

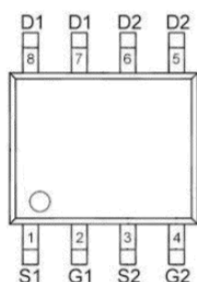
Application

- Reverse Battery protection
- Load switch
- Power management
- Motor Control
- Portable Power Adaptors

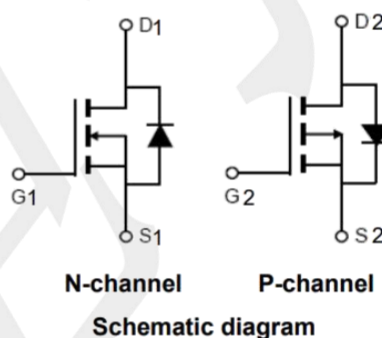
Product Summary

Device	BV _{DSS}	R _{DS(ON)} MAX	I _D MAX TA=25°C
Q1 N-Channel	40V	26mΩ@ VGS=10V	7.2A
		35mΩ@VGS=4.5V	5.2A
Q2 P-Channel	-40V	38mΩ@VGS=10V	-7.5A
		58mΩ@VGS=4.5V	-5.5A

Package and Pin Configuration



Circuit diagram



Marking:4614B

Absolute Maximum Ratings

(@ TA = +25°C, unless otherwise specified.)

Characteristic			Symbol	Q1 N-CHANNEL	Q2 P-CHANNEL	Unit
Drain-Source Voltage			VDSS	40	-40	V
Gate-Source Voltage			V _{GSS}	±20	±20	V
Continuous Drain Current N-Channel: VGS = 10V P-Channel: VGS = -10V	Steady State	TA=25°C	I _D	7.2	-7.5	A
		TA=70°C		6.2	-6.5	A
Maximum Continuous Body Diode Forward Current (Note 1)			IS	5	-5.5	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			IDM	30	-32	A

Notes: 1. Device mounted on 1" × 1" FR-4 PCB with high coverage 2oz. Copper, single sided.

Thermal Characteristic

PARAMETER	Symbol	Value	Unit
Total Power Dissipation (Note 1)	PD	2	W
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Case (Note 1)	$R_{\theta JC}$	15	$^{\circ}\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics Q1 N-CHANNEL

(@ $T_A = +25^{\circ}\text{C}$, unless otherwise specified.)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS (Note 2)						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BVDSS	40	--	--	V
Zero Gate Voltage Drain Current $T_J = +25^{\circ}\text{C}$	$V_{DS}=20V, V_{GS}=0V$	I_{DSS}	--	--	1	μA
Gate-Source Leakage	$V_{DS}=0V, V_{GS}=\pm 8V$	I_{GSS}	--	--	± 100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.65	--	2.5	V
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=7.2A$	$R_{DS(on)}$	--	24	26	m Ω
	$V_{GS}=4.5V, I_D=5A$		--	32	35	
Diode Forward Voltage	$V_{GS} = 0V, I_S = 5A$	VSD	--	0.7	1.2	V
DYNAMIC CHARACTERISTICS (Note 3)						
Input Capacitance	$V_{DS} = 10V,$ $V_{GS} = 0V,$ $f = 1.0\text{MHz}$	C_{iss}	--	700	--	pF
Output Capacitance		C_{oss}	--	92	--	
Reverse Transfer Capacitance		C_{rss}	--	80	--	
Total Gate Charge ($V_{GS} = 4.5V$)	$V_{DS} = 10V, I_D = 5A$	Q_g	--	9.4	--	nC
Total Gate Charge ($V_{GS} = 10V$)			--	18	--	
Gate-Source Charge		Q_{gs}	--	0.6	--	
Gate-Drain Charge		Q_{gd}	--	2	--	
Turn-On Delay Time	$V_{DD} = 10V, V_{GS} = 4.5V,$ $I_D=1A, R_G = 1\Omega$	$t_{D(ON)}$	--	5	--	nS
Turn-On Delay Time		t_R	--	14.4	--	
Turn-Off Delay Time		$t_{D(OFF)}$	--	30	--	
Turn-Off Fall Time		t_F	--	9.2	--	
Body Diode Reverse Recovery Time	$I_S = 5A, dI/dt = 100A/\mu s$	t_{RR}	--	7.6	--	nC
Body Diode Reverse Recovery Charge	$I_S = 5A, dI/dt = 100A/\mu s$	Q_{RR}	--	0.9	--	

Notes: 2. Short duration pulse test used to minimize self-heating effect.

3. Guaranteed by design. Not subject to product testing.

Electrical Characteristics Q2 P-CHANNEL

(@ TA = +25°C, unless otherwise specified.)

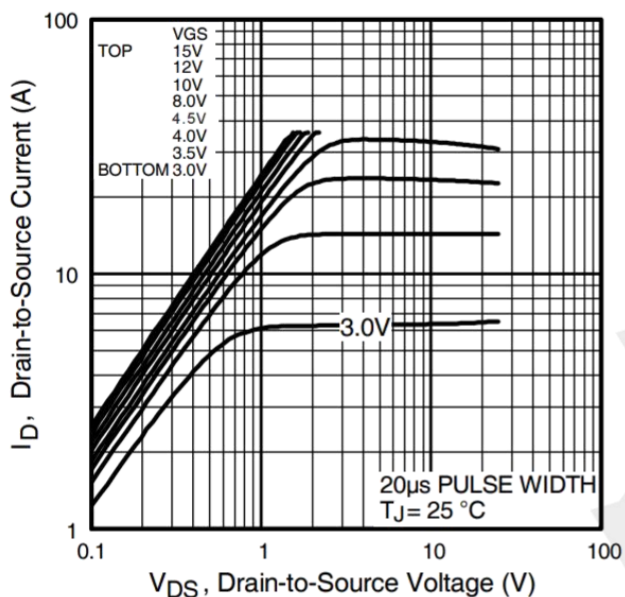
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS (Note 2)						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BVDSS	-40	--	--	V
Zero Gate Voltage Drain Current TJ = +25°C	$V_{DS}=-20V, V_{GS}=0V$	I_{DSS}	--	--	-1	μA
Gate-Source Leakage	$V_{DS}=0V, V_{GS}=\pm 8V$	I_{GSS}	--	--	± 100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	$V_{GS(TH)}$	-0.65	--	-2.5	V
Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-7.5A$	$R_{DS(on)}$	--	36	38	m Ω
	$V_{GS}=-4.5V, I_D=-5A$		--	55	58	
Diode Forward Voltage	$V_{GS}=0V, I_S=-5A$	VSD	--	-0.7	-1.2	V
DYNAMIC CHARACTERISTICS (Note 3)						
Input Capacitance	$V_{DS}=-10V,$ $V_{GS}=0V,$ $f=1.0MHz$	C_{iss}	--	710	--	pF
Output Capacitance		C_{oss}	--	94	--	
Reverse Transfer Capacitance		C_{rss}	--	85	--	
Total Gate Charge ($V_{GS}=-4.5V$)	$V_{DS}=-10V, I_D=-5A$	Q_g	--	9.6	--	nC
Total Gate Charge ($V_{GS}=-10V$)			--	19	--	
Gate-Source Charge		Q_{gs}	--	0.8	--	
Gate-Drain Charge		Q_{gd}	--	2.5	--	
Turn-On Delay Time	$V_{DD}=-10V,$ $V_{GS}=-4.5V,$ $I_D=-1A, R_G=1\Omega$	$t_{D(ON)}$	--	5.6	--	nS
Turn-On Delay Time		t_R	--	14.8	--	
Turn-Off Delay Time		$t_{D(OFF)}$	--	35	--	
Turn-Off Fall Time		t_F	--	9.8	--	
Body Diode Reverse Recovery Time	$I_S=-5A, dI/dt=100A/\mu s$	t_{RR}	--	7.9	--	nC
Body Diode Reverse Recovery Charge	$I_S=-5A, dI/dt=100A/\mu s$	Q_{RR}	--	1.1	--	

Notes: 2. Short duration pulse test used to minimize self-heating effect.

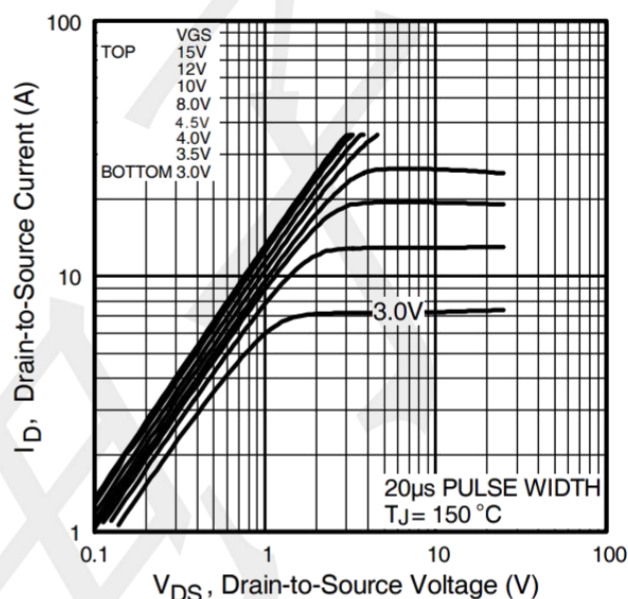
3. Guaranteed by design. Not subject to product testing.

Typical Performance Characteristics(TA=25°C unless otherwise Specified)

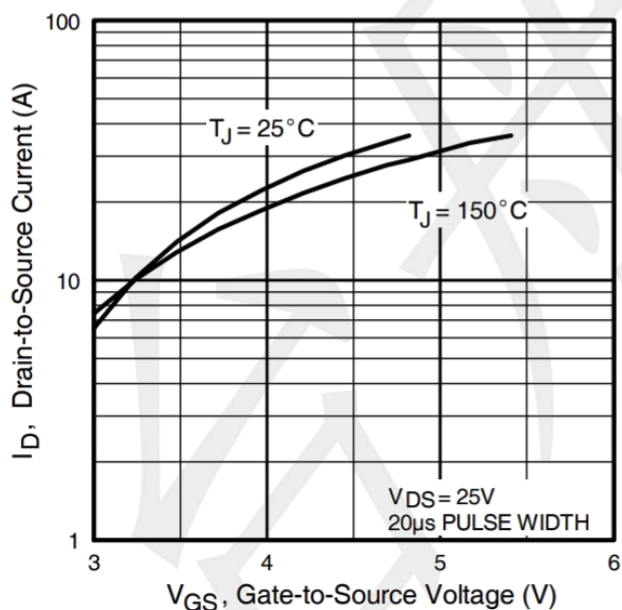
Q1 N-CHANNEL



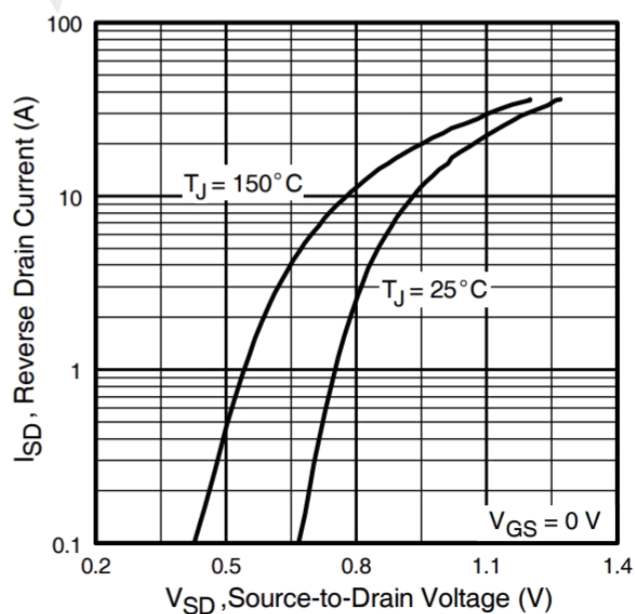
Typical Output Characteristics



Typical Output Characteristics



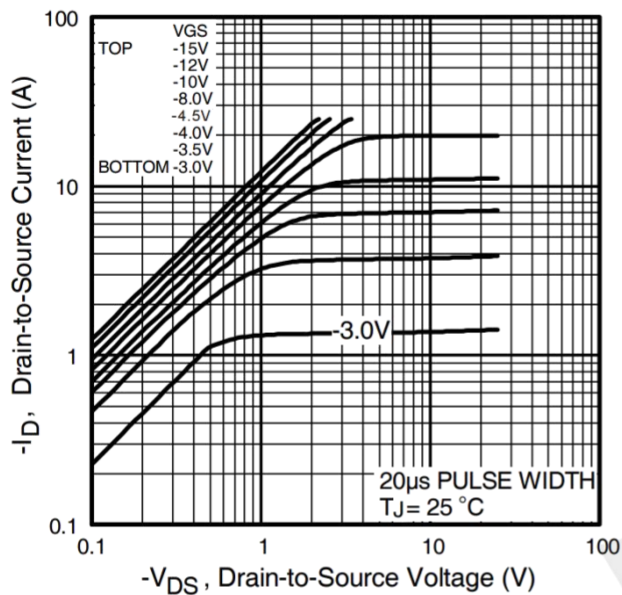
Typical Transfer Characteristics



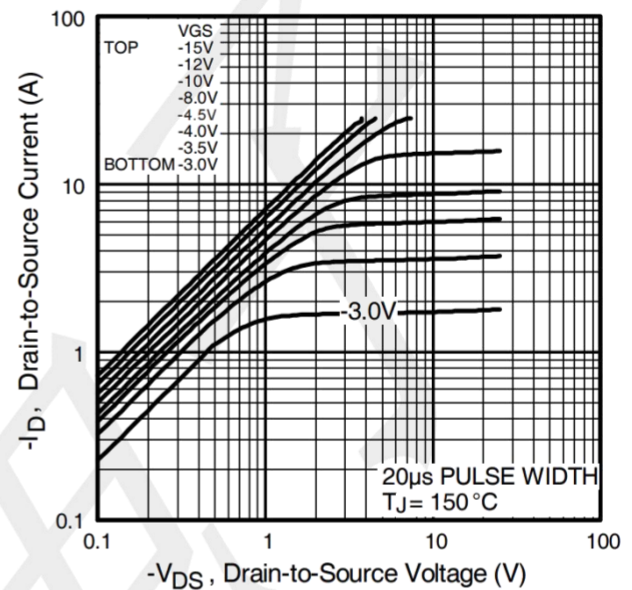
Typical Source-Drain Diode Forward Voltage

Typical Performance Characteristics(TA=25°C unless otherwise Specified)

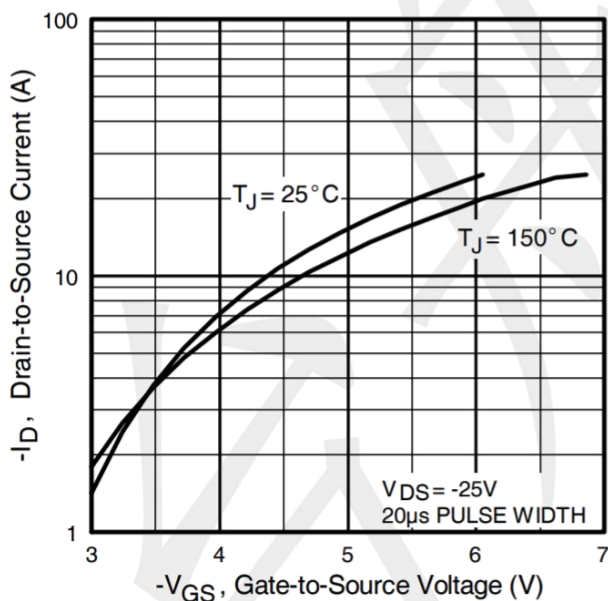
Q2 P-CHANNEL



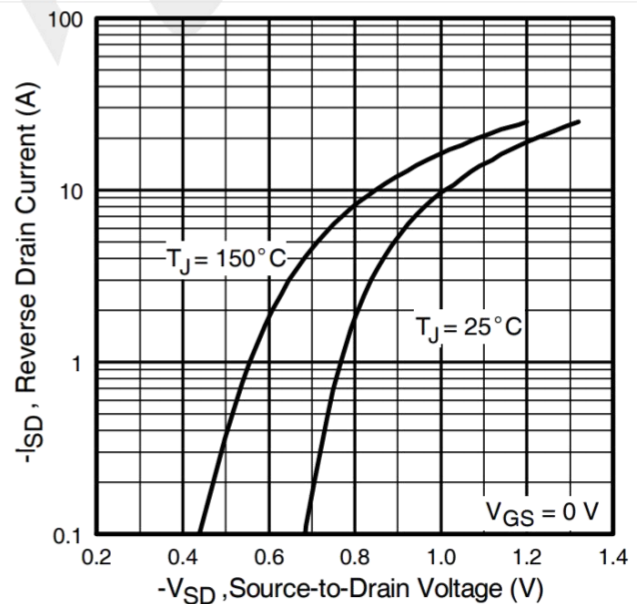
Typical Output Characteristics



Typical Output Characteristics



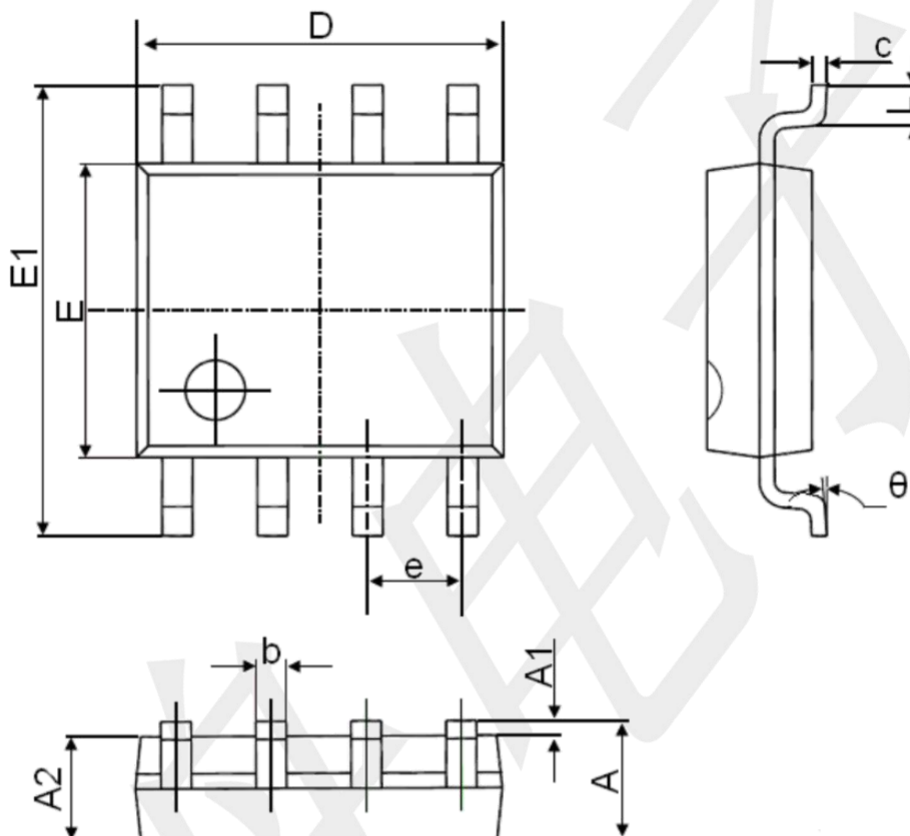
Typical Transfer Characteristics



Typical Source-Drain Diode Forward Voltage

Package Outline Dimensions (Unit: mm)

SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°