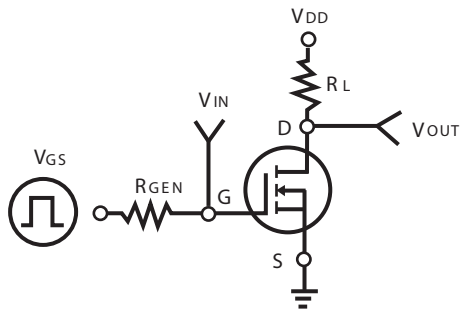


Figure 11. S witching Test Circuit

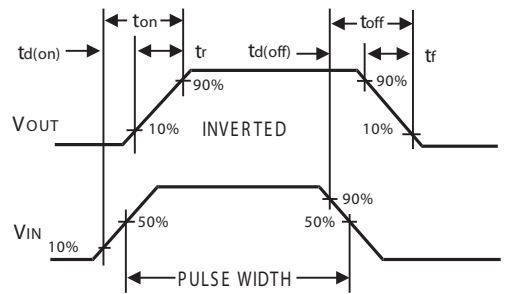


Figure 12. Switching Waveforms

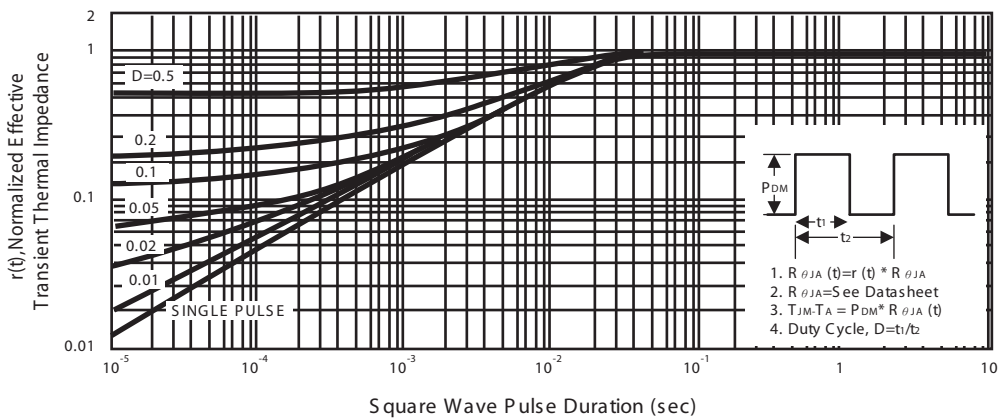


Figure 13. Normalized Thermal Transient Impedance Curve

