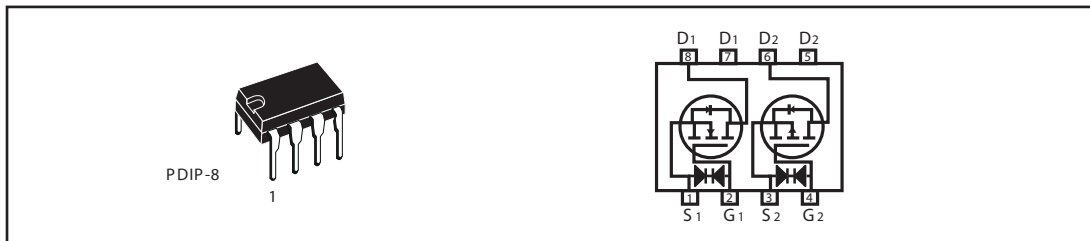




## Dual Enhancement Mode Field Effect Transistor ( N and P Channel)

PRODUCT SUMMARY (N-Channel)		
VDSS	ID	RDS(ON) (mΩ) Max
30V	7.6A	23 @ VGS = 10V
		30 @ VGS = 4.5V

PRODUCT SUMMARY (P-Channel)		
VDSS	ID	RDS(ON) (mΩ) Max
-30V	-6.6A	35 @ VGS = -10V
		55 @ VGS = -4.5V



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

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		VDS	30	-30	V
Gate-Source Voltage		VGS	±20	±20	V
Drain Current-Continuous <sup>a</sup> @ Ta	25°C	ID	7.6	-6.6	A
	70°C		6	5.3	A
-Pulsed <sup>b</sup>		IDM	30	28	A
Drain-Source Diode Forward Current <sup>a</sup>		IS	1.7	-1.7	A
Maximum Power Dissipation <sup>a</sup>	Ta=25°C	PD	3		W
	Ta=70°C		2		
Operating Junction and Storage Temperature Range		TJ, TSTG	-55 to 150		°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient <sup>a</sup>	RθJA	41.5	°C/W
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N-Channel ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=24V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS<sup>b</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.7	3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=7A$		17	23	m ohm
		$V_{GS}=4.5V, I_D=5A$		23	30	m ohm
On-State Drain Current	$I_{D(on)}$	$V_{DS}=15V, V_{GS}=10V$	20			A
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=7A$		15		S
<b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=15V, V_{GS}=0V$ $f=1.0MHz$		620		pF
Output Capacitance	$C_{OSS}$			190		pF
Reverse Transfer Capacitance	$C_{RSS}$			115		pF
<b>SWITCHING CHARACTERISTICS<sup>c</sup></b>						
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=15V,$ $I_D=7A,$ $R_L=2.1\text{ ohm},$ $V_{GS}=10V,$ $R_{GEN}=6\text{ ohm}$		13		ns
Rise Time	$t_r$			14.4		ns
Turn-Off Delay Time	$t_{D(off)}$			40		ns
Fall Time	$t_f$			8.4		ns
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=7A, V_{GS}=10V$		13		nC
		$V_{DS}=15V, I_D=7A, V_{GS}=4.5V$		6.8		nC
Gate-Source Charge	$Q_{gs}$	$V_{DS}=15V, I_D=7A,$ $V_{GS}=10V$		1.5		nC
Gate-Drain Charge	$Q_{gd}$			3.5		nC

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P-Channel 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			±10	uA
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	-1.9	-3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A		28	35	m ohm
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A		44	55	m ohm
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V	-20			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-6A		9.5		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		850		pF
Output Capacitance	C <sub>OSS</sub>			205		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			105		pF
SWITCHING CHARACTERISTICS <sup>c</sup>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>D</sub> =-15V, R <sub>L</sub> =15 ohm, I <sub>D</sub> =-1A, V <sub>GEN</sub> =-10V, R <sub>GEN</sub> =6 ohm		12.5		ns
Rise Time	t <sub>r</sub>			17.5		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			66		ns
Fall Time	t <sub>f</sub>			27		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-6A, V <sub>GS</sub> =-10V		15		nC
		V <sub>DS</sub> =-15V, I <sub>D</sub> =-6A, V <sub>GS</sub> =-4.5V		7.5		nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-6A, V <sub>GS</sub> =-10V		1.7		nC
Gate-Drain Charge	Q <sub>gd</sub>			4.5		nC

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

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>DRAIN-SOURCE DIODE CHARACTERISTICS<sup>b</sup></b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0\text{V}, I_S = 1.7\text{A}$	N-Ch	0.8	1.2	V
		$V_{GS} = 0\text{V}, I_S = -1.7\text{A}$	P-Ch	-0.8	-1.2	

### 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.
- N-Channel

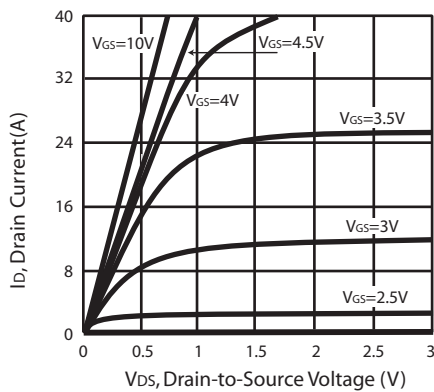


Figure 1. Output Characteristics

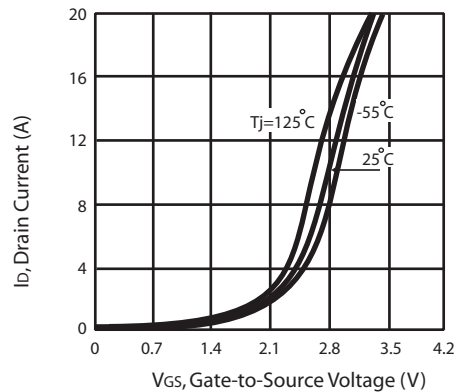


Figure 2. Transfer Characteristics

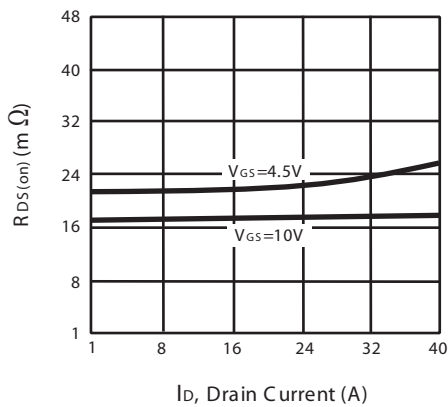


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

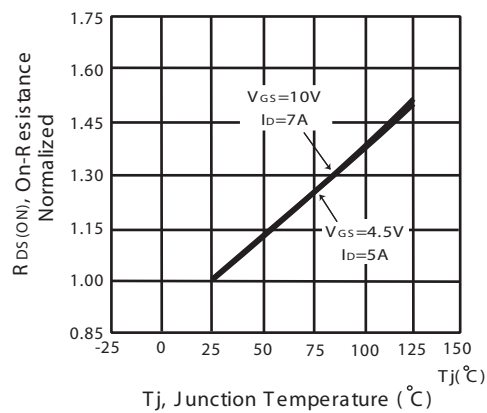


Figure 4. On-Resistance Variation with Drain Current and Temperature

# STA6611

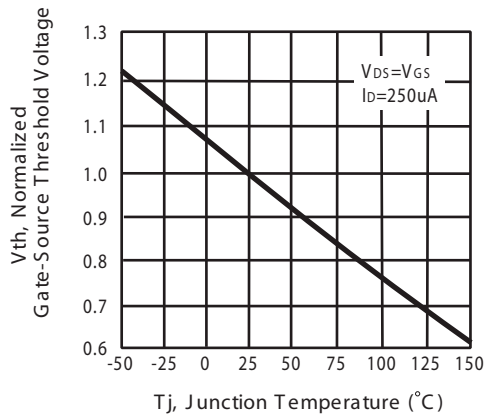


Figure 5. Gate Threshold Variation with Temperature

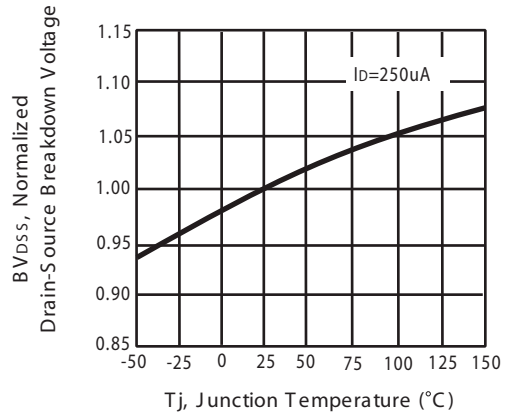


Figure 6. Breakdown Voltage Variation with Temperature

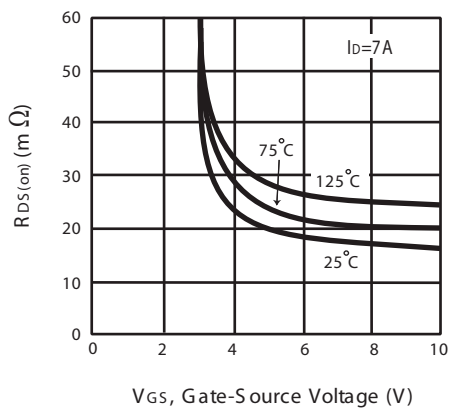


Figure 7. On-Resistance vs. Gate-Source Voltage

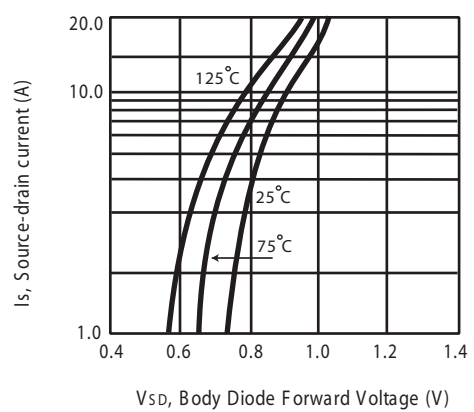


Figure 8. Body Diode Forward Voltage Variation with Source Current

# STA6611

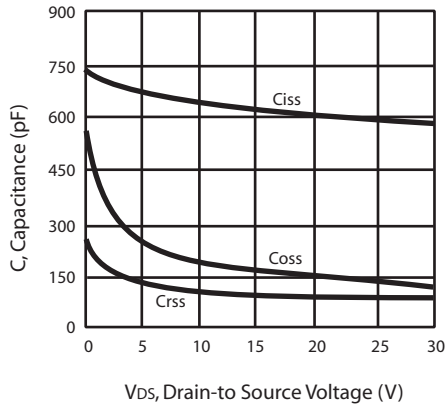


Figure 8. Capacitance

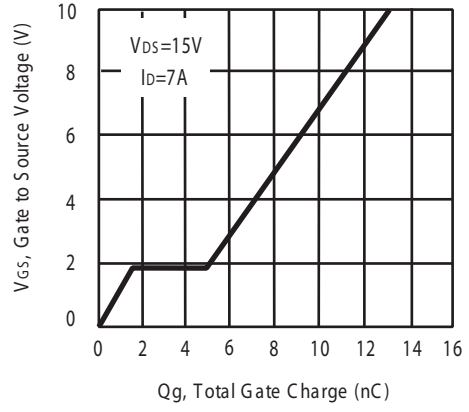


Figure 9. Gate Charge

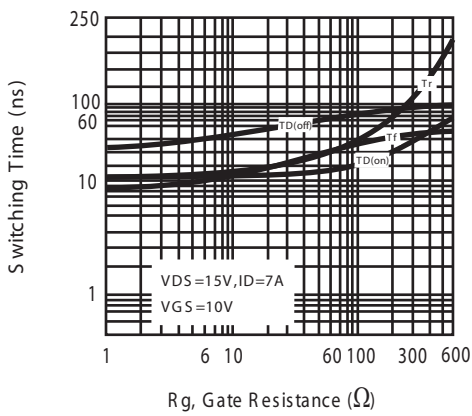


Figure 11. switching characteristics

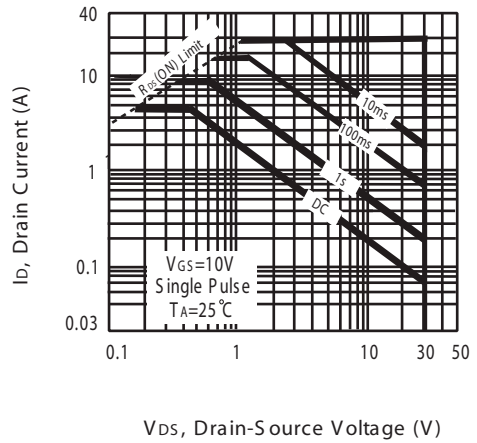
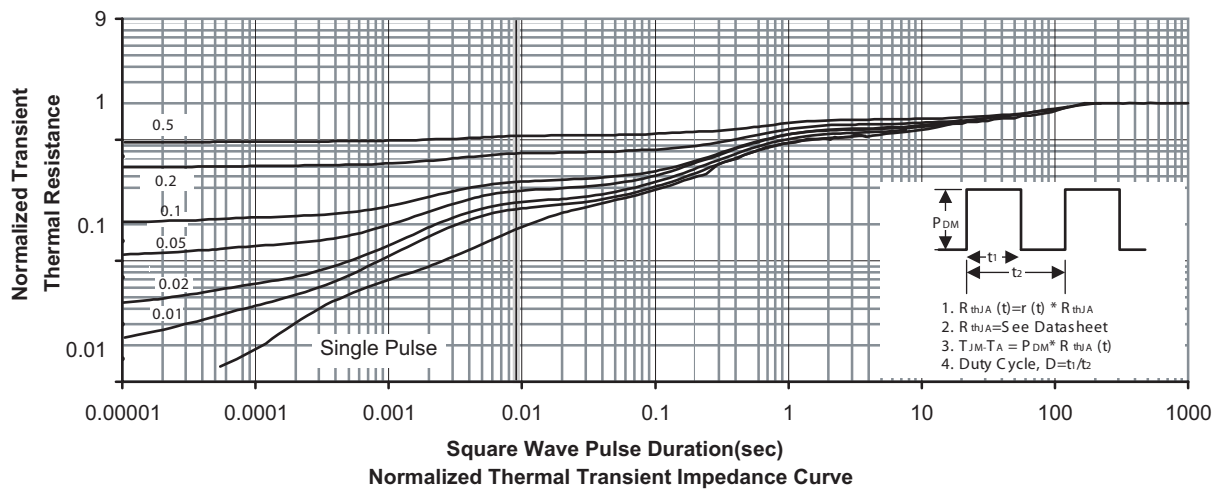


Figure 10. Maximum Safe Operating Area



# STA6611

P-Channel

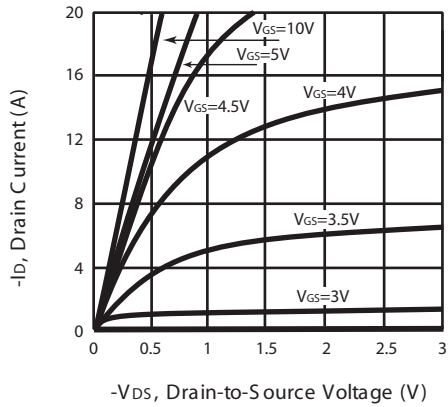


Figure 1. Output Characteristics

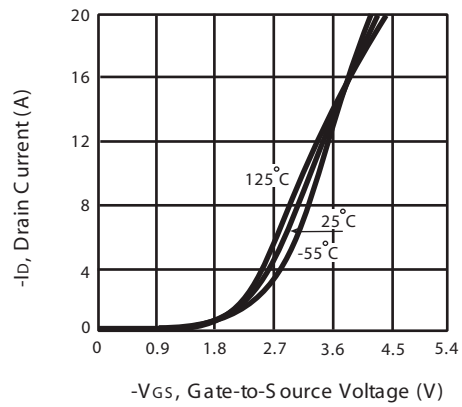


Figure 2. Transfer Characteristics

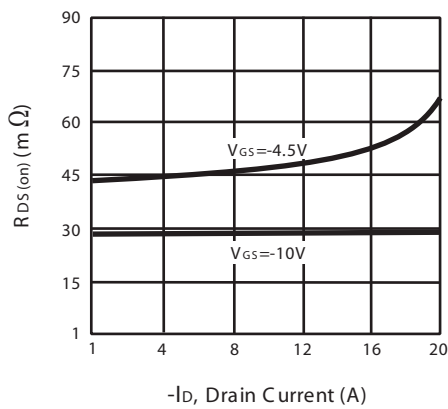


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

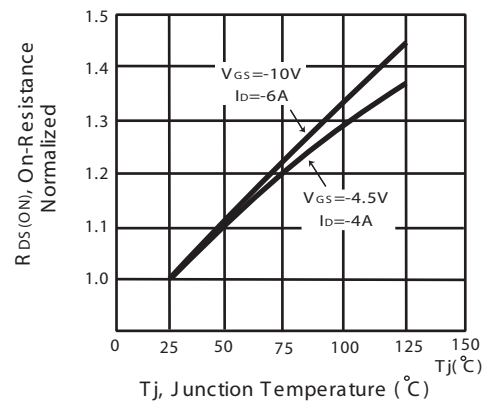


Figure 4. On-Resistance Variation with Drain Current and Temperature

# STA6611

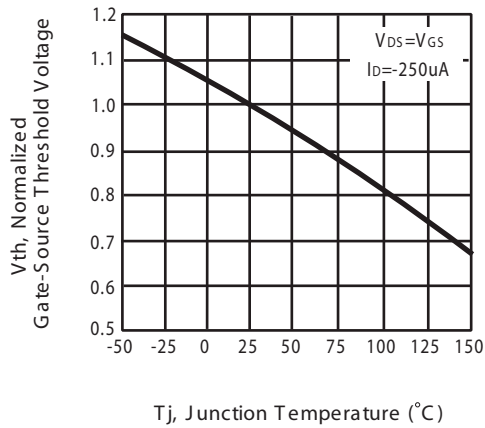


Figure 5. Gate Threshold Variation with Temperature

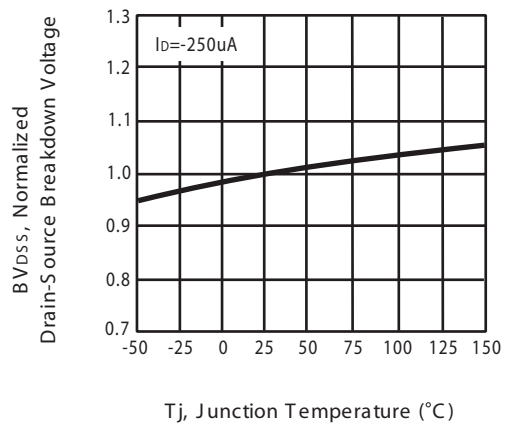


Figure 6. Breakdown Voltage Variation with Temperature

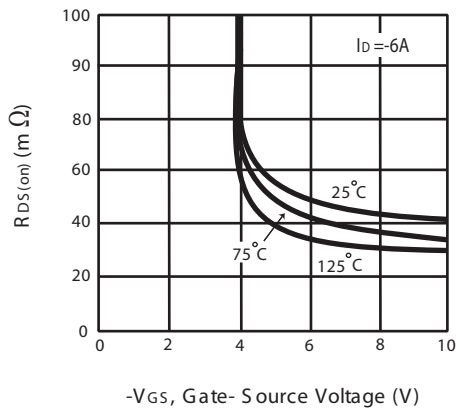


Figure 7. On-Resistance vs. Gate-Source Voltage

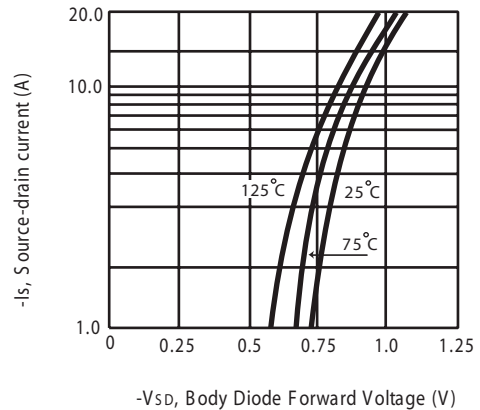


Figure 8. Body Diode Forward Voltage Variation with Source Current



# STA6611

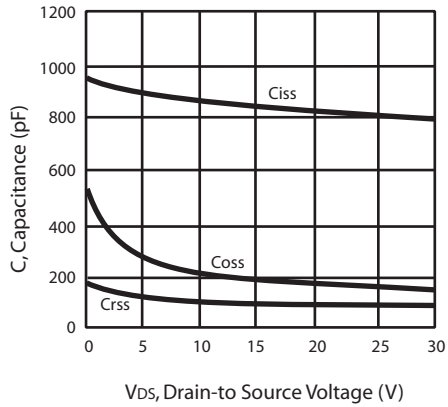


Figure 8. Capacitance

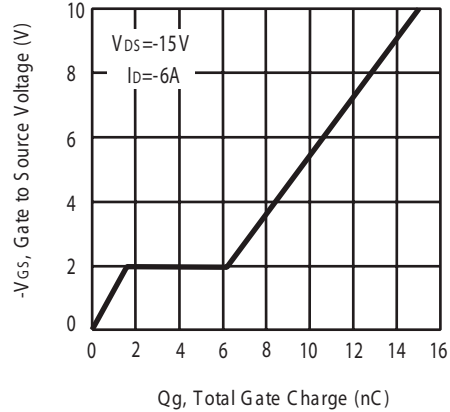


Figure 9. Gate Charge

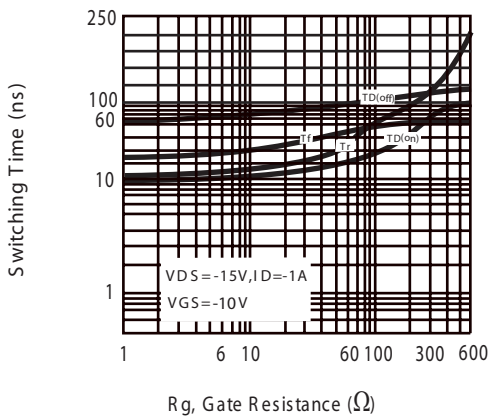


Figure 11. switching characteristics

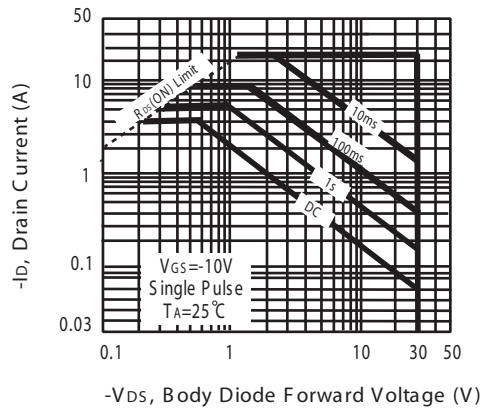
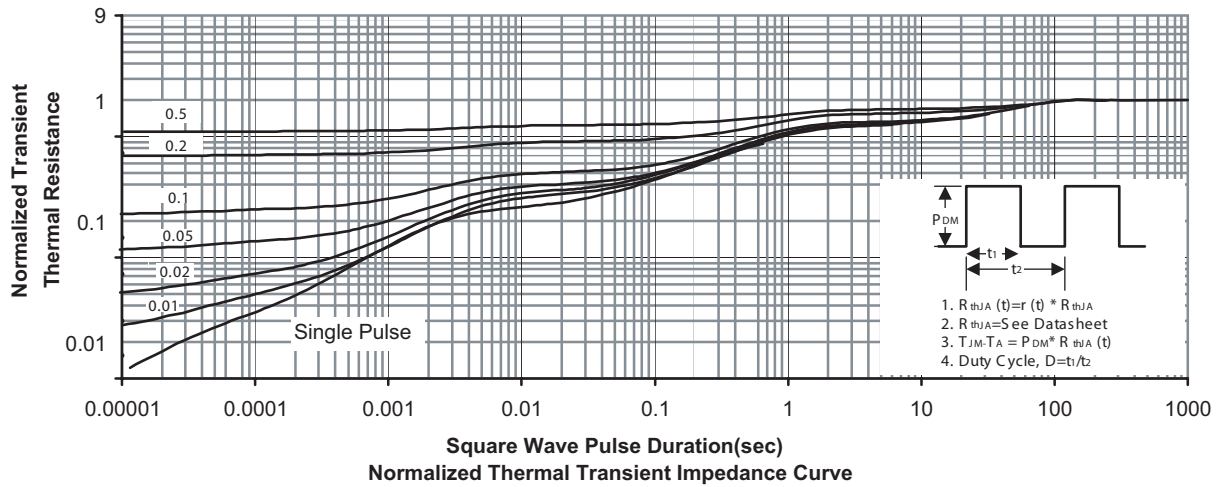


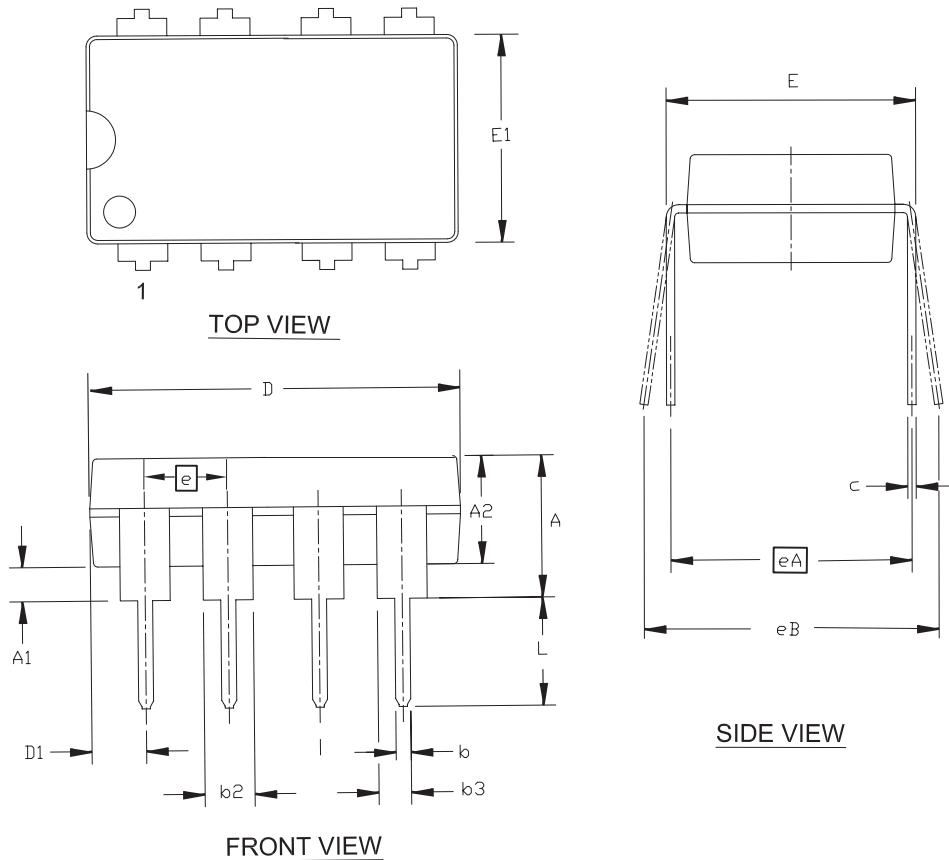
Figure 10. Maximum Safe Operating Area



# STA6611

## PACKAGE OUTLINE DIMENSIONS

### PDIP 8



SYMBOL	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.145	.172	.200	3.68	4.37	5.08
A1	.020	-	-	0.51	-	-
A2	.125	.130	.135	3.18	3.30	3.43
b	.015	.018	.021	0.38	0.46	0.53
c	.009	.012	.014	0.23	0.30	0.36
b2	.045	.060	.070	1.14	1.52	1.78
b3	.030	.039	.045	0.76	0.99	1.14
L	.125	.132	.140	3.18	3.35	3.56
e	.090	.100	.110	2.29	2.54	2.79
D	.373	.386	.400	9.47	9.80	10.16
D1	.030	.045	.060	0.76	1.14	1.52
E	.300	.310	.320	7.62	7.87	8.13
E1	.245	.250	.255	6.22	6.35	6.48
eA	.280	-	-	7.11	-	-
eB	.310	.325	.365	7.87	8.26	9.27