

SE4625

**Complementary Enhancement-Mode MOSFET**

Revision: A

**General Description**

Advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and low operation voltage. This device is suitable for using as a load switch or in PWM applications.

- Low  $R_{DS(on)}$
- Small Package Outline
- ESD protected

**Features**

For N-Channel MOSFET

- $V_{DS} = 12V$
- $R_{DS(ON)} = 28m\Omega @ V_{GS}=4.5V$

For P-Channel MOSFET

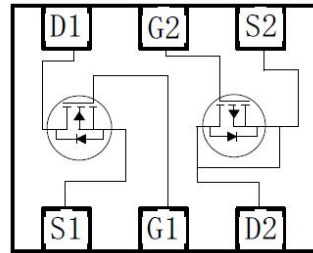
- $V_{DS} = -12V$
- $R_{DS(ON)} = 57m\Omega @ V_{GS}=-4.5V$

**Pin configurations**

See Diagram below



DFN2\*2-6



**Absolute Maximum Ratings**

Parameter		Symbol	N-Channel	P-Channel	Units
Drain-Source Voltage		$V_{DS}$	12	-12	V
Gate-Source Voltage		$V_{GS}$	$\pm 8$	$\pm 8$	V
Drain Current	Continuous	$I_D$	5.1	-4.0	A
	Pulsed		17.6	-13.6	
Total Power Dissipation	@ $T_A=25^\circ C$	$P_D$	1.8		W
Operating Junction Temperature Range		$T_J$	-55 to 150		$^\circ C$

**Thermal Resistance**

Parameter	Symbol	Value	Units
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	85	$^\circ C/W$

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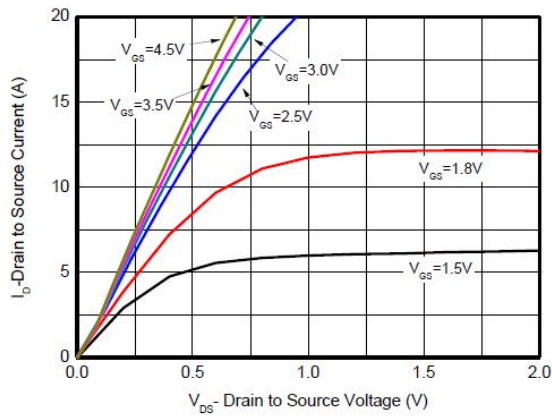
N-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS (Note 2)</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0 V	12			V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±1	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA		0.7	1.2	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.0A		28	46	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4.6A		35	66	
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =6V, f=1MHz		469		pF
C <sub>oss</sub>	Output Capacitance			125		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			95		pF
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =10V, I <sub>D</sub> =6.5A		5.38		nC
Q <sub>gs</sub>	Gate Source Charge			1.3		nC
Q <sub>gd</sub>	Gate Drain Charge			0.76		nC
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =6V, R <sub>GEN</sub> =1Ω I <sub>D</sub> =5.2A		20		ns
t <sub>d(off)</sub>	Turn-Off Delay Time			48		ns
t <sub>d(r)</sub>	Turn-On Rise Time			22		ns
t <sub>d(f)</sub>	Turn-Off Fall Time			15		ns

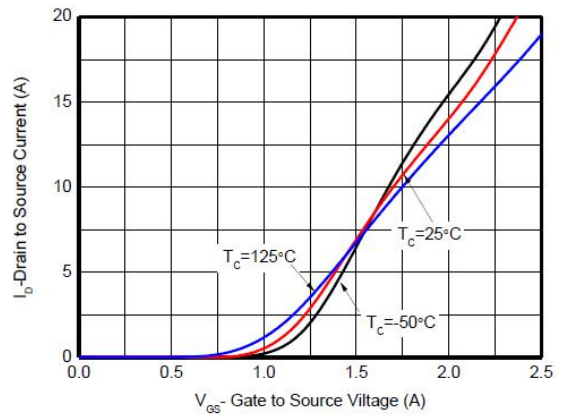
P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS (Note 2)</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0 V	-12			V
I <sub>DSS</sub>	Drain to Source Leakage Current	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V			-1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V			±1	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250μA		-0.8	-1.2	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.6A		57	75	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-3.2A		87	110	
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-6V, f=1MHz		673		pF
C <sub>oss</sub>	Output Capacitance			175		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			162		pF
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge <sup>2</sup>	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-10V, I <sub>D</sub> =-4.3A		6.56		nC
Q <sub>gs</sub>	Gate Source Charge			1.2		nC
Q <sub>gd</sub>	Gate Drain Charge			2.1		nC
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =-4.5V, V <sub>DS</sub> =-6V, R <sub>GEN</sub> =1Ω I <sub>D</sub> =-3.8A		30		ns
t <sub>d(off)</sub>	Turn-Off Delay Time			62		ns
t <sub>d(r)</sub>	Turn-On Rise Time			32		ns
t <sub>d(f)</sub>	Turn-Off Fall Time			18		ns

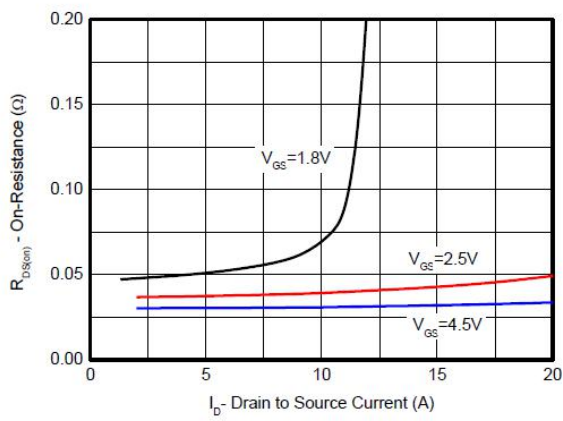
Typical Characteristics(N-Channel)



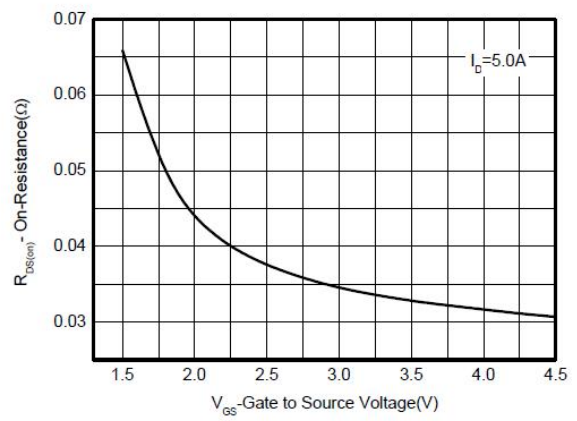
Output Characteristics



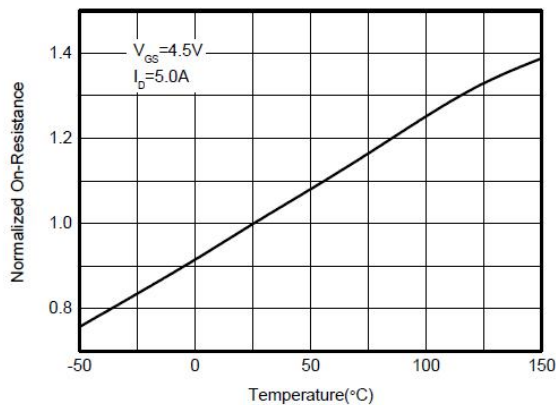
Transfer Characteristics



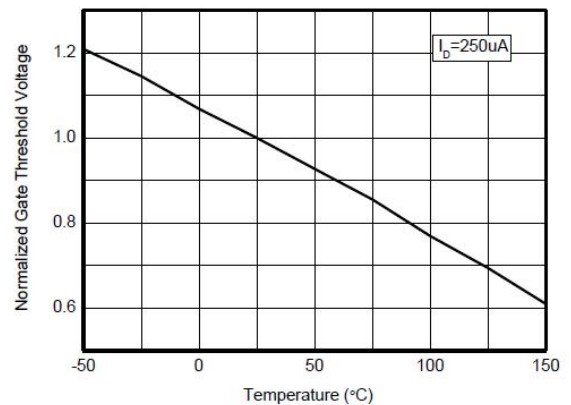
On-Resistance vs. Drain Current



On-Resistance vs. Gate-to-Source Voltage

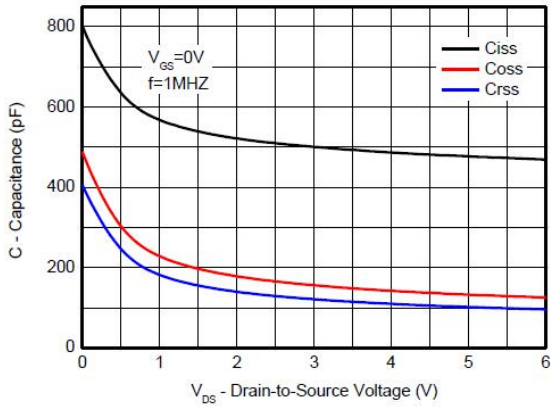


On-Resistance vs. Junction Temperature

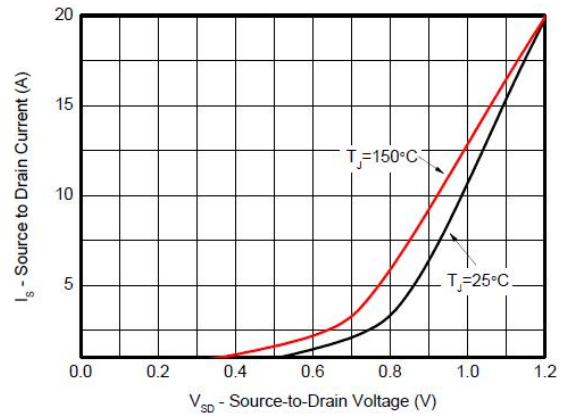


Threshold Voltage vs. Temperature

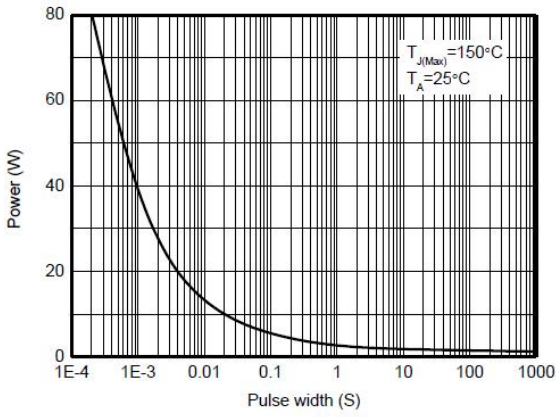
Typical Characteristics(N-Channel)



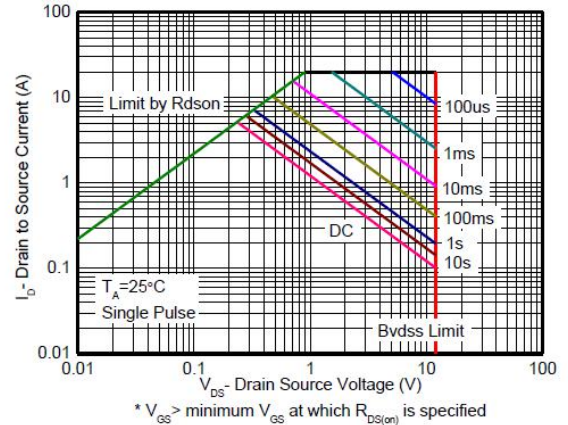
Capacitance



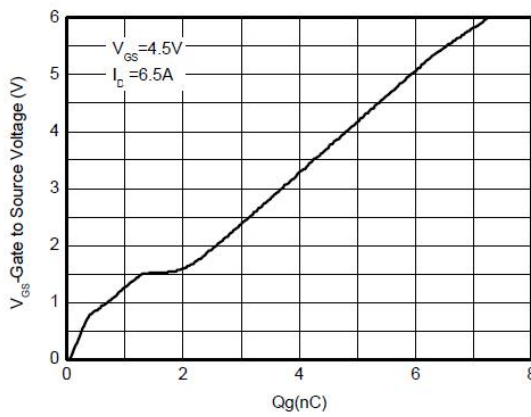
Body Diode Forward Voltage



Single pulse power

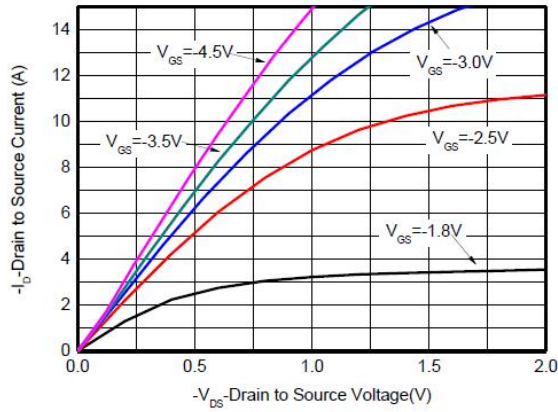


Safe operating power

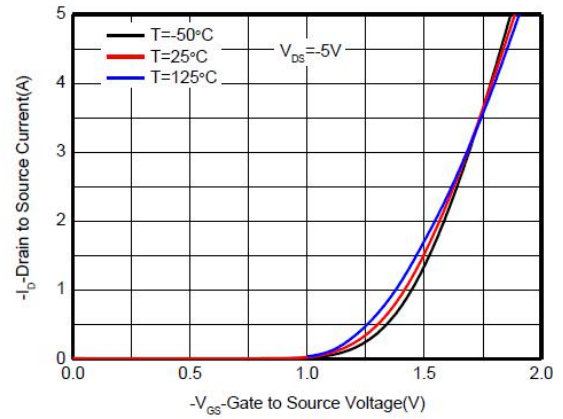


Gate charge Characteristics

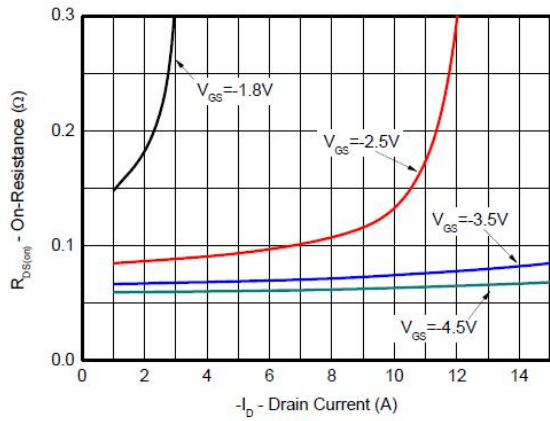
Typical Characteristics(P-Channel)



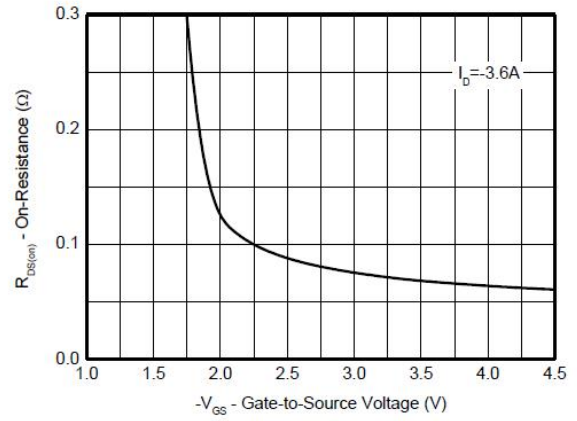
Output characteristics



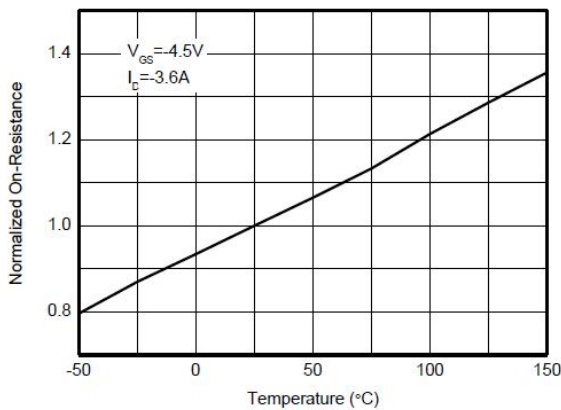
Transfer characteristics



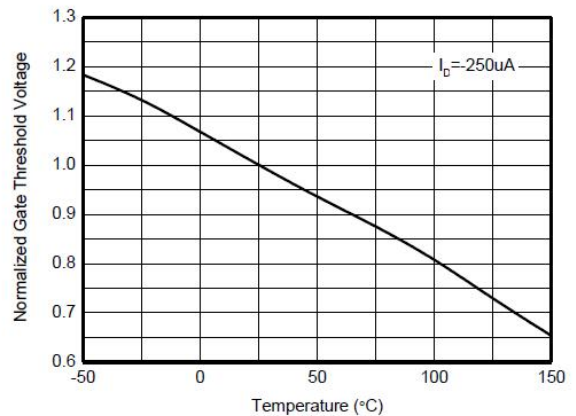
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage

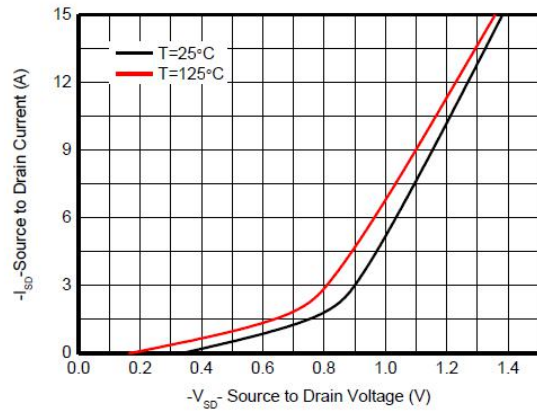
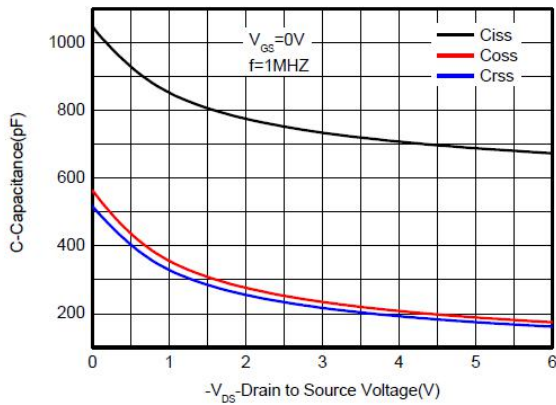


On-Resistance vs. Junction temperature



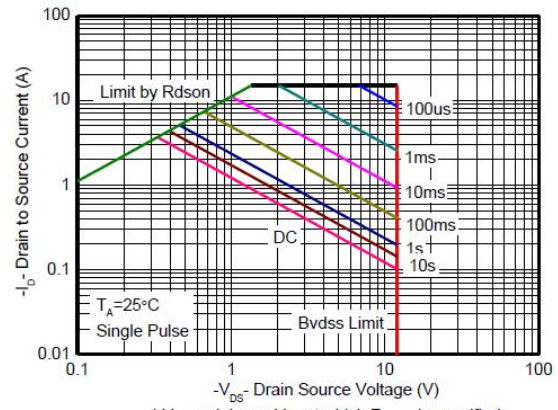
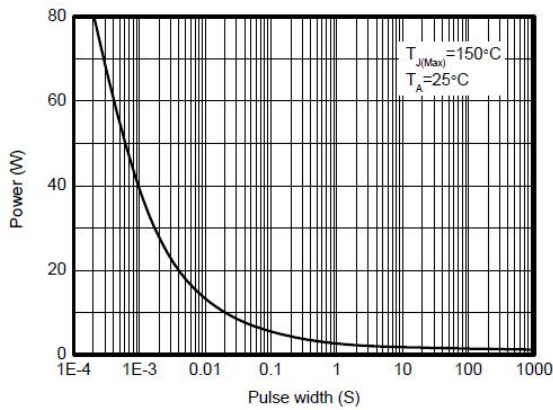
Threshold voltage vs. Temperature

Typical Characteristics(P-Channel)



Body diode forward voltage

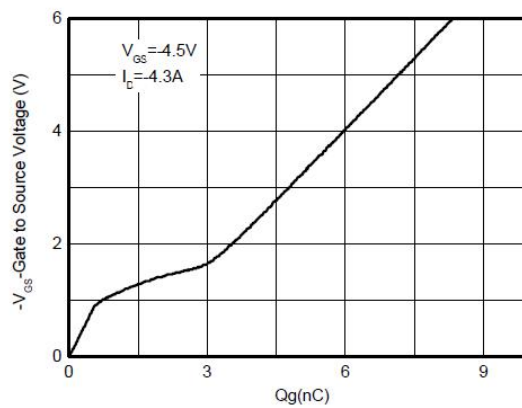
Capacitor



\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

Single pulse power (Junction-to-ambient)

Safe operating power

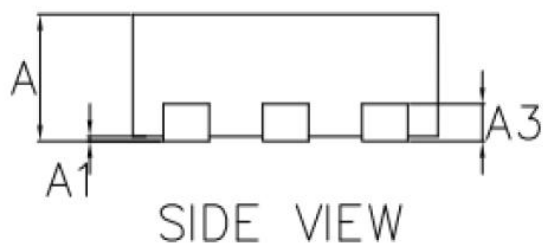
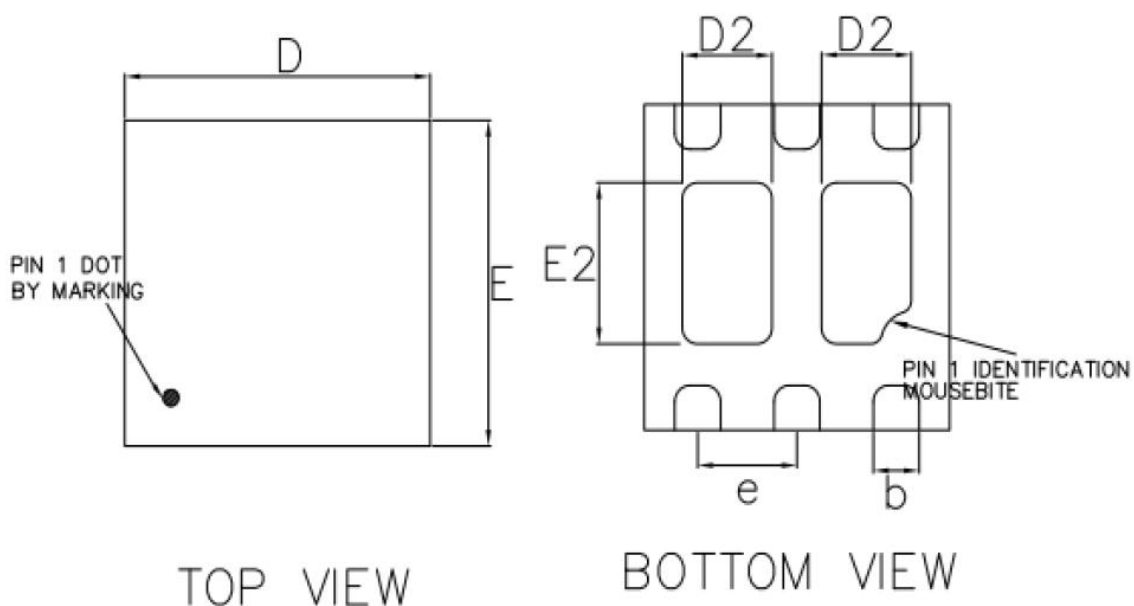


Gate charge Characteristics

# SE4625

## Package Outline Dimension

### DFN2x2-6



COMMON DIMENSIONS(MM)			
PKG.	W: VERY VERY THIN		
REF.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0.00	-	0.05
A3	0.20 REF.		
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D2	0.44	0.59	0.69
E2	0.84	0.99	1.09
b	0.25	0.30	0.35
L	0.175	0.275	0.375
e	0.65 BSC		