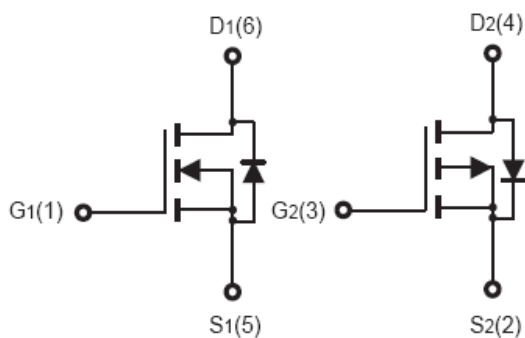
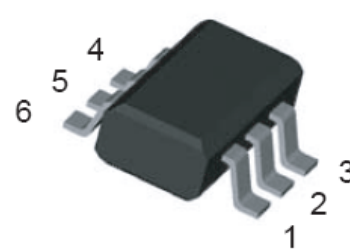


Dual Enhancement Mode Field Effect Transistor (N and P Channel)

<p>Features</p> <ul style="list-style-type: none"> ● $V_{DS} = 20V, I_D = 2.5A$ $R_{DS(ON)} < 70m\Omega @ V_{GS} = 4.5V$ $R_{DS(ON)} < 130m\Omega @ V_{GS} = 2.5V$ ● $V_{DS} = -20V, I_D = -2.5A$ $R_{DS(ON)} < 160m\Omega @ V_{GS} = -4.5V$ $R_{DS(ON)} < 240m\Omega @ V_{GS} = -2.5V$ ● Super high dense cell design for extremely low $R_{DS(ON)}$ ● High Power and current handing capability ● Lead free product is acquired ● Surface Mount Package <p>Application</p> <ul style="list-style-type: none"> ● Battery protection ● Load switch ● Power management 	 <p style="text-align: center;">Schematic Diagram</p>  <p style="text-align: center;">TSOP-6</p>
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Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
2609	CS2609	TSOP-6	--	--	--

Absolute Maximum Ratings ($T_A=25^{\circ}C$)

Symbol	Parameter	N-ch	P-ch	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	20	-20	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 12	± 12	V
I_D	Drain Current-Continuous	2.5	-2.5	A
$I_{DM (pluse)}$	Drain Current-Continuous@ Current-Pulsed ^(Note 1)	10	10	A
P_D	Maximum Power Dissipation	0.9		W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150		$^{\circ}C$

Thermal Characteristic

Symbol	Parameter	N-ch	P-ch	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	138		$^{\circ}C/W$

N-Channel Electrical Characteristics TA = 25 C unless otherwise noted

Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	22		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	0.9	1.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =2.5A	4			S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =2.5A		45	70	mΩ
		V _{GS} =2.5V, I _D =2A		68	130	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1.0MHz		280		pF
C _{oss}	Output Capacitance			60		pF
C _{rss}	Reverse Transfer Capacitance			40		pF
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DD} =10V, I _D =1A, R _L =2.8Ω V _{GS} =4.5V, R _G =6Ω		6		nS
t _r	Turn-on Rise Time			5		nS
t _{d(off)}	Turn-Off Delay Time			9		nS
t _f	Turn-Off Fall Time			1.5		nS
Q _g	Total Gate Charge	V _{DS} =10V, I _D =2.5A, V _{GS} =4.5V		1.7		nC
Q _{gs}	Gate-Source Charge			0.3		nC
Q _{gd}	Gate-Drain Charge			0.8		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)				2.5	A
V _{SD}	Forward on Voltage (Note 1)	V _{GS} =0V, I _S =2.5A			1.2	V

P-Channel Electrical Characteristics TA = 25 C unless otherwise noted

Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-20	-24		V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-20V, V _{GS} =0V			-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-0.5	-0.7	-1.5	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-2.5A	4			S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-2.5A		120	160	mΩ
		V _{GS} =-2.5V, I _D =-2A		175	240	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1.0MHz		290		pF
C _{oss}	Output Capacitance			55		pF
C _{rss}	Reverse Transfer Capacitance			29		pF
Switching Times						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-10V, I _D =-1A, R _L =2.8Ω V _{GS} =-4.5V, R _G =6Ω		8		nS
t _r	Turn-on Rise Time			13		nS
t _{d(off)}	Turn-Off Delay Time			13		nS
t _f	Turn-Off Fall Time			18		nS
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-2.5A, V _{GS} =-4.5V		3		nC
Q _{gs}	Gate-Source Charge			0.7		nC
Q _{gd}	Gate-Drain Charge			0.8		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current(Body Diode)				-2.5	A
V _{SD}	Forward on Voltage ^(Note 1)	V _{GS} =0V, I _S =-2.5A			-1.2	V

Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

TYPICAL CHARACTERISTICS (Curves) N-ch

Figure1. Output Characteristics

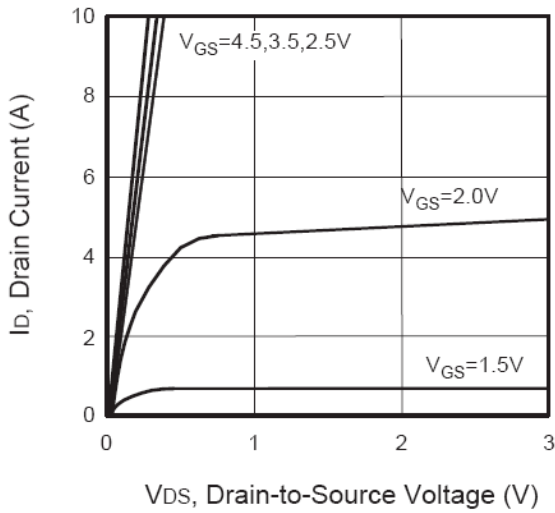


Figure2. Transfer Characteristics

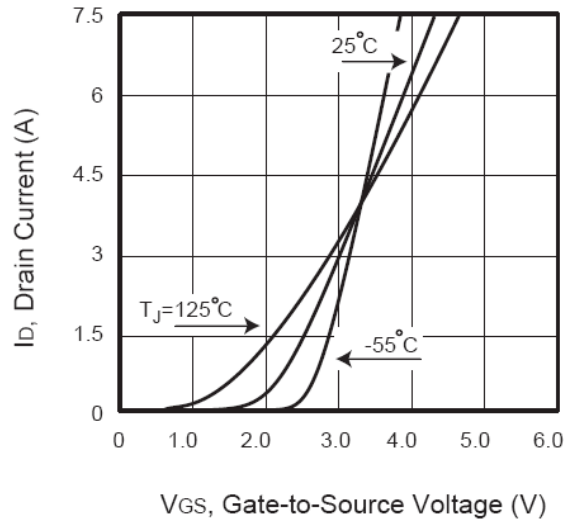


Figure3. Capacitance

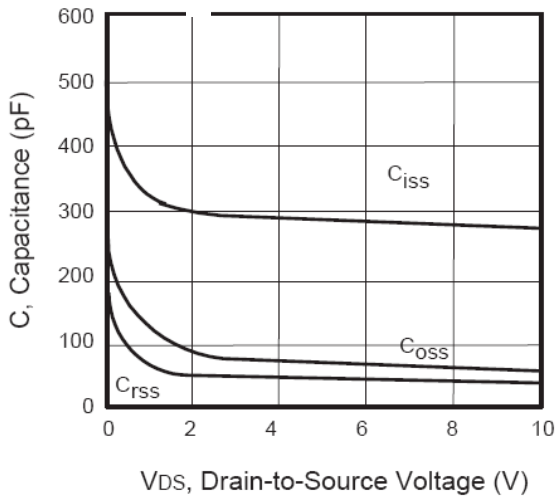


Figure4. $R_{DS(ON)}$ vs Junction Temperature

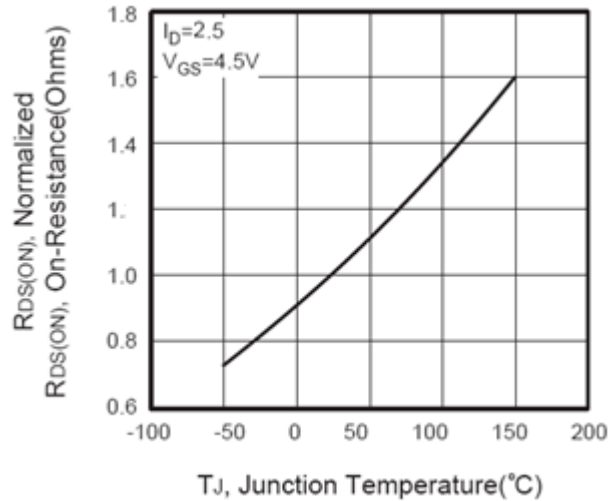


Figure5. Max BV_{DSS} vs Junction Temperature

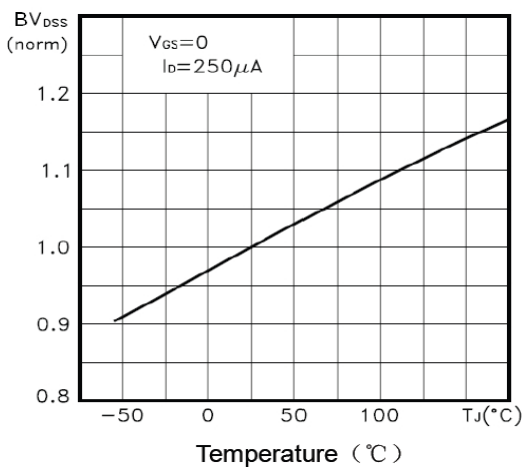
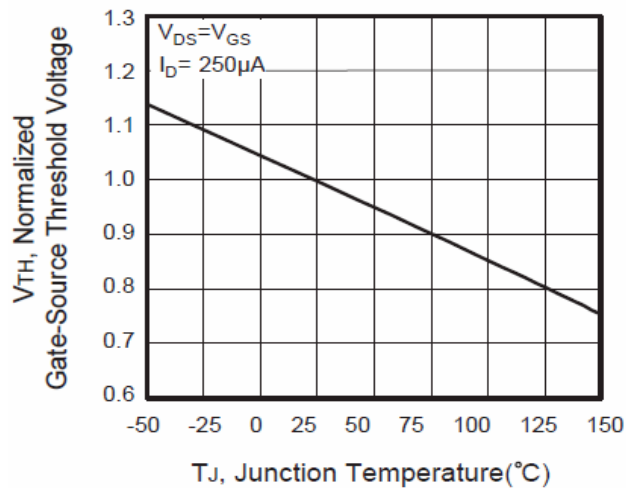


Figure6. $V_{GS(th)}$ vs Junction Temperature



TYPICAL CHARACTERISTICS (Curves) P-ch

Figure1. Output Characteristics

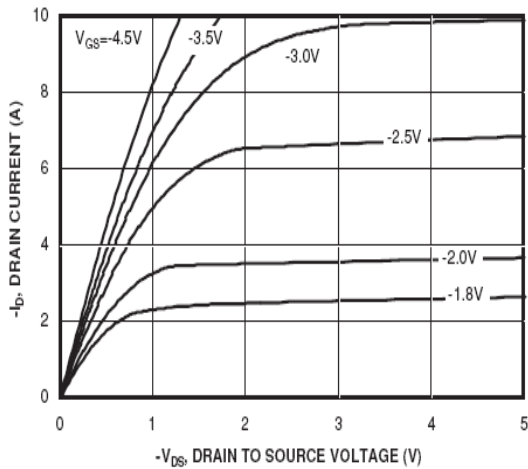


Figure2. Transfer Characteristics

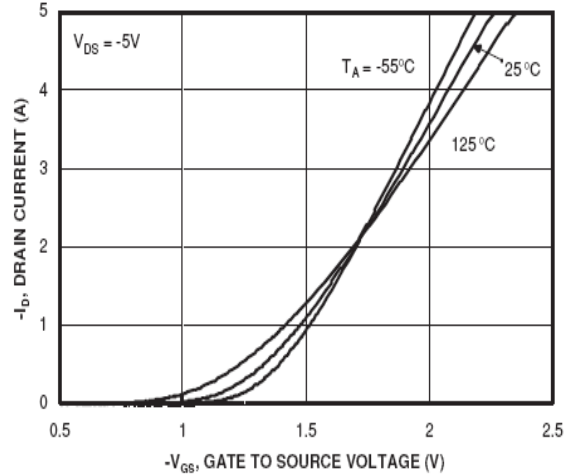


Figure3. Capacitance

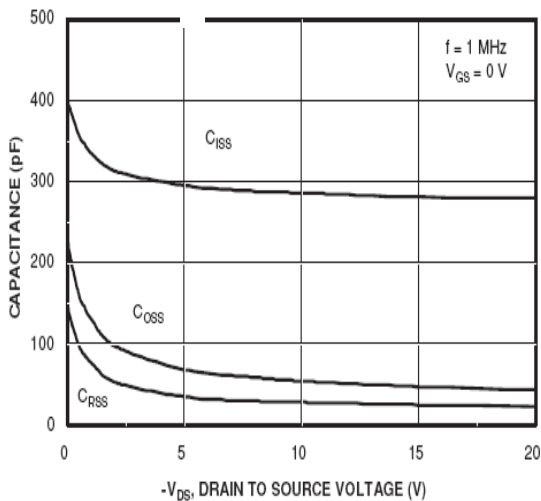


Figure4. $R_{DS(ON)}$ vs Junction Temperature

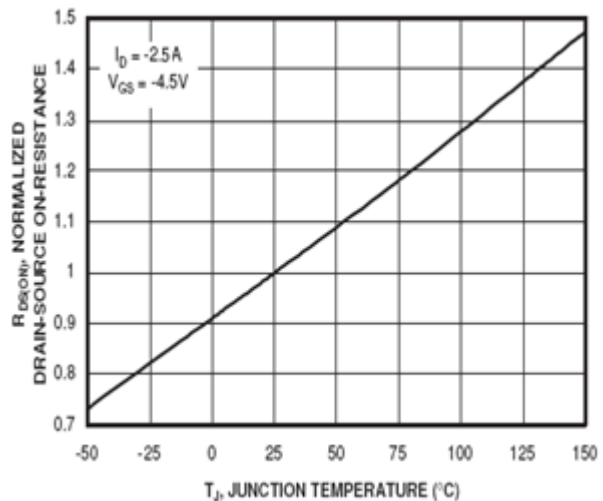


Figure5. Max BV_{DSS} vs Junction Temperature

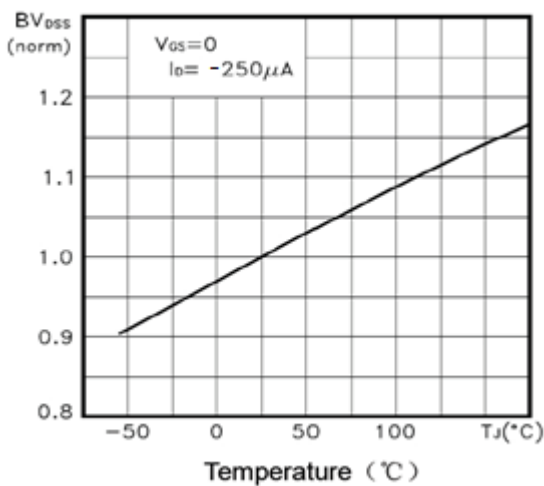
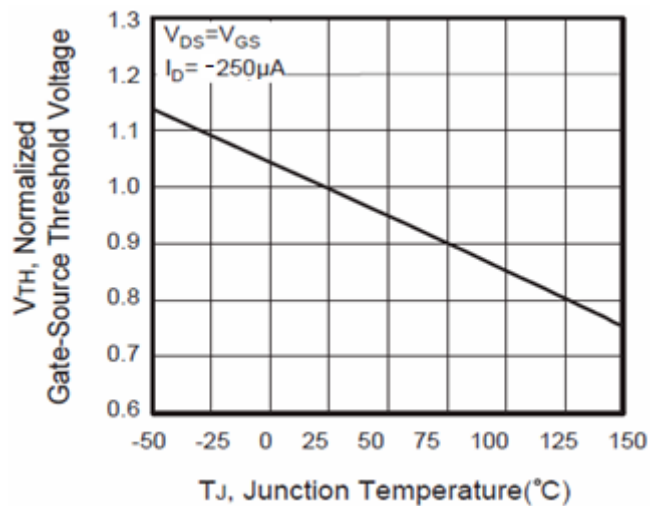
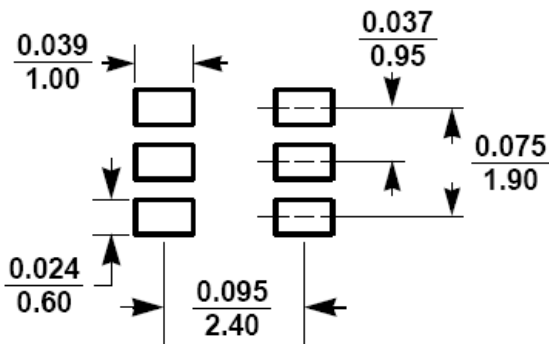
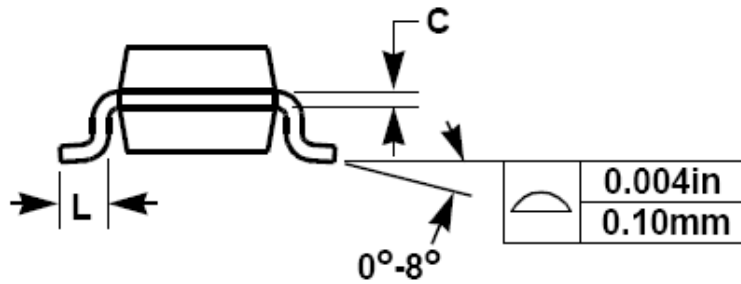
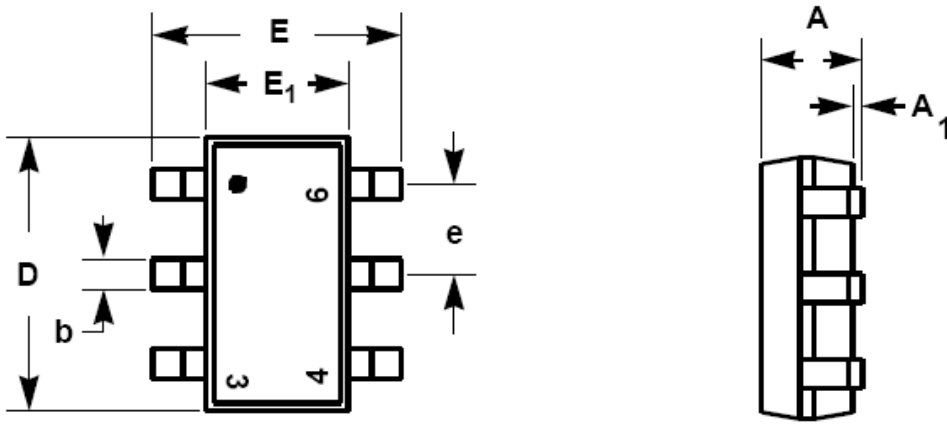


Figure6. $V_{GS(th)}$ vs Junction Temperature



TSOP-6 Package Information



SYMBOL	Millimeters	
	MIN	MAX
A	0.90	1.10
A1	0.10	
b	0.30	0.50
c	0.08	0.20
D	2.70	3.10
E	2.60	3.00
E1	1.40	1.80
e	0.95 BSC	
L	0.35	0.55