



## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Max
30V	2A	94 @ V <sub>GS</sub> =10V
		107 @ V <sub>GS</sub> =4.5V
		139 @ V <sub>GS</sub> =2.5V

### FEATURES

- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- Surface Mount Package.
- ESD Protected.



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

Symbol	Parameter	Limit	Units	
V <sub>DS</sub>	Drain-Source Voltage	30	V	
V <sub>GS</sub>	Gate-Source Voltage	±12	V	
I <sub>D</sub>	Drain Current-Continuous <sup>a</sup>	T <sub>A</sub> =25°C	2	A
		T <sub>A</sub> =70°C	1.6	A
I <sub>DM</sub>	-Pulsed <sup>b</sup>	8	A	
P <sub>D</sub>	Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> =25°C	1	W
		T <sub>A</sub> =70°C	0.64	W
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	°C	

### THERMAL CHARACTERISTICS

Symbol	Parameter	Limit	Units
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	125	°C/W

# STC3116E

Ver 1.0

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V , V <sub>GS</sub> =0V			1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±12V , V <sub>DS</sub> =0V			±10	uA
<b>ON CHARACTERISTICS</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	0.5	0.9	1.5	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V , I <sub>D</sub> =1.0A		75	94	m ohm
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =0.9A		82	107	m ohm
		V <sub>GS</sub> =2.5V , I <sub>D</sub> =0.8A		103	139	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =1.0A		6.5		S
<b>DYNAMIC CHARACTERISTICS <sup>c</sup></b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1.0MHz		396		pF
C <sub>oss</sub>	Output Capacitance			56		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			33		pF
<b>SWITCHING CHARACTERISTICS <sup>c</sup></b>						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V I <sub>D</sub> =1A		46		ns
t <sub>r</sub>	Rise Time			77		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time	V <sub>GS</sub> =10V		413		ns
t <sub>f</sub>	Fall Time	R <sub>GEN</sub> = 6 ohm		48		ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =1.0A, V <sub>GS</sub> =10V		3.8		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =1.0A, V <sub>GS</sub> =10V		0.6		nC
Q <sub>gd</sub>	Gate-Drain Charge			1.3		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = 1.0A		0.82	1.2	V

### Notes

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

Jun, 14, 2012

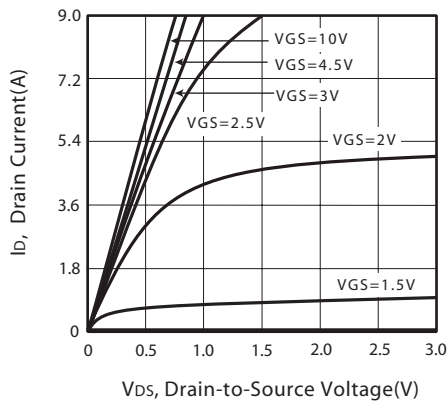


Figure 1. Output Characteristics

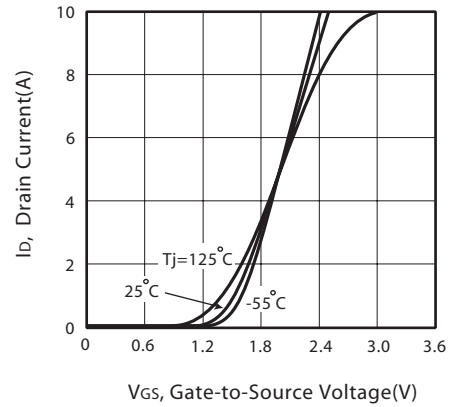


Figure 2. Transfer Characteristics

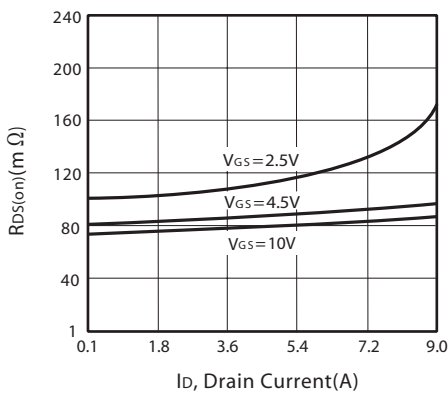


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

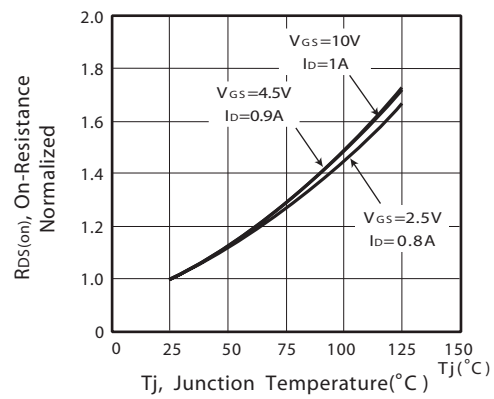


Figure 4. On-Resistance Variation with Drain Current and Temperature

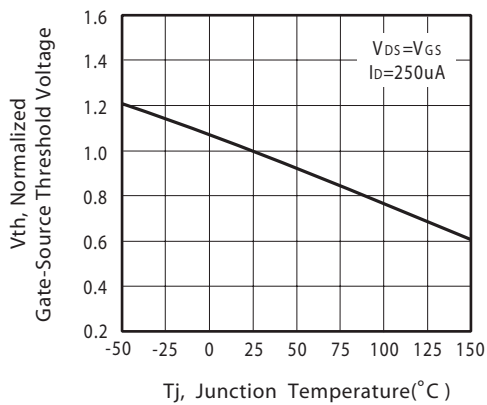


Figure 5. Gate Threshold Variation with Temperature

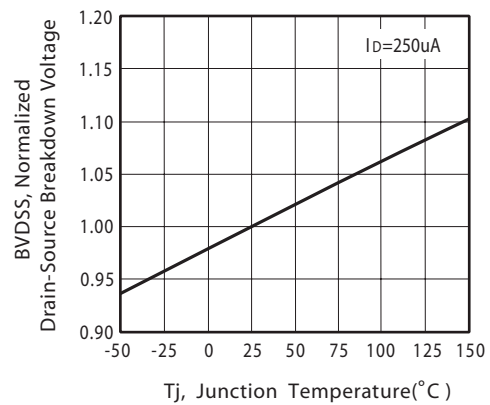


Figure 6. Breakdown Voltage Variation with Temperature

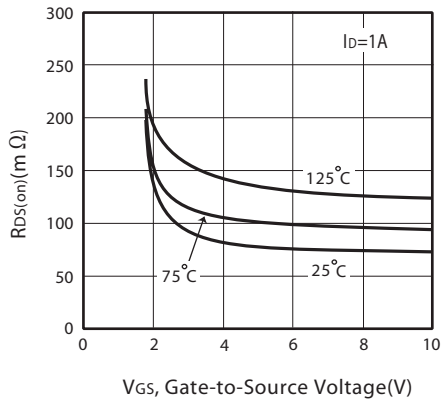


Figure 7. On-Resistance vs. Gate-Source Voltage

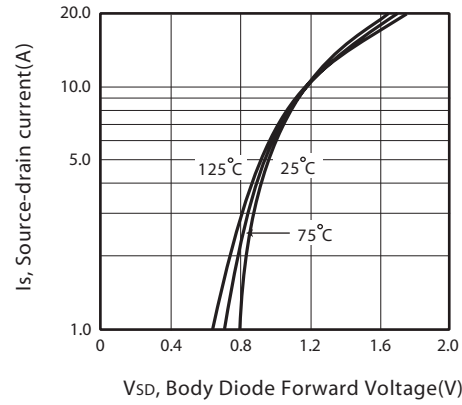


Figure 8. Body Diode Forward Voltage Variation with Source Current

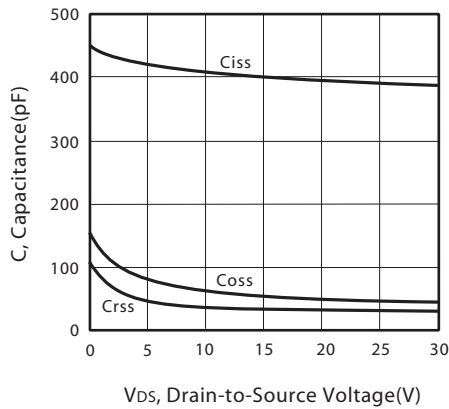


Figure 9. Capacitance

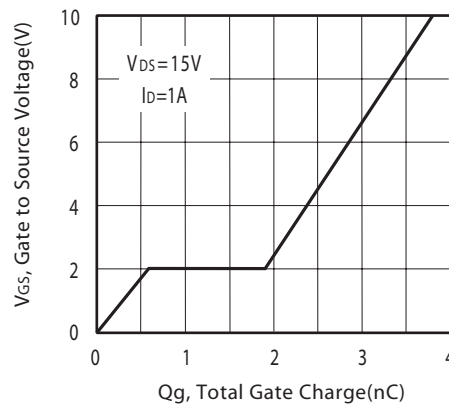


Figure 10. Gate Charge

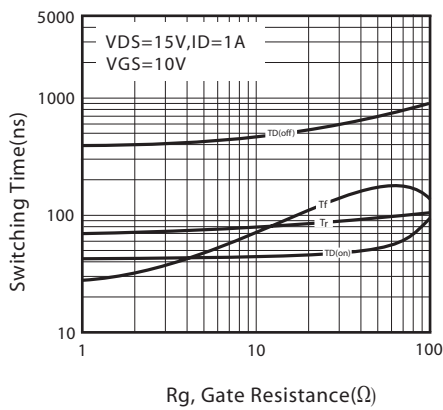


Figure 11. switching characteristics

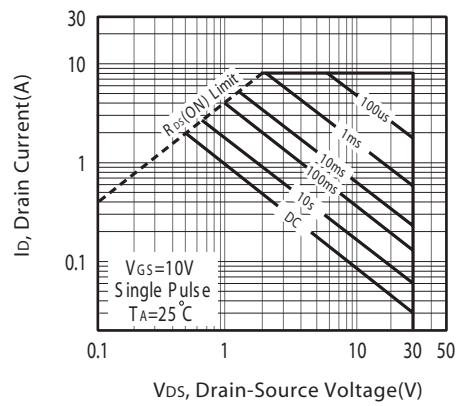


Figure 12. Maximum Safe Operating Area

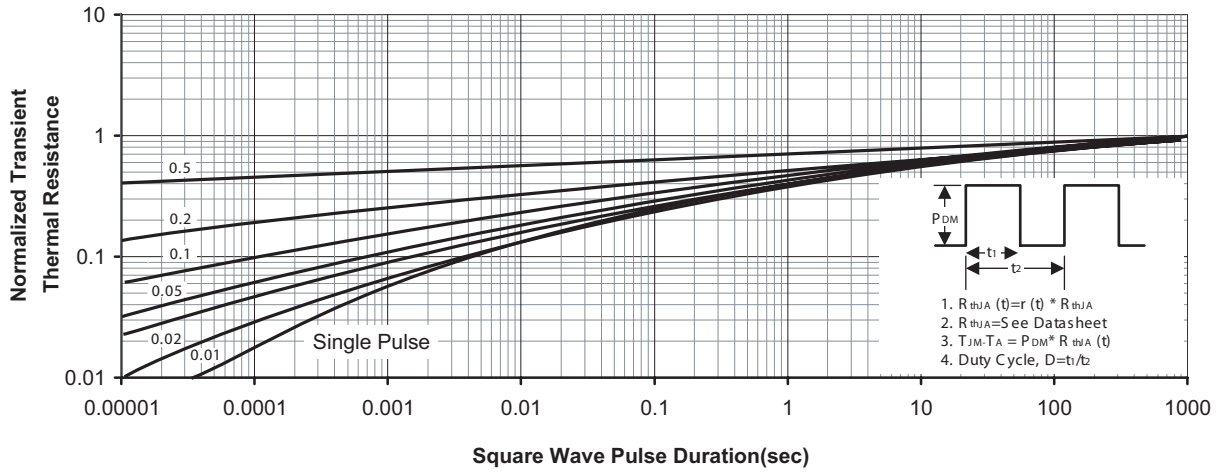
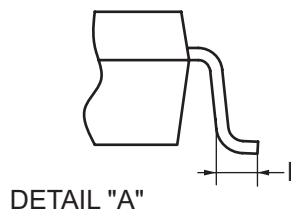
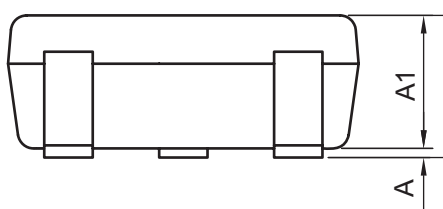
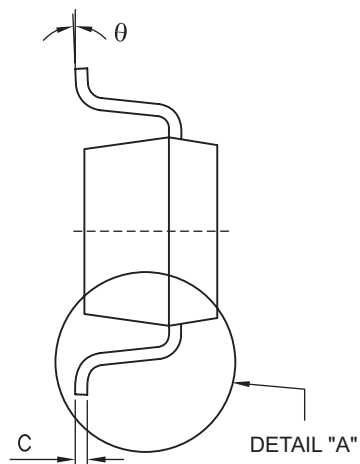
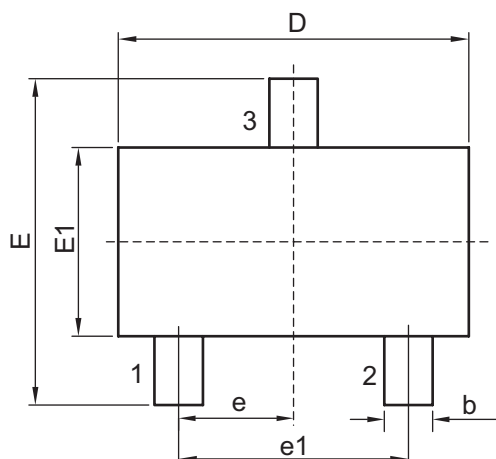


Figure 7. Normalized Thermal Transient Impedance Curve

## PACKAGE OUTLINE DIMENSIONS

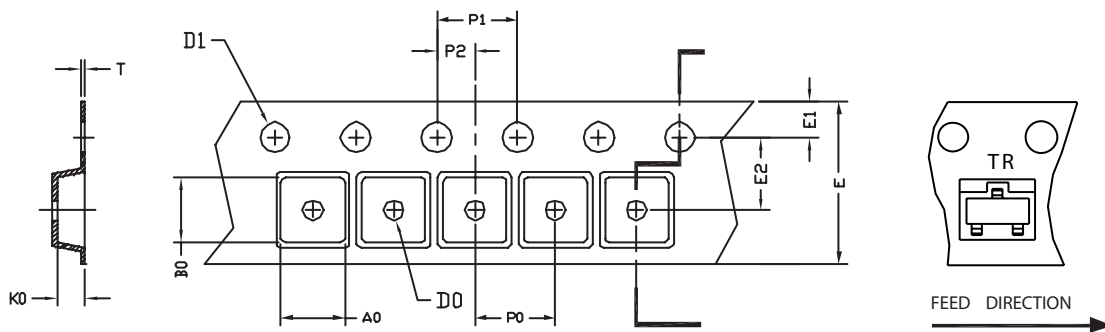
### SOT 323



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
D	1.900	2.100	0.074	0.084
E	2.000	2.200	0.078	0.086
E1	1.150	1.350	0.045	0.055
e	0.650 BSC		0.650 BSC	
e1	1.300 BSC		1.300 BSC	
b	0.150	0.300	0.006	0.012
C	0.080	0.250	0.003	0.010
A	0.000	0.100	0.000	0.004
A1	0.800	1.000	0.031	0.040
L	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

## SOT-323 Tape and Reel Data

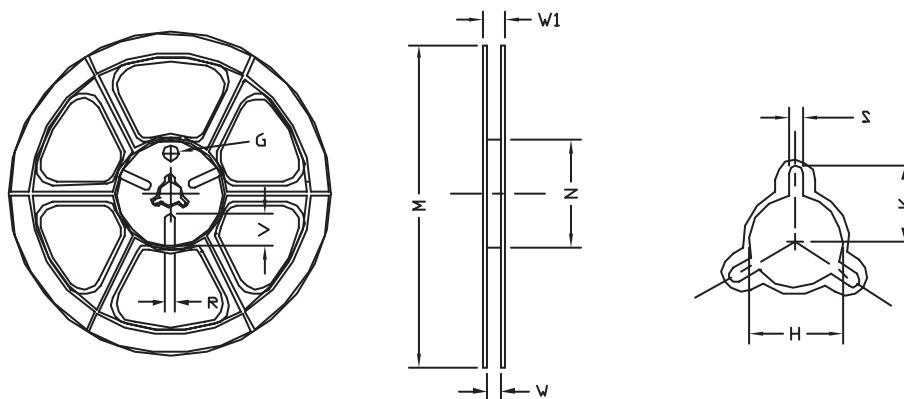
### SOT-323 Carrier Tape



UNIT:mm

PACKAGE	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOT-323	2.40 ±0.10	2.40 ±0.10	1.19 ±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	0.254 ±0.02

### SOT-323 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