

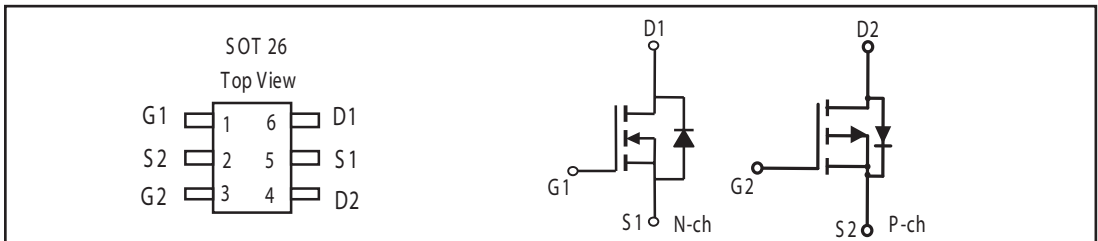


# STS 3621

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

PRODUCT SUMMARY (N-Channel)		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> ( mΩ ) Max
30V	3A	50 @ V <sub>GS</sub> = 10V
		65 @ V <sub>GS</sub> = 4.5V

PRODUCT SUMMARY (P-Channel)		
V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> ( mΩ ) Max
-30V	-2A	90 @ V <sub>GS</sub> = -10V
		135 @ V <sub>GS</sub> = -4.5V



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

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V <sub>DS</sub>	30	-30	V
Gate-Source Voltage		V <sub>GS</sub>	±20	±20	V
Drain Current-Continuous <sup>a</sup> @ T <sub>a</sub>	25°C	I <sub>D</sub>	3	-2	A
	70°C		2.7	1.8	A
-Pulsed <sup>b</sup>		I <sub>DM</sub>	12	-8	A
Drain-Source Diode Forward Current <sup>a</sup>		I <sub>S</sub>	1.25	-1.25	A
Maximum Power Dissipation <sup>a</sup>	T <sub>a</sub> =25°C	P <sub>D</sub>	1.25		W
	T <sub>a</sub> =70°C		0.8		
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150		°C

### THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient <sup>a</sup>	R <sub>θJA</sub>	100	°C/W
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## N-Channel ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ <sup>c</sup>	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	30			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V			1	μA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ± 20V, V <sub>DS</sub> = 0V			±100	nA
<b>ON CHARACTERISTICS<sup>b</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.7	3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3A		40	50	m-ohm
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2A		52	65	m-ohm
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> = 5V, V <sub>GS</sub> = 4.5V	10			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 3A		9		S
<b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V f = 1.0MHz		330		pF
Output Capacitance	C <sub>OSS</sub>			70		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			45		pF
<b>SWITCHING CHARACTERISTICS<sup>c</sup></b>						
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		9		ns
Rise Time	t <sub>r</sub>			9		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			15		ns
Fall Time	t <sub>f</sub>			10		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3A, V <sub>GS</sub> = 10V		6		nC
		V <sub>DS</sub> = 15V, I <sub>D</sub> = 3A, V <sub>GS</sub> = 4.5V		3		nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 3A V <sub>GS</sub> = 10V		1		nC
Gate-Drain Charge	Q <sub>gd</sub>			1.5		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
<b>OFF CHARACTERISTICS</b>						
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
<b>ON CHARACTERISTICS<sup>b</sup></b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1	-1.8	-3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A		75	90	m-ohm
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A		120	135	m-ohm
On-State Drain Current	I <sub>D(ON)</sub>	V <sub>DS</sub> =-5V, V <sub>GS</sub> =-10V	8			A
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-3A		5.5		S
<b>DYNAMIC CHARACTERISTICS<sup>c</sup></b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V f=1.0MHz		360		pF
Output Capacitance	C <sub>OSS</sub>			84		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			52		pF
<b>SWITCHING CHARACTERISTICS<sup>c</sup></b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =-15V, I <sub>D</sub> =-1A, V <sub>GEN</sub> =-10V, R <sub>GEN</sub> =6 ohm		6		ns
Rise Time	t <sub>r</sub>			9.5		ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			48		ns
Fall Time	t <sub>f</sub>			25		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-2A, V <sub>GS</sub> =-10V		7		nC
		V <sub>DS</sub> =-15V, I <sub>D</sub> =-2A, V <sub>GS</sub> =-4.5V		3.4		nC
Gate-Source Charge	Q <sub>gs</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-2A V <sub>GS</sub> =-10V		0.9		nC
Gate-Drain Charge	Q <sub>gd</sub>			2.2		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	$V_{SD}$	$V_{GS} = 0V, I_S = 1.25A$	N-Ch	0.81	1.2	V
		$V_{GS} = 0V, I_S = -1.25A$	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

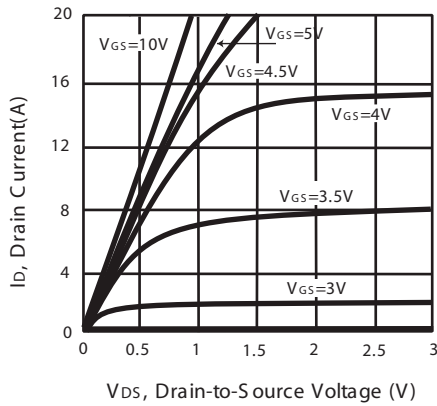


Figure 1. Output Characteristics

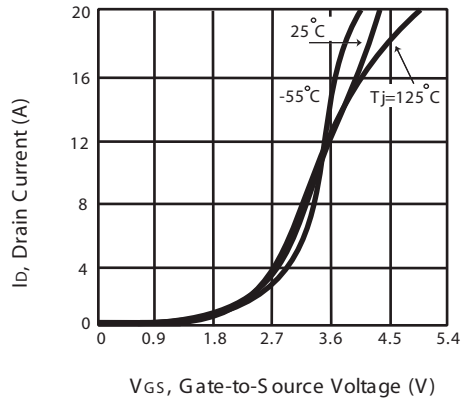


Figure 2. Transfer Characteristics

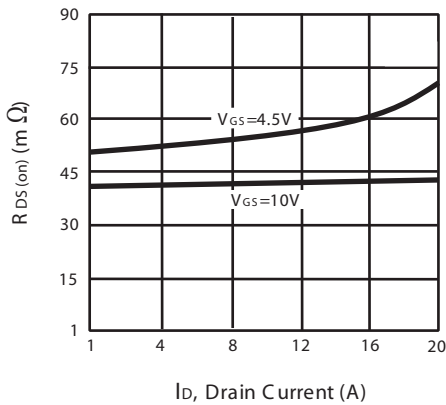


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

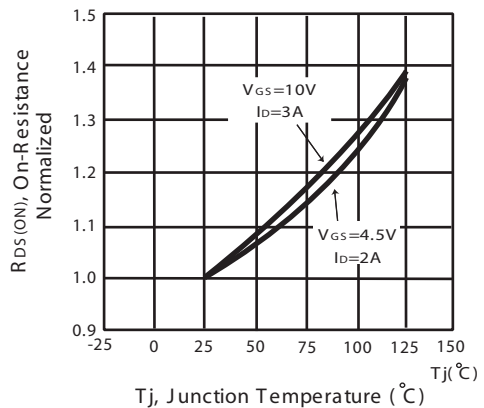


Figure 4. On-Resistance Variation with Drain Current and Temperature

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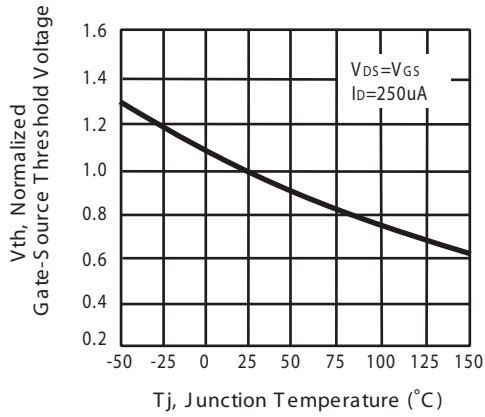


Figure 5. Gate Threshold Variation with Temperature

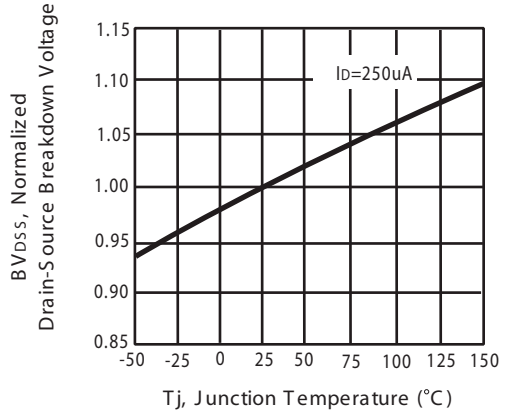


Figure 6. Breakdown Voltage Variation with Temperature

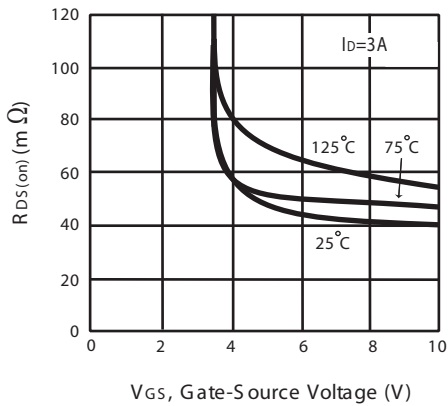


Figure 7. On-Resistance vs. Gate-Source Voltage

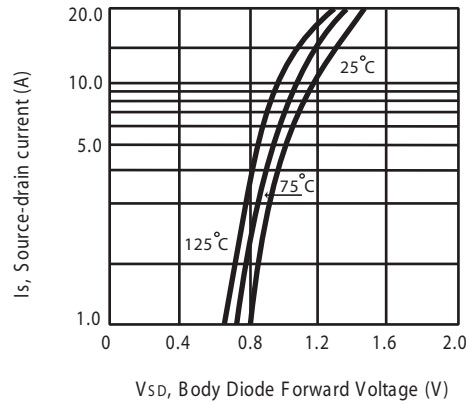


Figure 8. Body Diode Forward Voltage Variation with Source Current

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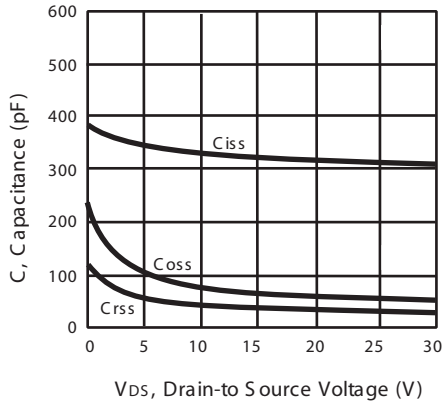


Figure 9. Capacitance

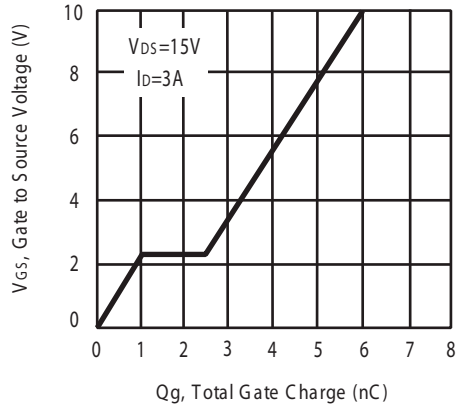


Figure 10. Gate Charge

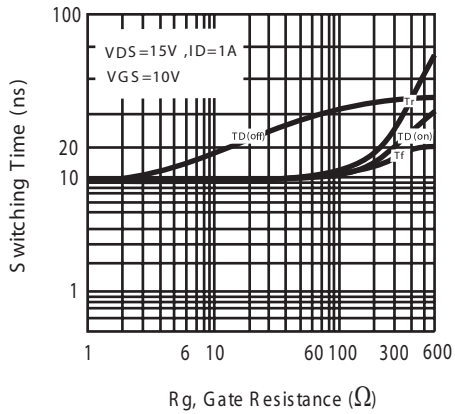


Figure 11. switching characteristics

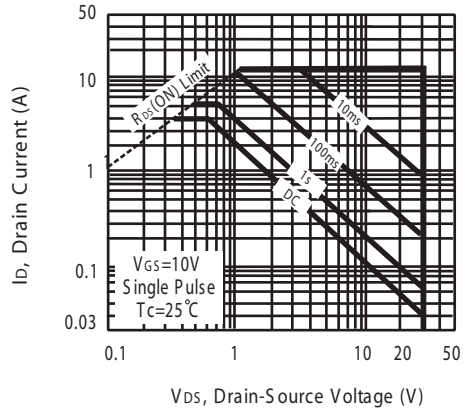
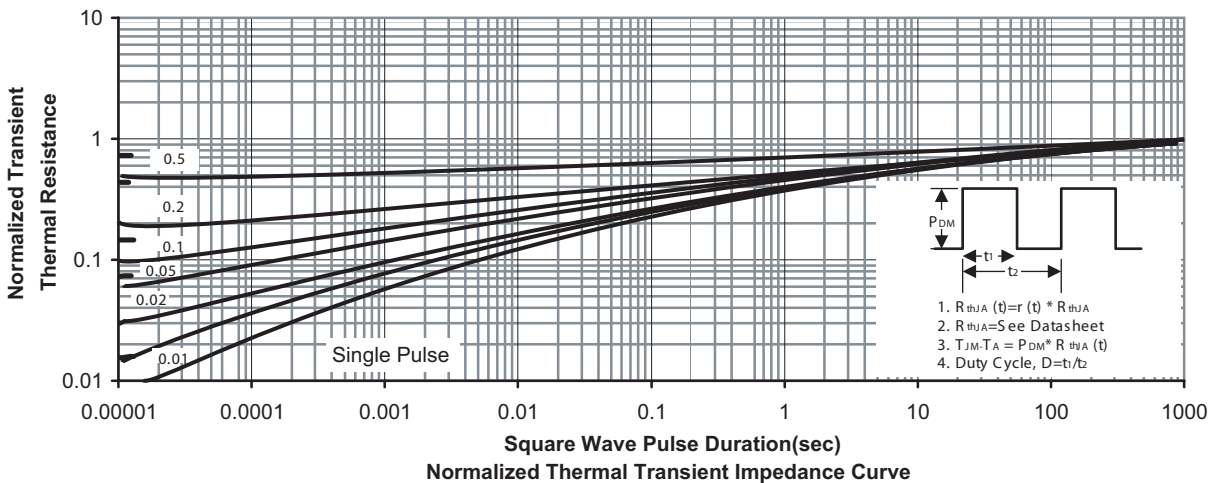


Figure 12. Maximum Safe Operating Area



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P-Channel

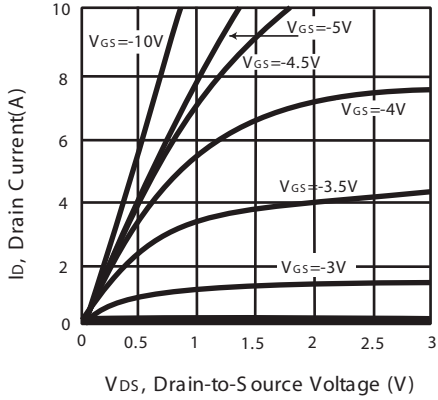


Figure 1. Output Characteristics

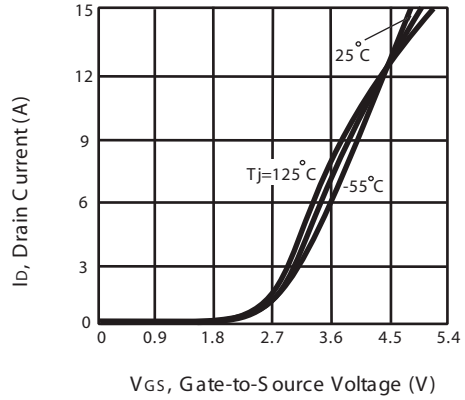


Figure 2. Transfer Characteristics

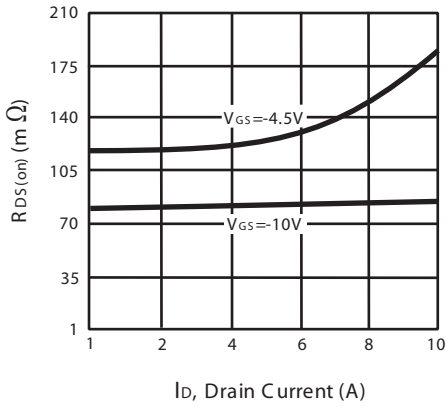


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

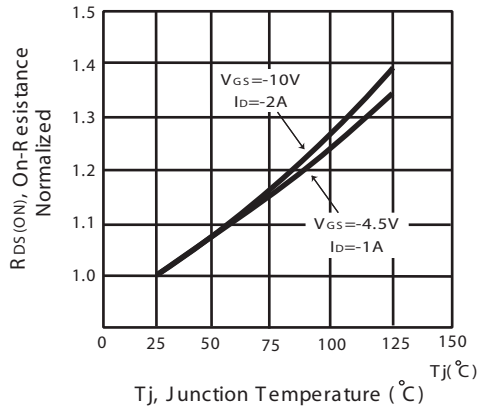


Figure 4. On-Resistance Variation with Drain Current and Temperature

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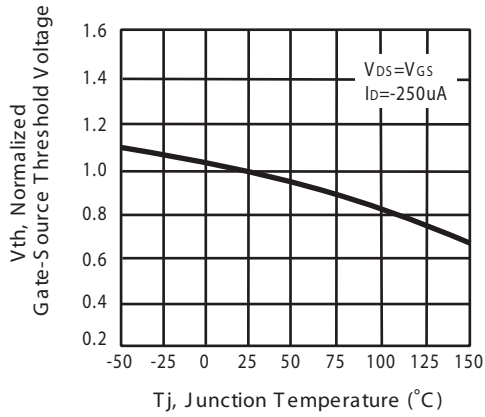


Figure 5. Gate Threshold Variation with Temperature

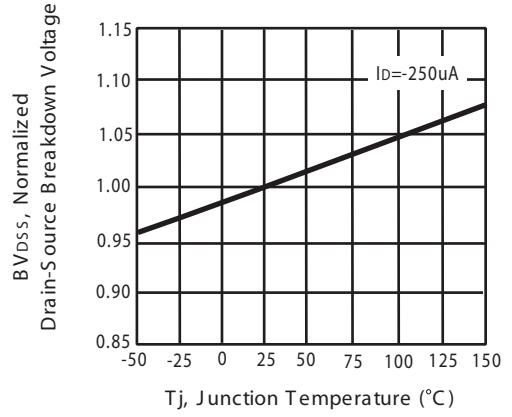


Figure 6. Breakdown Voltage Variation with Temperature

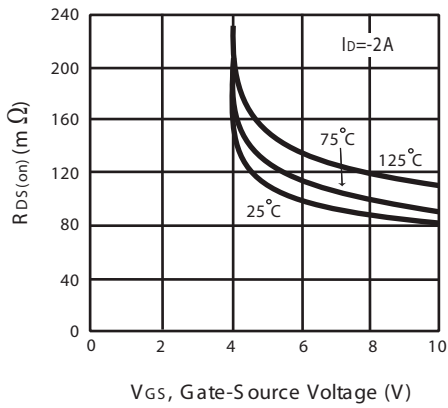


Figure 7. On-Resistance vs. Gate-Source Voltage

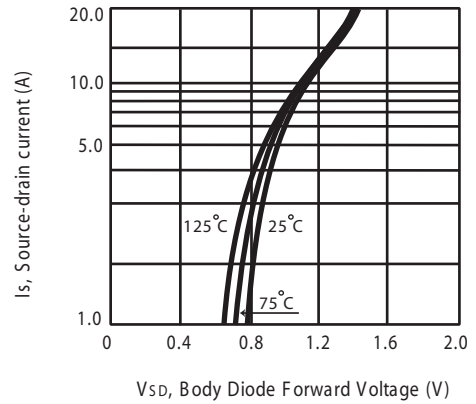


Figure 8. Body Diode Forward Voltage Variation with Source Current



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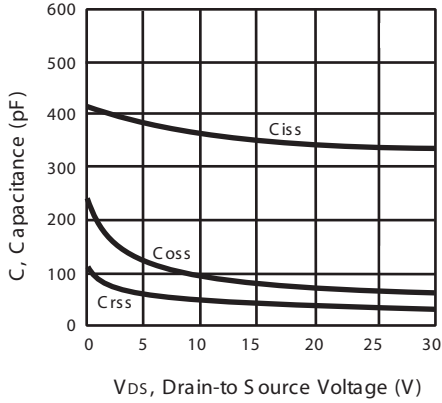


Figure 9. Capacitance

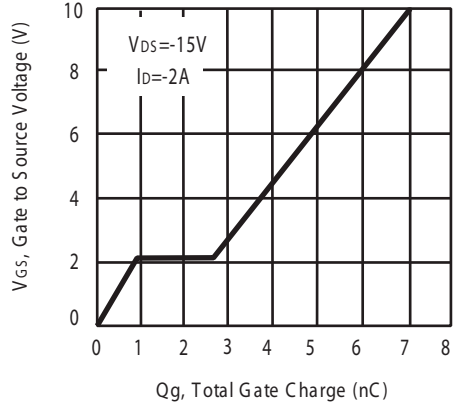


Figure 10. Gate Charge

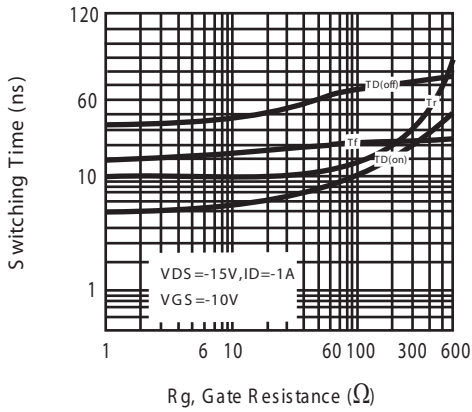


Figure 11. switching characteristics

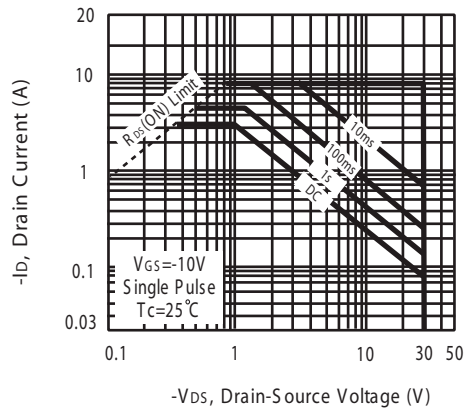
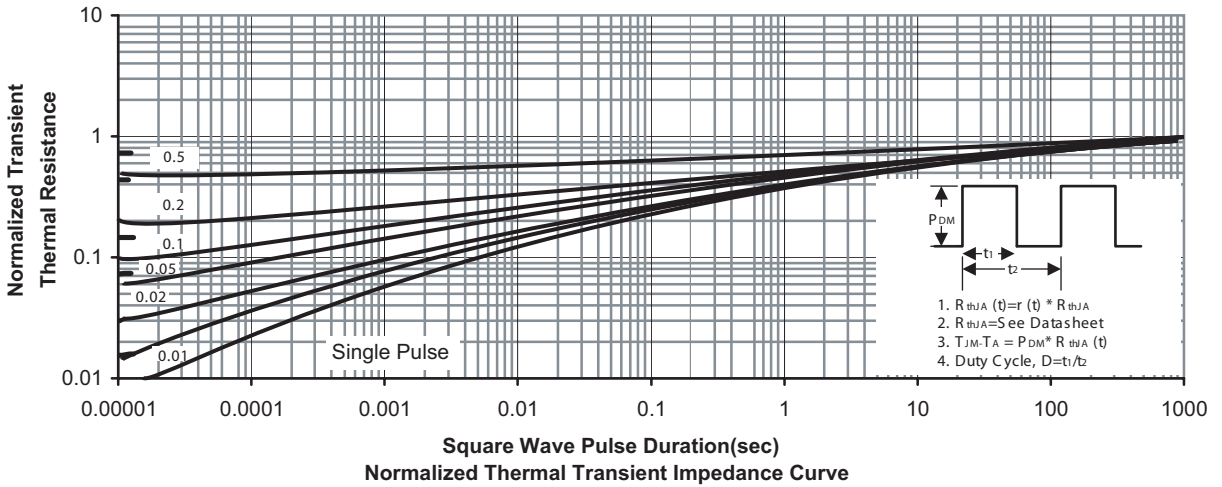


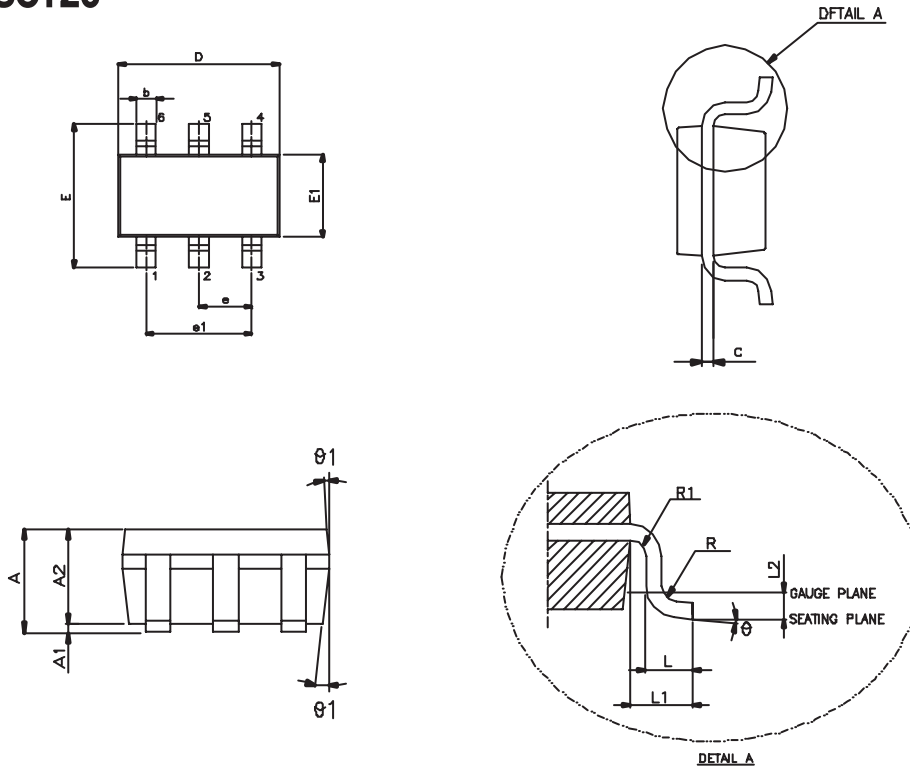
Figure 12. Maximum Safe Operating Area



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## PACKAGE OUTLINE DIMENSIONS

### SOT26



SYMBOL	MIN.	NOM.	MAX.
A	—	—	1.45
A1	—	—	0.15
A2	0.90	1.15	1.30
b	0.30	—	0.50
c	0.08	—	0.22
D	2.90 BSC.		
E	2.80 BSC.		
E1	1.60 BSC.		
e	0.95 BSC.		
e1	1.90 BSC.		
L	0.30	0.45	0.60
L1	0.60 REF.		
L2	0.25 BSC.		
R	0.10	—	—
R1	0.10	—	0.25
$\theta$	0°	4°	8°
$\phi$	5°	10°	15°

