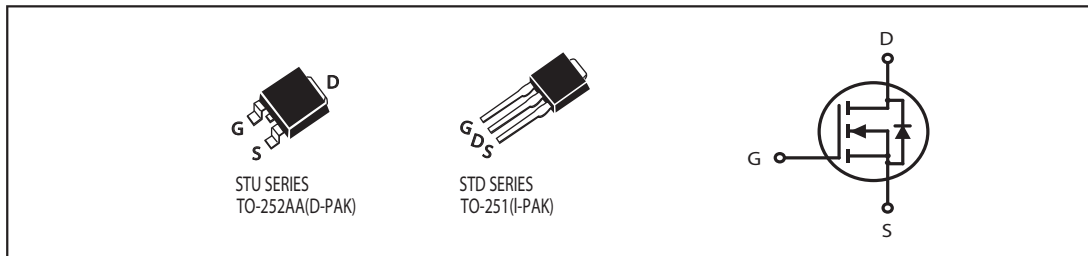


**N-Channel Logic Level Enhancement Mode Field Effect Transistor**

PRODUCT SUMMARY			
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (m $\Omega$ )	Typ
30V	60A	5.5 @ V <sub>GS</sub> = 10V	
		8 @ V <sub>GS</sub> = 4.5V	

**FEATURES**

- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- TO-252 and TO-251 Package.

**ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25 C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	$\pm 20$	V
Drain Current-Continuous @T <sub>J</sub> =25 C ° -Pulsed <sup>a</sup>	I <sub>D</sub>	60	A
	I <sub>DM</sub>	100	A
Drain-Source Diode Forward Current	I <sub>S</sub>	20	A
Maximum Power Dissipation @T <sub>C</sub> =25 C°	P <sub>D</sub>	50	W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 175	°C

**THERMAL CHARACTERISTICS**

Thermal Resistance, Junction-to-Case	R $\theta$ C	3	°C/W
Thermal Resistance, Junction-to-Ambient	R $\theta$ A	50	°C/W

# STU/D6025NL

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

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V			1	uA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ± 20V, V <sub>DS</sub> = 0V			±100	nA
ON CHARACTERISTICS <sup>b</sup>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250uA	1	1.6	3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 14A		5.5	7	m ohm
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A		8	10	m ohm
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 10V	85			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 14A		24.5		S
DYNAMIC CHARACTERISTICS <sup>c</sup>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V f = 1.0MHz		3270		pF
Output Capacitance	C <sub>OSS</sub>			590		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			420		pF
SWITCHING CHARACTERISTICS <sup>c</sup>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = 15V I <sub>D</sub> = 1A V <sub>GS</sub> = 10V R <sub>GEN</sub> = 6 ohm		37.3		ns
Rise Time	t <sub>r</sub>			65.6		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			94.7		ns
Fall Time	t <sub>f</sub>			44.5		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 14A, V <sub>GS</sub> = 10V		59.6		nC
		V <sub>DS</sub> = 15V, I <sub>D</sub> = 14A, V <sub>GS</sub> = 4.5V		28.3		nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 14A		8.5		nC
Gate-Drain Charge	Q <sub>gd</sub>	V <sub>GS</sub> = 10V		12.6		nC

# STU/D6025NL

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>DRAIN-SOURCE DIODE CHARACTERISTICS <sup>a</sup></b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_s = 20A$		0.86	1.3	V

### Notes

- a. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

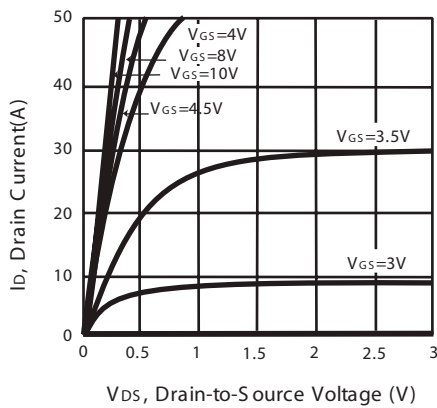


Figure 1. Output C characteristics

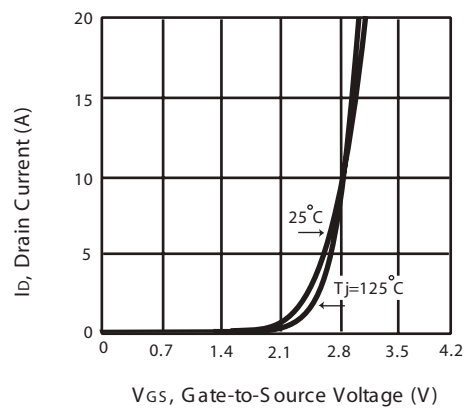


Figure 2. Transfer C characteristics

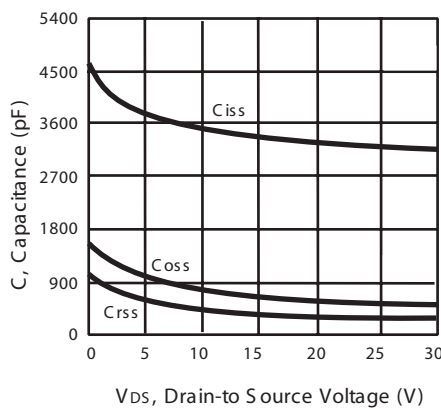


Figure 3. Capacitance

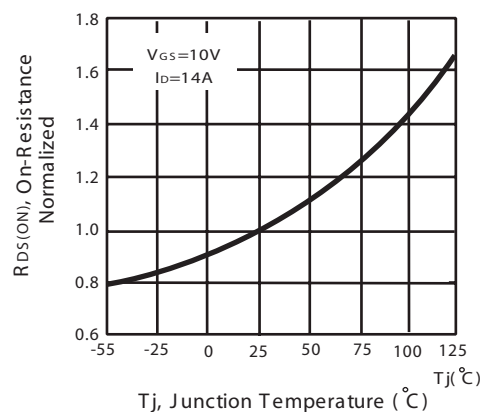


Figure 4. On-Resistance Variation with Drain Current and Temperature

# STU/D6025NL

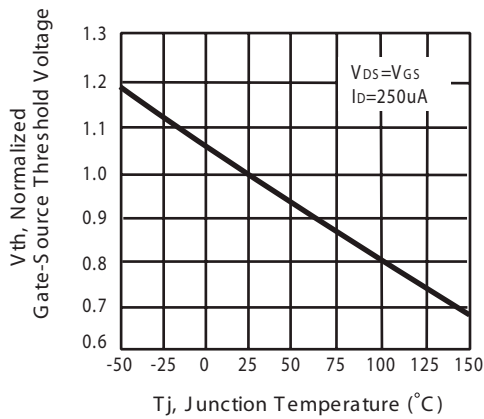


Figure 5. Gate Threshold Variation with Temperature

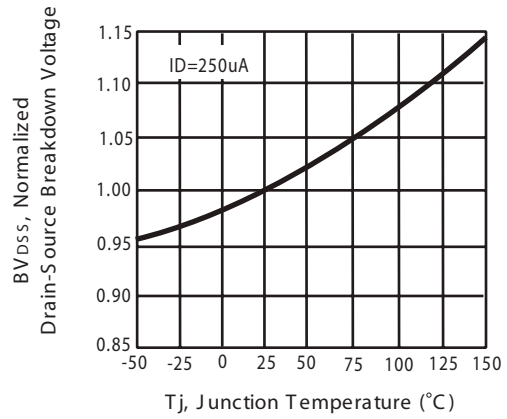


Figure 6. Breakdown Voltage Variation with Temperature

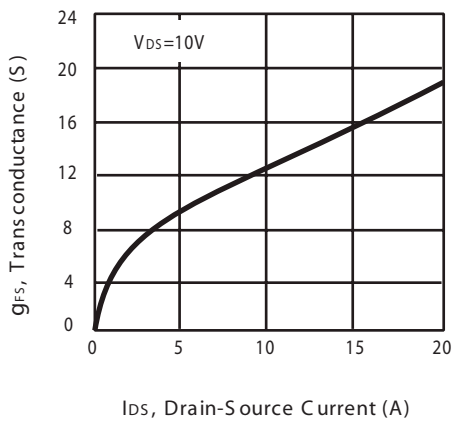


Figure 7. Transconductance Variation with Drain Current

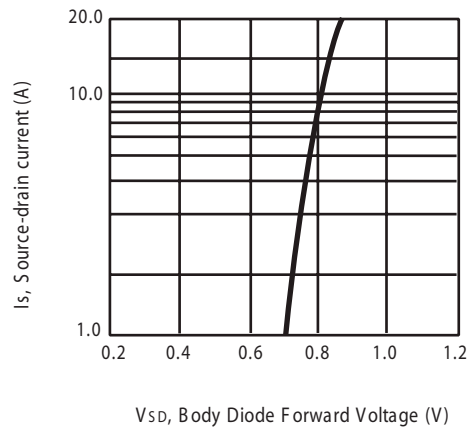


Figure 8. Body Diode Forward Voltage Variation with Source Current

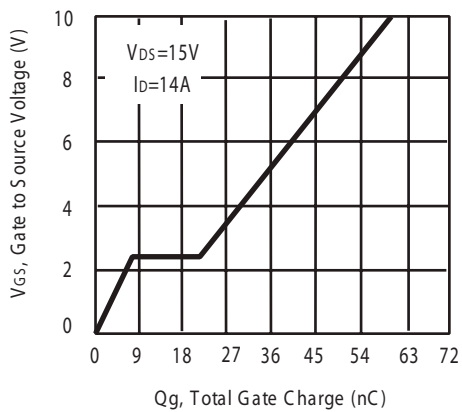


Figure 9. Gate Charge

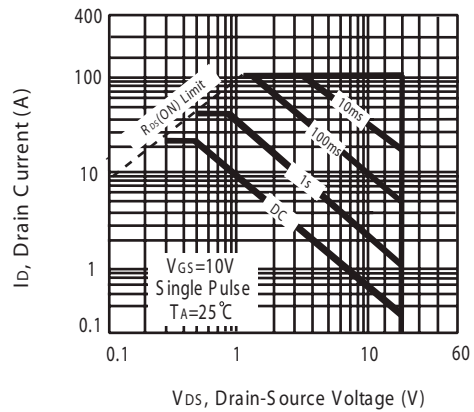


Figure 10. Maximum Safe Operating Area

# STU/D6025NL

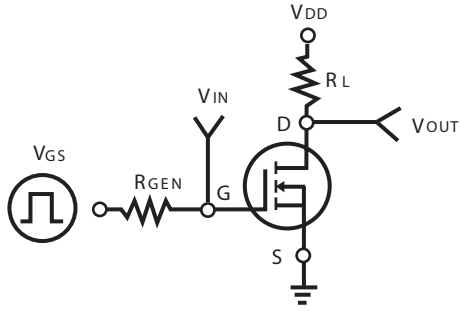


Figure 11. S switching Test Circuit

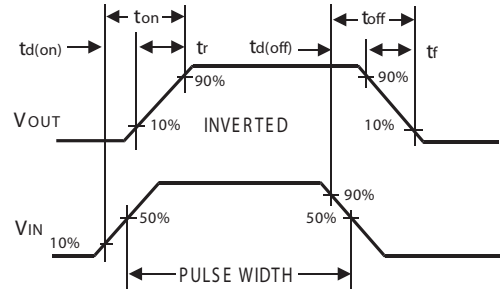
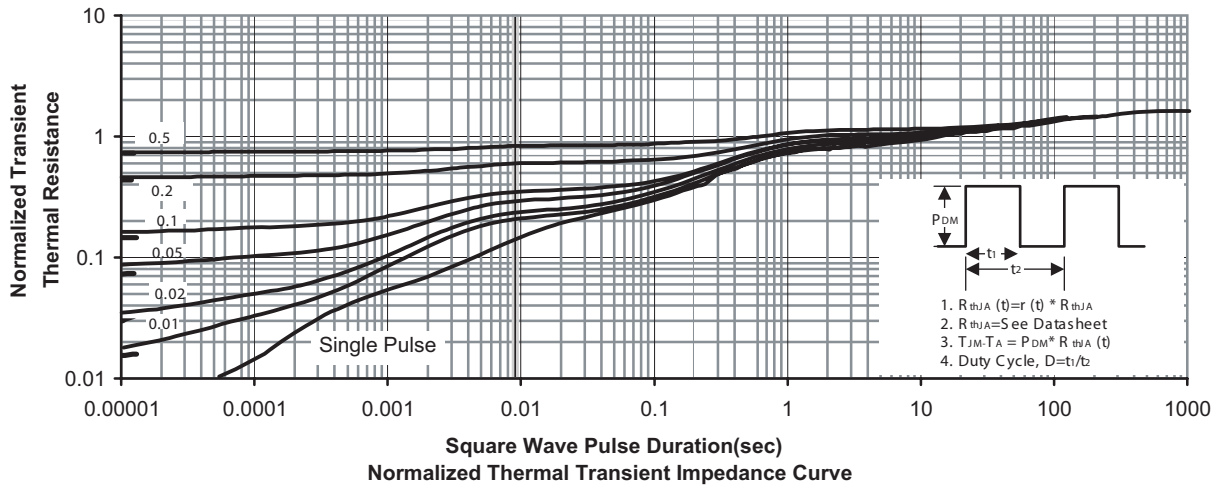
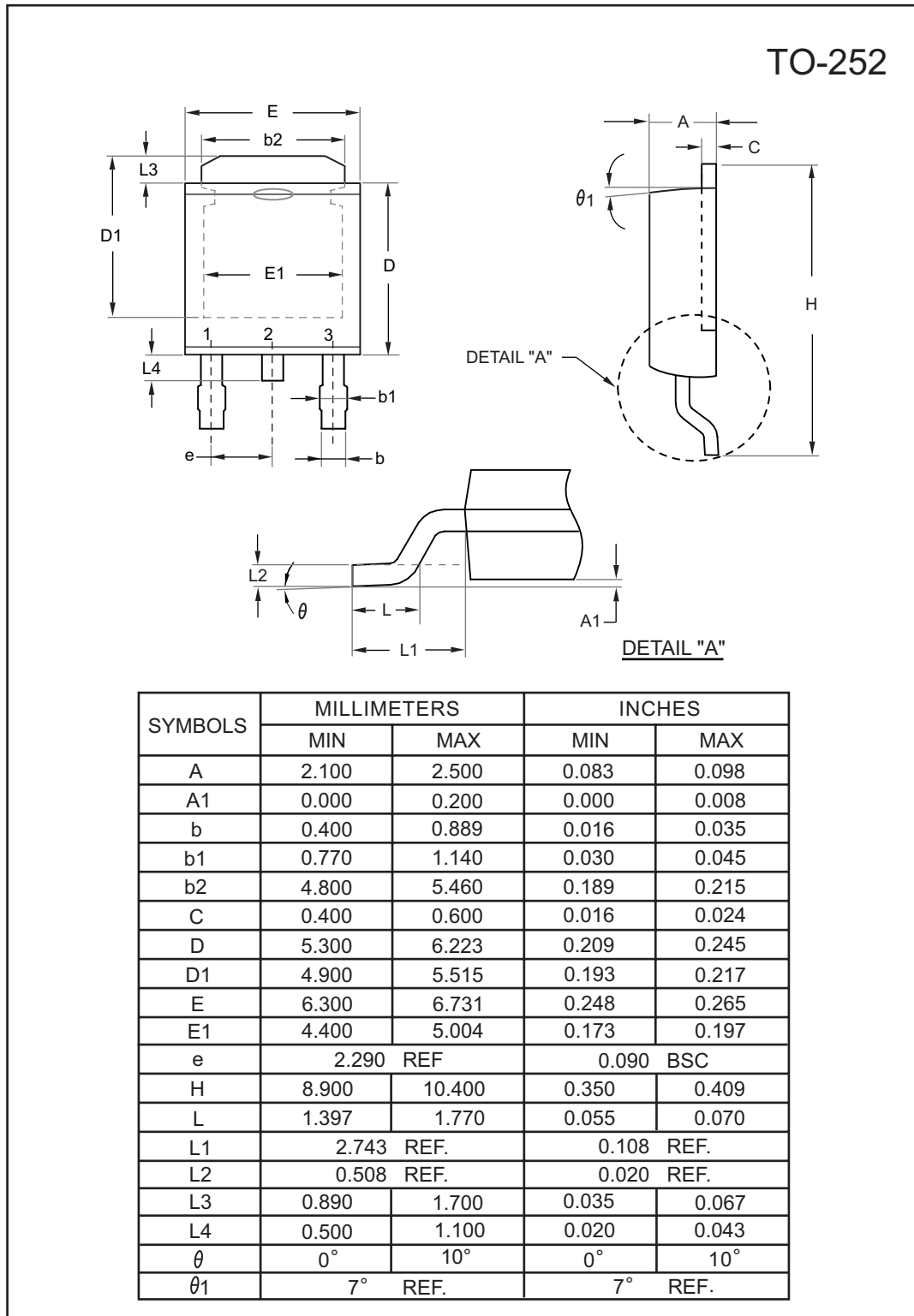


Figure 12. S switching Waveforms



# STU/D6025NL

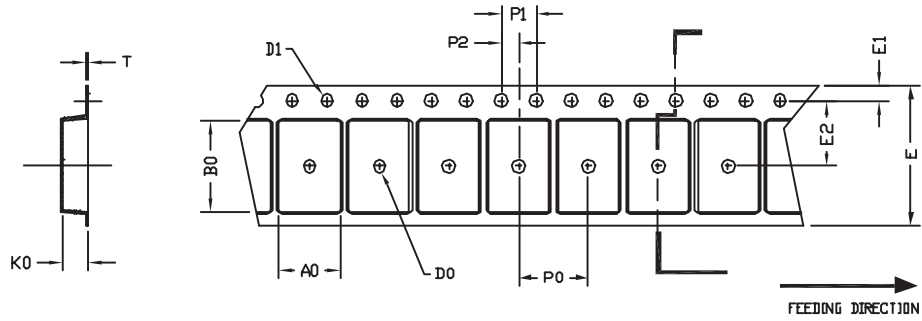
## PACKAGE OUTLINE DIMENSIONS



# STU/D6025NL

## TO-252 Tape and Reel Data

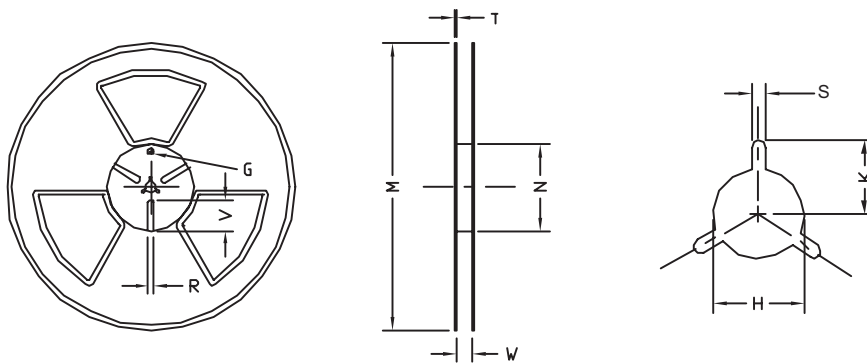
### TO-252 Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
TO-252 (16 mm)	6.80 ±0.1	10.3 ±0.1	2.50 ±0.1	φ2	φ1.5 +0.1 -0	16.0 0.3±	1.75 0.1±	7.5 ±0.15	8.0 ±0.1	4.0 ±0.1	2.0 ±0.15	0.3 ±0.05

### TO-252 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	T	H	K	S	G	R	V
16 mm	φ 330	φ 330 ± 0.5	φ 97 ± 1.0	17.0 + 1.5 - 0	2.2	φ 13.0 + 0.5 - 0.2	10.6	2.0 ±0.5	---	---	---