



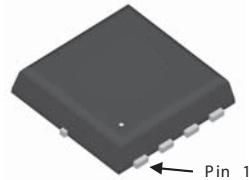
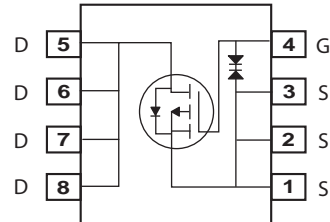
P-Channel Enhancement Mode Field Effect Transistor

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(ON)} (mΩ) Max
-20V	-20A	7.9 @ V _{GS} =-10V
		11.2 @ V _{GS} =-4.5V

FEATURES

- Super high dense cell design for low R_{DS(ON)}.
- Rugged and reliable.
- Surface Mount Package.
- ESD Protected.

**TSON 3.3 x 3.3**

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

Symbol	Parameter		Limit	Units
V _{DS}	Drain-Source Voltage		-20	V
V _{GS}	Gate-Source Voltage		±20	V
I _D	Drain Current-Continuous ^c	T _A =25°C	-20	A
		T _A =70°C	-16	A
I _{DM}	-Pulsed ^{a c}		-115	A
P _D	Maximum Power Dissipation	T _A =25°C	1.67	W
		T _A =70°C	1.07	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range		-55 to 150	°C

THERMAL CHARACTERISTICS

R _{θJA}	Thermal Resistance, Junction-to-Ambient	75	°C/W
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SP8013

Ver 1.0

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-16V, V _{GS} =0V			-1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20V, V _{DS} =0V			±10	uA
ON CHARACTERISTICS						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250uA	-0.8	-1.3	-1.8	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-10A		6.3	7.9	m ohm
		V _{GS} =-4.5V, I _D =-8.4A		8.3	11.2	m ohm
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-10A		27		S
SWITCHING CHARACTERISTICS ^b						
t _{D(ON)}	Turn-On Delay Time	V _{DD} =-10V I _D =-1A V _{GS} =-10V R _{GEN} = 6 ohm		190		ns
t _r	Rise Time			335		ns
t _{D(OFF)}	Turn-Off Delay Time			4000		ns
t _f	Fall Time			1580		ns
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-10A, V _{GS} =-10V		82		nC
		V _{DS} =-10V, I _D =-10A, V _{GS} =-4.5V		38		nC
Q _{gs}	Gate-Source Charge	V _{DS} =-10V, I _D =-10A,		6		nC
Q _{gd}	Gate-Drain Charge	V _{GS} =-10V		18		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A		-0.83	-1.2	V

Notes

- a. Pulse Test: Pulse Width < 10us, Duty Cycle ≤ 1%.
- b. Guaranteed by design, not subject to production testing.
- c. Drain current limited by maximum junction temperature.
- d. Mounted on FR4 Board of 1 inch², 2oz.

Jun, 13, 2014

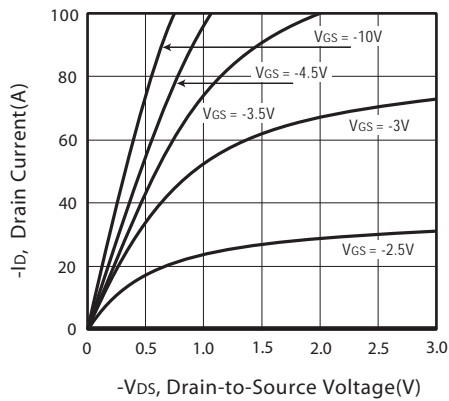


Figure 1. Output Characteristics

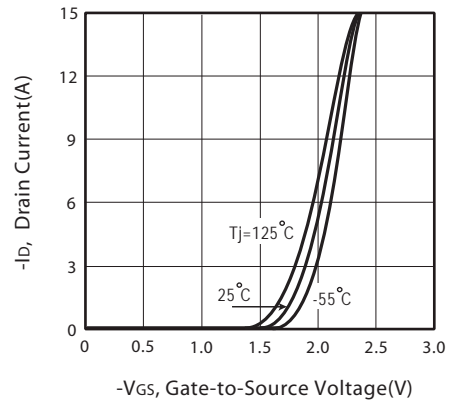


Figure 2. Transfer Characteristics

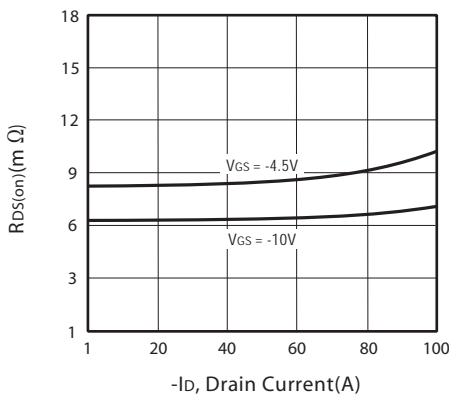


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

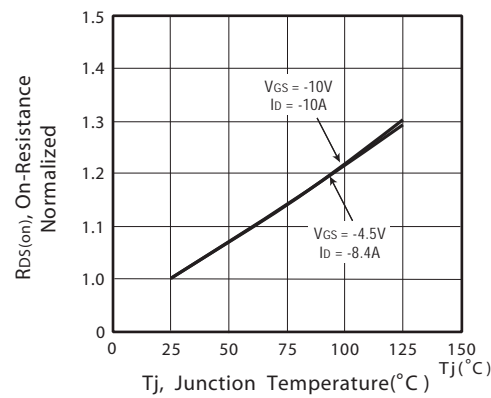


Figure 4. On-Resistance Variation with Drain Current and Temperature

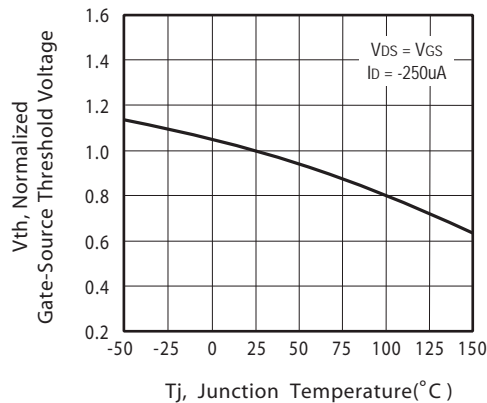


Figure 5. Gate Threshold Variation with Temperature

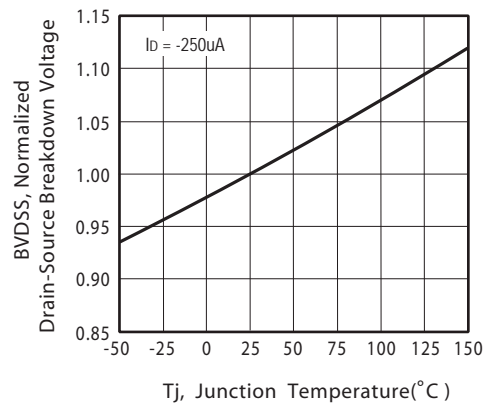


Figure 6. Breakdown Voltage Variation with Temperature

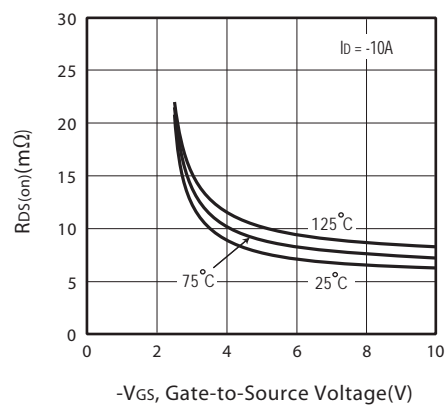


Figure 7. On-Resistance vs. Gate-Source Voltage

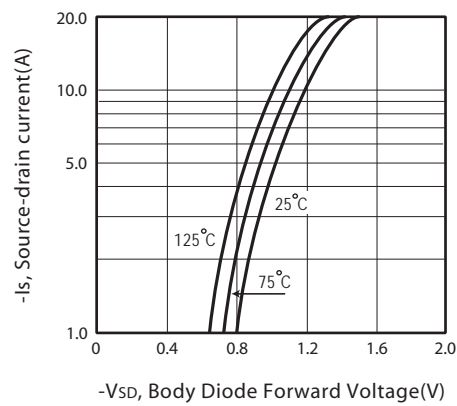


Figure 8. Body Diode Forward Voltage Variation with Source Current

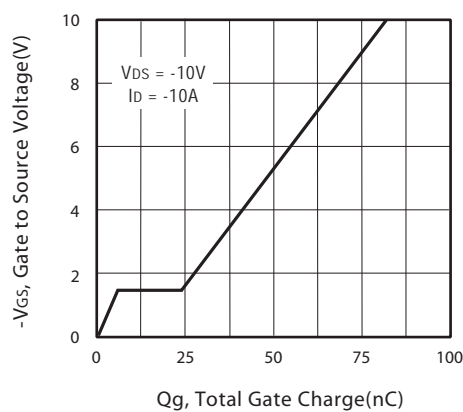


Figure 9. Gate Charge

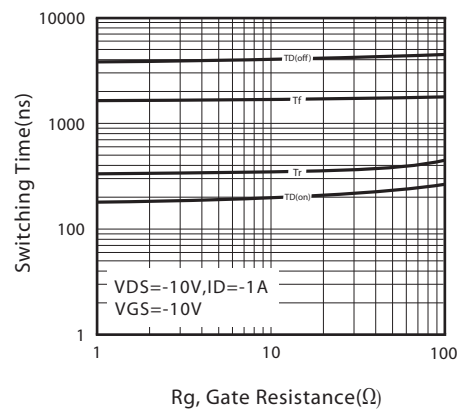


Figure 10. switching characteristics

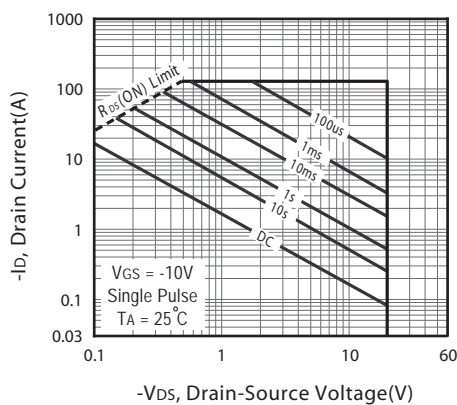
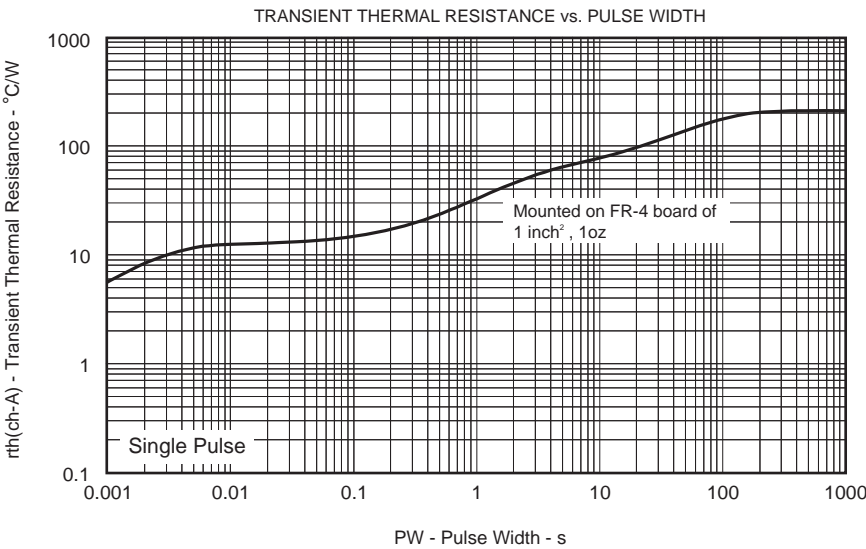
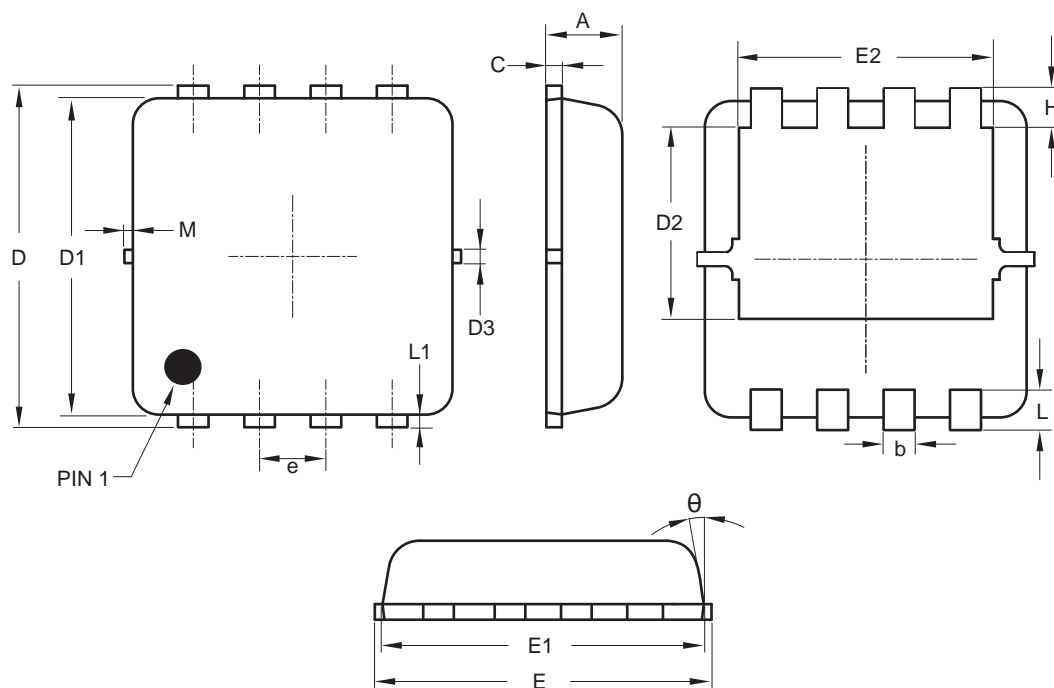


Figure 11. Maximum Safe Operating Area



PACKAGE OUTLINE DIMENSIONS

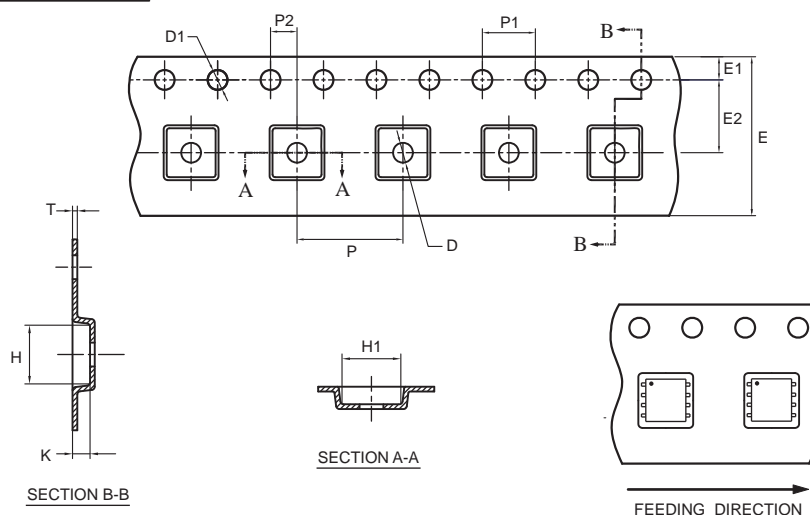
TSOP 3.3 x 3.3



SYMBOLS	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
C	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	—	0.13	—
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	—	0.13	—
M	—	—	0.15
θ	—	10°	12°

TSON 3.3 x 3.3 Tape

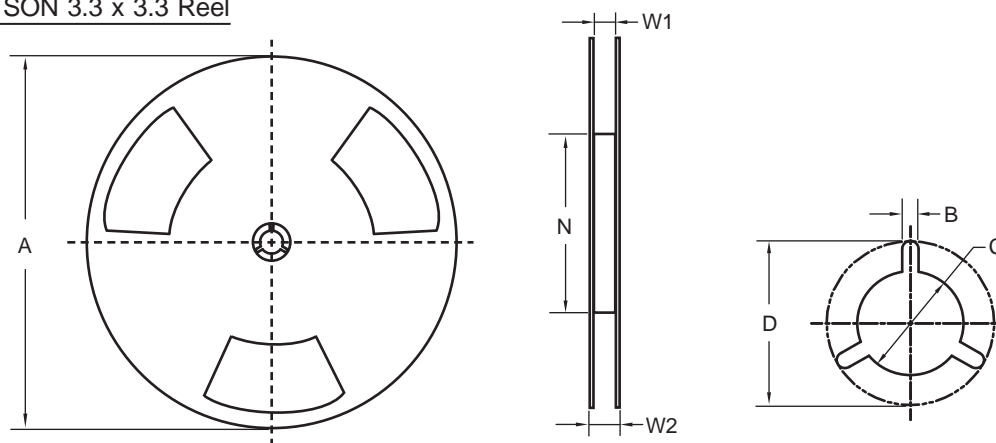
TSON 3.3 x 3.3 Tape and Reel Data



unit:mm

PACKAGE	D	D1	E	E1	E2	H	H1	K	P	P1	P2	T
S mini 8	$\phi 1.50$ (MIN)	$\phi 1.50$ +0.10 -0.00	12.0 +0.30 -0.10	1.75 ± 0.10	5.50 ± 0.05	3.70 ± 0.10	3.70 ± 0.10	1.10 ± 0.10	8.0 ± 0.10	4.0 ± 0.10	2.0 ± 0.05	0.3 ± 0.05

TSON 3.3 x 3.3 Reel



UNIT:mm

TAPE SIZE	REEL SIZE	A	B	C	D	N	W1	W2
12 mm	13 "	330 \pm 1.0	1.5 $\begin{smallmatrix} +0.5 \\ -0.2 \end{smallmatrix}$	$\phi 13.0$ $\begin{smallmatrix} +0.5 \\ -0.2 \end{smallmatrix}$	20.2(ref.)	178 $\begin{smallmatrix} +0.0 \\ -2.0 \end{smallmatrix}$	12.4 $\begin{smallmatrix} +2.0 \\ -0.0 \end{smallmatrix}$	18.4(ref.)

TOP MARKING DEFINITION

