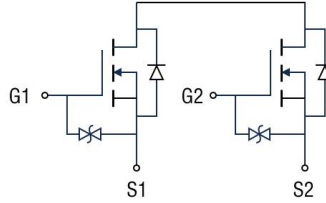
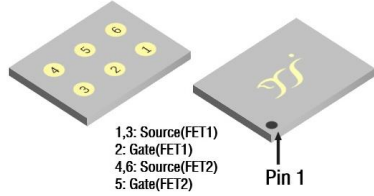


Dual N-Channel Enhancement Mode Field Effect Transistor



Product Summary

• V_{SS}	12V
• I_S	7.7A
• $R_{SS(ON)}$ (at $V_{GS}=4.5V$)	<5.3m Ω
• $R_{SS(ON)}$ (at $V_{GS}=3.8V$)	<6.5m Ω
• $R_{SS(ON)}$ (at $V_{GS}=3.1V$)	<7.7m Ω
• $R_{SS(ON)}$ (at $V_{GS}=2.5V$)	<10m Ω
• ESD Level(HBM)	H2

General Description

- CSP(Chip Size Package)
- Super High Dense Cell for Low $R_{SS(ON)}$
- ROHS Compliant and Halogen-Free

Applications

- Battery protection
- Load switch

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Source-Source Voltage			V _{SS}	-	12	V
Gate-Source Voltage			V _{GS}	-10	10	
Continuous Source Current (Note 1,2)	Steady-State	T _A =25°C,V _{GS} =4.5V	I _{S1}	-	7.7	A
Continuous Source Current (Note 1,3)			I _{S2}	-	16.8	
Pulsed Source Current	T _A =25°C,t _p ≤10μs		I _{SM}	-	67	
Total Power Dissipation (Note 1,2)	Steady-State	T _A =25°C	P _{D1}	-	0.45	W
Total Power Dissipation (Note 1,3)		T _A =100°C	P _{D2}	-	2.1	
Junction and Storage Temperature Range			T _J ,T _{STG}	-55	150	°C

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA1}$	-	278	$^{\circ}C/W$
Thermal Resistance Junction-to-Ambient (Note 3)	Steady-State	$R_{\theta JA2}$	-	59	$^{\circ}C/W$



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■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Source-Source Breakdown Voltage	BV_{SSS}	$V_{GS}=0V, I_S=250\mu A, T_j=25^\circ C$	12	-	-	V
Zero Gate Voltage Source Current	I_{SSS}	$V_{SS}=12V, V_{GS}=0V, T_j=25^\circ C$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 8V, V_{SS}=0V, T_j=25^\circ C$	-	-	± 10	μA
		$V_{GS}=\pm 5V, V_{SS}=0V, T_j=25^\circ C$			± 1	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{SS}=V_{GS}, I_S=250\mu A, T_j=25^\circ C$	0.4	0.9	1.3	V
Static Source-Source On-Resistance	$R_{SS(ON)}$	$V_{GS}=4.5V, I_S=4A, T_j=25^\circ C$	3.0	4.2	5.3	m Ω
		$V_{GS}=3.8V, I_S=4A, T_j=25^\circ C$	3.2	4.5	6.5	
		$V_{GS}=3.1V, I_S=4A, T_j=25^\circ C$	3.5	5.2	7.7	
		$V_{GS}=2.5V, I_S=4A, T_j=25^\circ C$	3.8	6.2	10	
Forward Transconductance	g_{FS}	$V_{SS}=5V, I_S=4A, T_j=25^\circ C$	-	7		S
Diode Forward Voltage	V_{FSS}	$I_S=4A, V_{GS}=0V, T_j=25^\circ C$	-	-	1.2	V
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{SS}=10V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	2712	-	pF
Output Capacitance	C_{oss}		-	401	-	
Reverse Transfer Capacitance	C_{rss}		-	339	-	
Total Gate Charge	Q_g	$V_{GS}=4.5V, V_{DD}=10V, I_S=4A, T_j=25^\circ C$	-	34	-	nC
Turn-On Delay Time	$t_{D(on)}$	$V_{GS}=4.5V, V_{DD}=10V, I_S=4A, R_{GEN}=50\Omega, T_j=25^\circ C$	-	4.2	-	μs
Turn-On Rise Time	t_r		-	6	-	
Turn-Off Delay Time	$t_{D(off)}$		-	13.3	-	
Turn-Off Fall Time	t_f		-	8.7	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA1}$ is measured with the device mounted on the 25.4mm*25.4mm*1.0mm single layer FR-4 PCB board with 1 inch² pad of 36 μ m Copper, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of 150 $^\circ C$. The value in any given application depends on the user's specific board design.
3. The value of $R_{\theta JA2}$ is measured with the device mounted on the 70mm*70mm*1.0mm ceramic substrate, in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of 150 $^\circ C$. The value in any given application depends on the user's specific board design.

■ Typical Electrical and Thermal Characteristics Diagrams

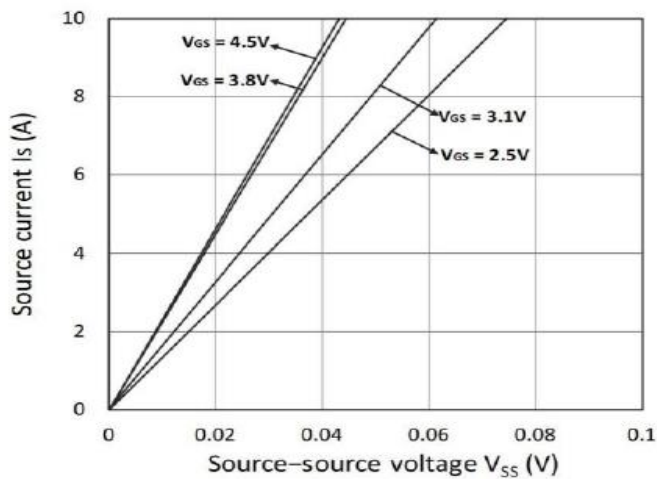


Figure 1. Output Characteristics; typical values

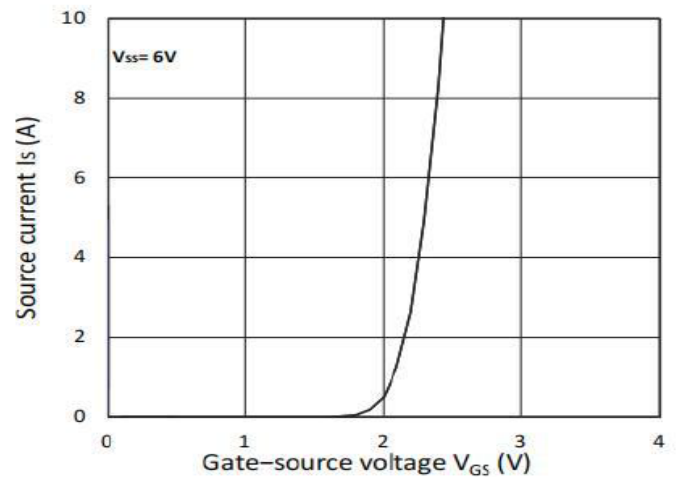


Figure 2. Transfer Characteristics; typical values

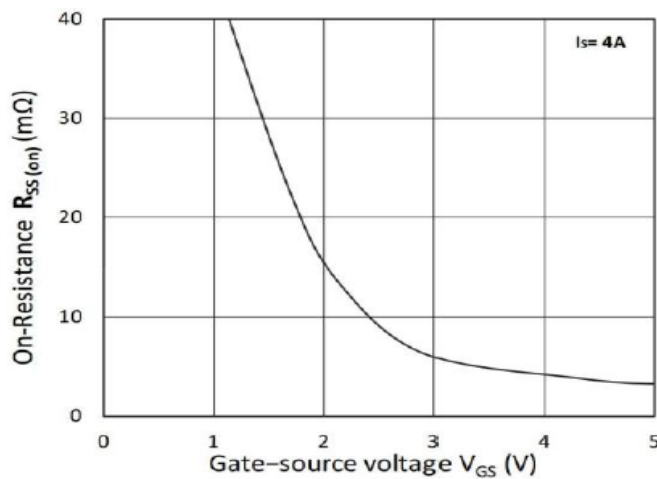


Figure 3. On-Resistance vs. Gate to Source Voltage; typical values

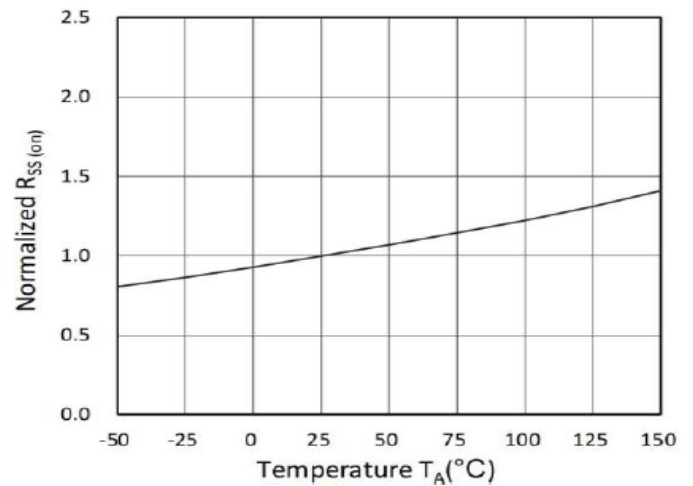


Figure 4. Normalized On-Resistance

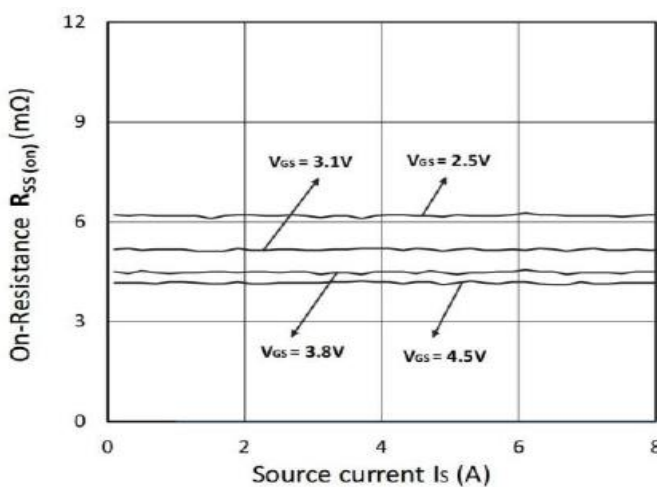


Figure 5. $R_{SS(on)}$ vs. Source Current; typical values

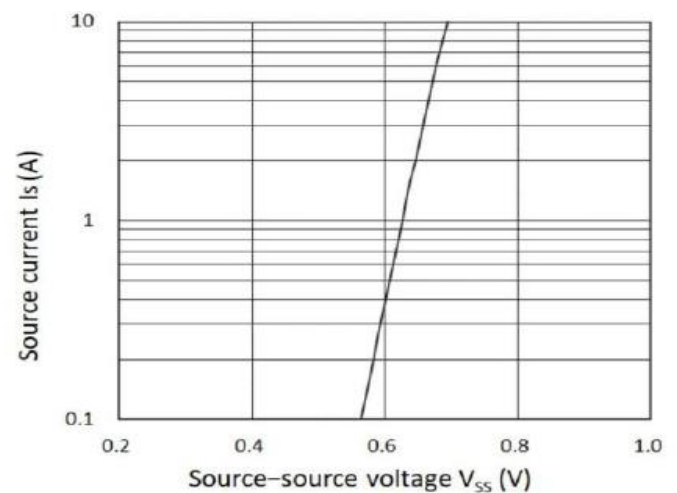


Figure 6. Forward characteristics of reverse diode; typical values

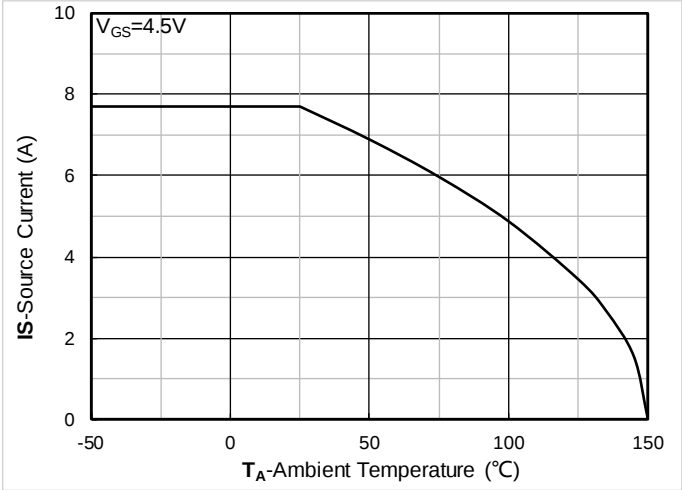


Figure 9. Current dissipation

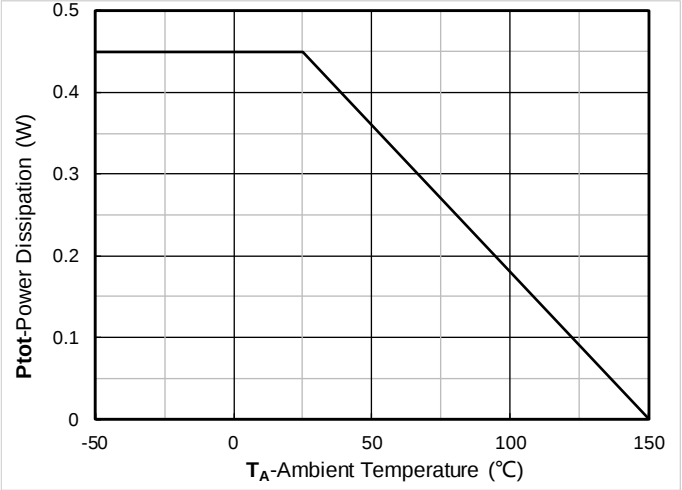
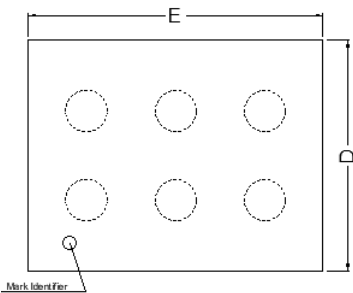


Figure 10. Power dissipation

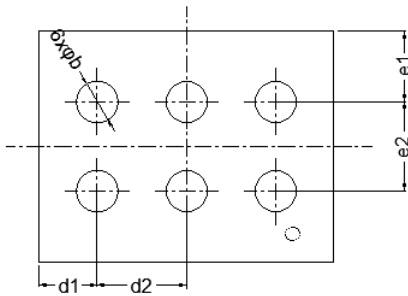


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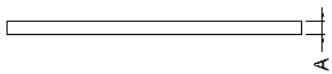
■ WLCSP-6L Package information



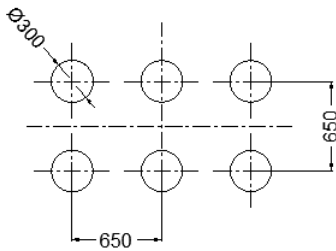
TOP VIEW



BOTTOM VIEW



SIDE VIEW



SUGGESTED SOLDER LAYOUT

UNIT: mm

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.0020	0.0059	0.050	0.150
b	0.0118TYP		0.300TYP	
D	0.0638	0.0677	1.620	1.720
d1	0.0165TYP		0.420TYP	
d2	0.0256TYP		0.650TYP	
E	0.0823	0.0862	2.090	2.190
e1	0.0201TYP		0.510TYP	
e2	0.0256TYP		0.650TYP	



■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. YYWWLT is Date Code&Lot ID, "YY" is year, "WW" is week, "LT" is Lot ID
4. Body color: Black



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