



P-Channel Enhancement Mode Field Effect Transistor

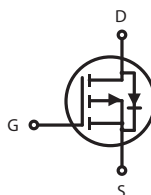
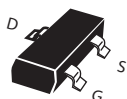
PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (m Ω) Max
-20V	-2.3A	130 @ V _{GS} = -4.5V 190 @ V _{GS} = -2.5V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- SOT-23 package.

SOT-23



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	-20	V
Gate-Source Voltage	V _{GS}	±10	V
Drain Current-Continuous ^a @ T _J =25°C -Pulsed ^b	I _D	-2.3	A
	I _{DM}	-8	A
Drain-Source Diode Forward Current ^a	I _S	-1.25	A
Maximum Power Dissipation ^a	P _D	1.25	W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient ^a	R _{thJA}	100	°C/W
--	-------------------	-----	------

STS 2309

ELECTRICAL CHARACTERISTICS (TA =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	-20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-16V, V _{GS} =0V			1	uA
Gate-Body Leakage	I _{GSS}	V _{GS} =± 10V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS ^b						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250uA	-0.5	-0.8	-1.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D = -2.3A		110	130	m-ohm
		V _{GS} =-2.5V, I _D = -2.0A		170	190	m-ohm
On-State Drain Current	I _{D(ON)}	V _{DS} = -5V, V _{GS} = -4.5V	-5			A
Forward Transconductance	g _{FS}	V _{DS} = -5V, I _D =-2A		5		S
DYNAMIC CHARACTERISTICS ^c						
Input Capacitance	C _{ISS}	V _{DS} = -15V, V _{GS} = 0V f=1.0MHz		350		pF
Output Capacitance	C _{OSS}			80		pF
Reverse Transfer Capacitance	C _{RSS}			35		pF
SWITCHING CHARACTERISTICS ^c						
Turn-On Delay Time	t _{D(ON)}	V _{DD} = -10V, I _D = -1A, V _{GS} = -4.5V, R _L = 10 ohm R _{GEN} = 6 ohm		9.6		ns
Rise Time	t _r			11.5		ns
Turn-Off Delay Time	t _{D(OFF)}			141.1		ns
Fall Time	t _f			56.2		ns
Total Gate Charge	Q _g	V _{DS} = -10V, I _D = -2.3A, V _{GS} = -4.5V		3.6		nC
Gate-Source Charge	Q _{gs}			0.6		nC
Gate-Drain Charge	Q _{gd}			1		nC

STS 2309

ELECTRICAL CHARACTERISTICS (T_A=25 °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 = -1.25A		-0.85	-1.2	V

Notes

- a.Surface Mounted on FR4 Board, t≤10sec.
- b.Pulse Test:Pulse Width≤300us, Duty Cycle≤2%.
- c.Guaranteed by design, not subject to production testing.

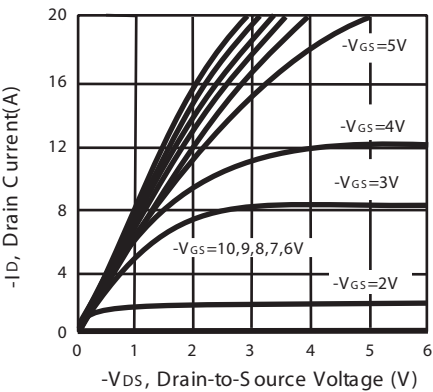


Figure 1. Output Characteristics

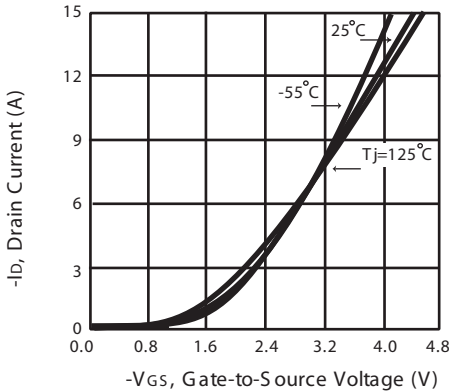


Figure 2. Transfer Characteristics

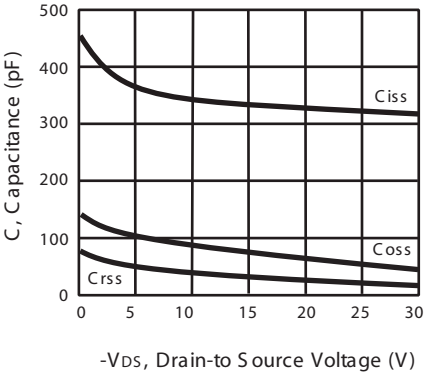


Figure 3. Capacitance

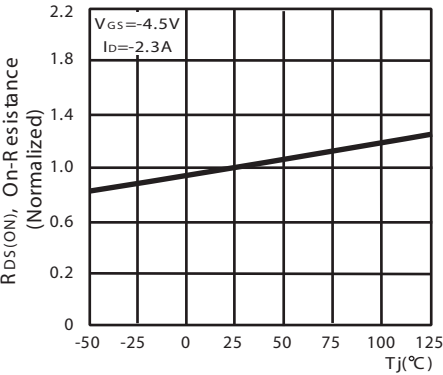
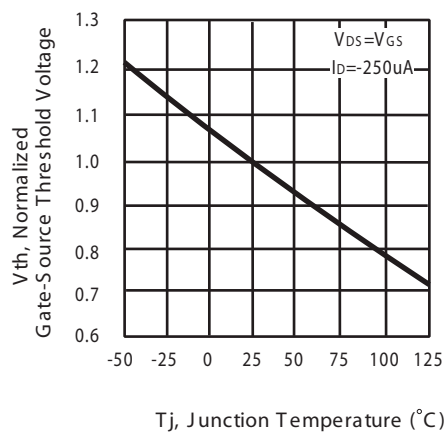


Figure 4. On-Resistance Variation with Temperature

STS 2309



with Temperature

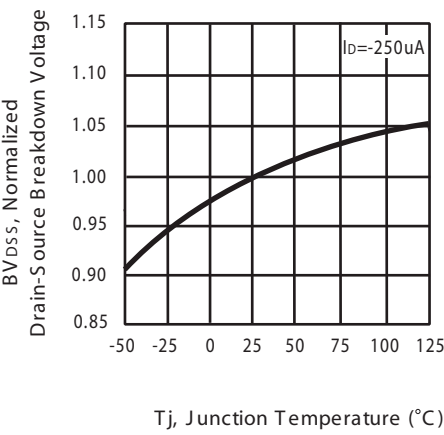


Figure 6. Breakdown Voltage Variation with Temperature

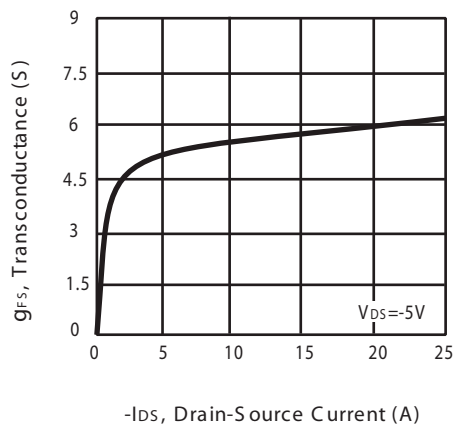


Figure 7. Transconductance Variation with Drain Current

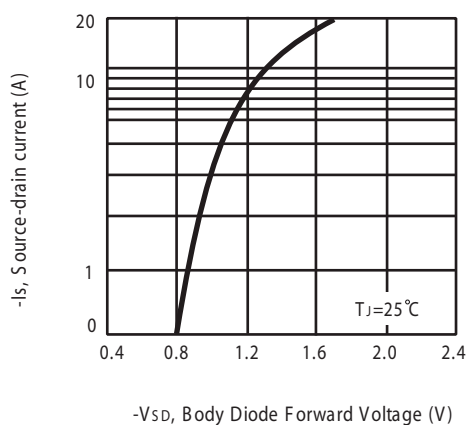


Figure 8. Body Diode Forward Voltage Variation with Source Current

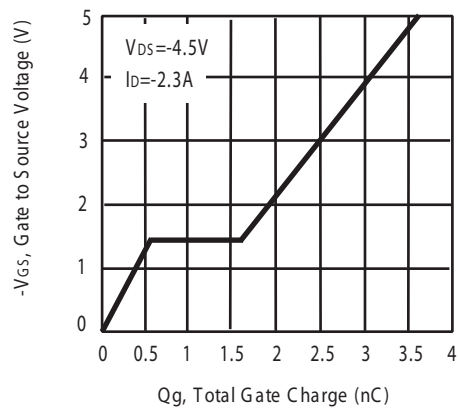


Figure 9. Gate Charge

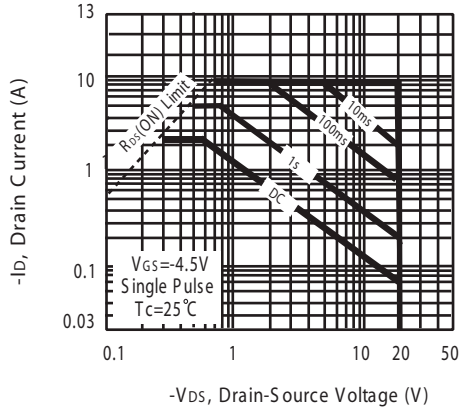


Figure 10. Maximum Safe Operating Area

STS 2309

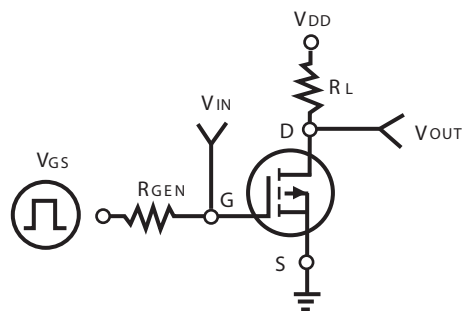


Figure 11. Switching Test Circuit

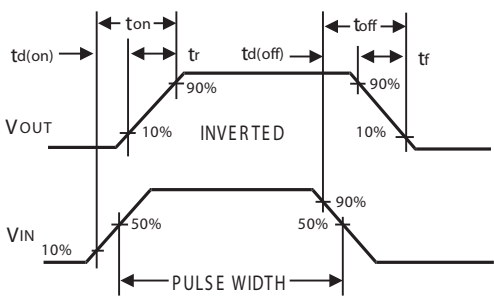
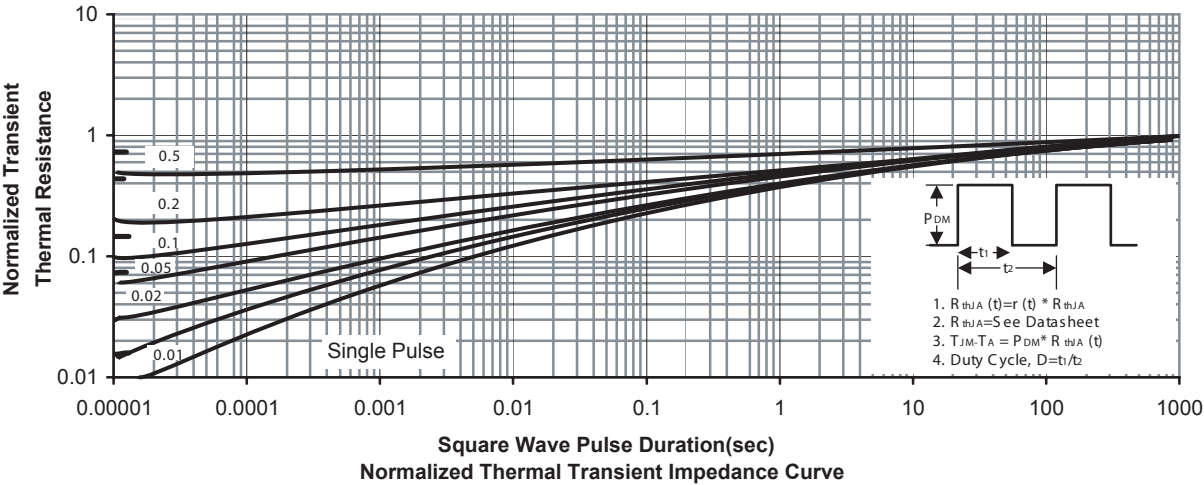


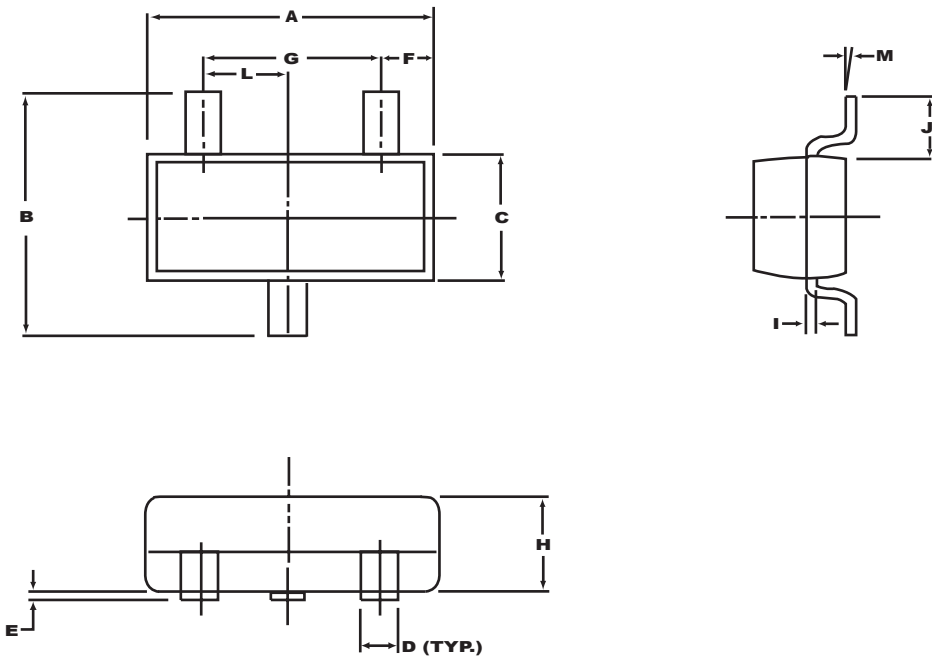
Figure 12. Switching Waveforms



STS 2309

PACKAGE OUTLINE DIMENSIONS

SOT-23

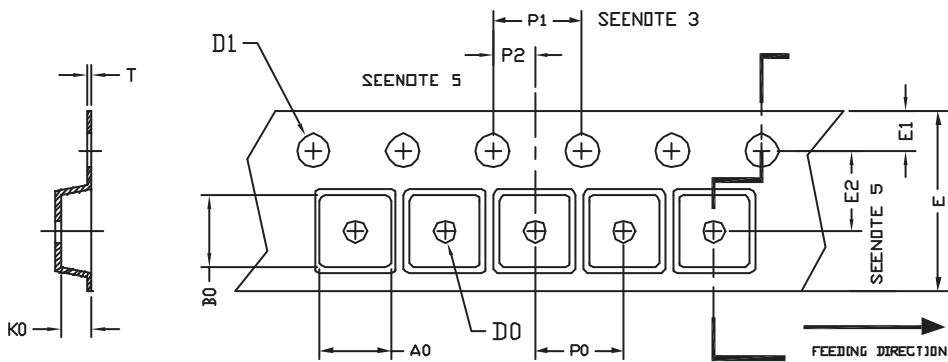


SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.70	3.10	0.106	0.122
B	2.40	2.80	0.094	0.110
C	1.40	1.60	0.055	0.063
D	0.35	0.50	0.014	0.020
E	0	0.10	0	0.004
F	0.45	0.55	0.018	0.022
G	1.90 REF.		0.075 REF.	
H	1.00	1.30	0.039	0.051
I	0.10	0.20	0.004	0.008
J	0.40	-	0.016	-
L	0.45	1.15	0.033	0.045
M	0°	10°	0°	10°

STS 2309

SOT-23 Tape and Reel Data

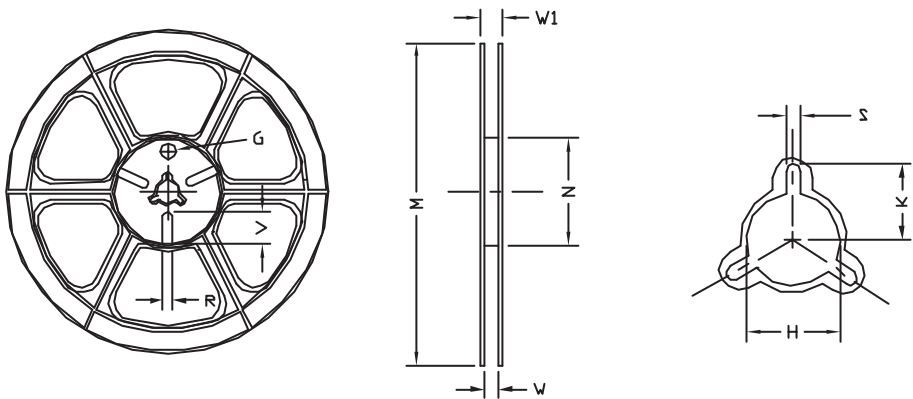
SOT-23 Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOT-23	3.20 ±0.10	3.00 ±0.10	1.33 ±0.10	1.00 ±0.25	1.50 ±0.10	8.00 +0.30 -0.10	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	0.20 ±0.02

SOT-23 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	M	N	W	W1	H	K	S	G	R	V
8mm	178	178 ±1	60 ±1	9.00 ±0.5	12.00 ±0.5	13.5 ±0.5	10.5	2.00 ±0.5	10.0	5.00	18.00