



# UD4606

*Power MOSFET*

## DUAL ENHANCEMENT MODE (N-CHANNEL/P-CHANNEL)

■ DESCRIPTION

The UTC **UD4606** provides excellent  $R_{DS(ON)}$  and low gate charge by using advanced trench technology MOSFETs. The complementary MOSFETs may help to form a level shifted high side switch and also for lots of other applications.

■ FEATURES

\* N-Channel: 30V/6.9A

$$R_{DS(ON)} = 22.5 \text{ m}\Omega \text{ (typ.) @ } V_{GS} = 10V$$

$$R_{DS(ON)} = 34.5 \text{ m}\Omega \text{ (typ.) @ } V_{GS} = 4.5V$$

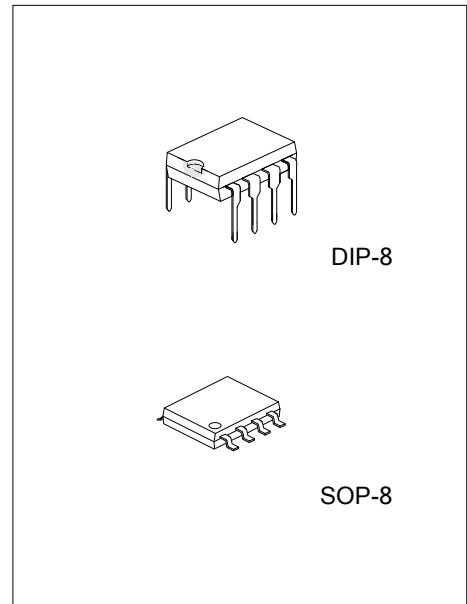
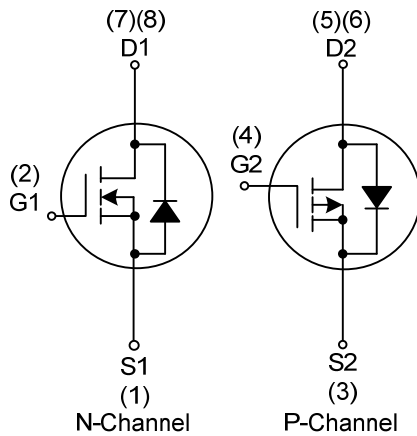
\* P-Channel: -30V/-6A

$$R_{DS(ON)} = 28 \text{ m}\Omega \text{ (typ.) @ } V_{GS} = -10V$$

$$R_{DS(ON)} = 44 \text{ m}\Omega \text{ (typ.) @ } V_{GS} = -4.5V$$

\* Reliable and rugged

■ SYMBOL

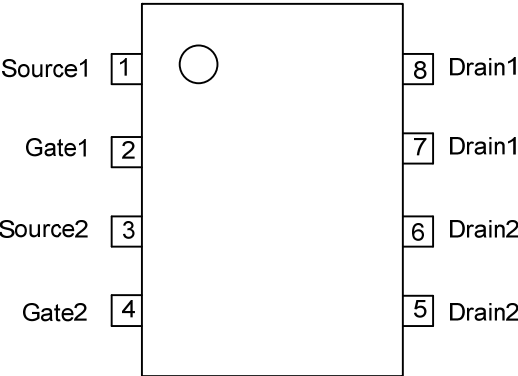


■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free Plating	Halogen Free		1	2	3	4	5	6	7	8	
UD4606L-D08-T	UD4606G-D08-T	DIP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tube
UD4606L-S08-R	UD4606G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

<p>UD4606L-D08-T</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) D08: DIP-8, S08: SOP-8</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ PIN CONFIGURATION



■ ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

**N-CHANNEL**

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note2)	$I_D$	6.9	A
Pulsed Drain Current (Note2)	$I_{DM}$	30	A
Power Dissipation	DIP-8	2.5	W
	SOP-8	2	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

**P-CHANNEL**

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	-30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 2)	$I_D$	-6	A
Pulsed Drain Current (Note 2)	$I_{DM}$	-30	A
Power Dissipation	DIP-8	2.5	W
	SOP-8	2	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Surface Mounted on  $1\text{in}^2$  pad area,  $t \leq 10\text{sec}$

■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient (Note)	DIP-8		74	110	$^\circ\text{C}/\text{W}$
	SOP-8		67	80	$^\circ\text{C}/\text{W}$

Note: Surface Mounted on  $1\text{in}^2$  pad area,  $t \leq 10\text{sec}$

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

**N-CHANNEL**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V			1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	1.9	3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6.9A		22.5	28	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A		34.5	42	mΩ
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1.0MHz		680		pF
Output Capacitance	C <sub>OSS</sub>			102		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			77		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note2)	t <sub>D(ON)</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω, R <sub>L</sub> =2.2Ω		4.6		ns
Turn-ON Rise Time	t <sub>R</sub>			4.1		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			20.6		ns
Turn-OFF Fall Time	t <sub>F</sub>			5.2		ns
Total Gate Charge (Note2)	Q <sub>G</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =6.9A		13.8		nC
Gate-Source Charge	Q <sub>GS</sub>			1.82		nC
Gate-Drain Charge	Q <sub>GD</sub>			3.2		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage(Note2)	V <sub>SD</sub>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.76	1	V
Diode Continuous Forward Current (Note3)	I <sub>S</sub>				3	A
Reverse Recovery Time	t <sub>RR</sub>	I <sub>DS</sub> =6.9A, dI/dt=100A/μs		16.5		ns
Reverse Recovery Charge	Q <sub>RR</sub>			7.8		nC

**P-CHANNEL**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-30			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V			-1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA	-1.2	-2	-2.4	V
Drain-Source On-State Resistance (Note2)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A		28	35	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A		44	58	mΩ
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1.0MHz		920		pF
Output Capacitance	C <sub>OSS</sub>			190		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			122		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note2)	t <sub>D(ON)</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =3Ω, R <sub>L</sub> =2.7Ω		7.7		ns
Turn-ON Rise Time	t <sub>R</sub>			5.7		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			20.2		ns
Turn-OFF Fall Time	t <sub>F</sub>			9.5		ns
Total Gate Charge (Note2)	Q <sub>G</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-6A		18.5		nC
Gate-Source Charge	Q <sub>GS</sub>			2.7		nC
Gate-Drain Charge	Q <sub>GD</sub>			4.5		nC

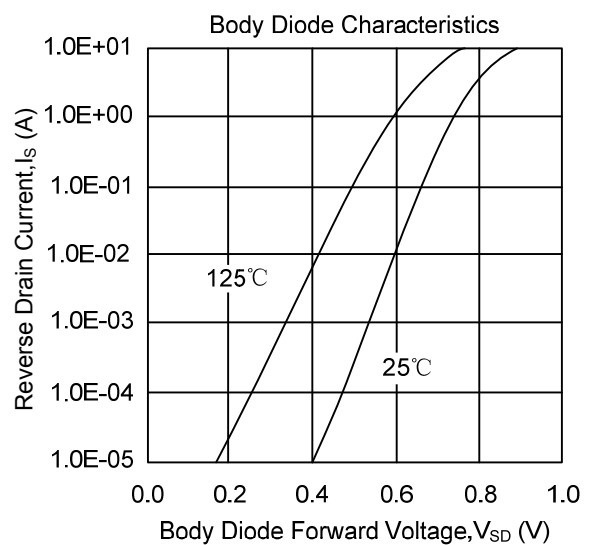
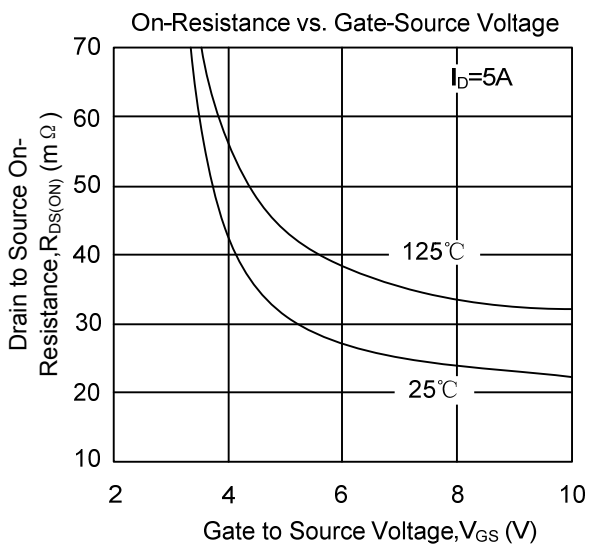
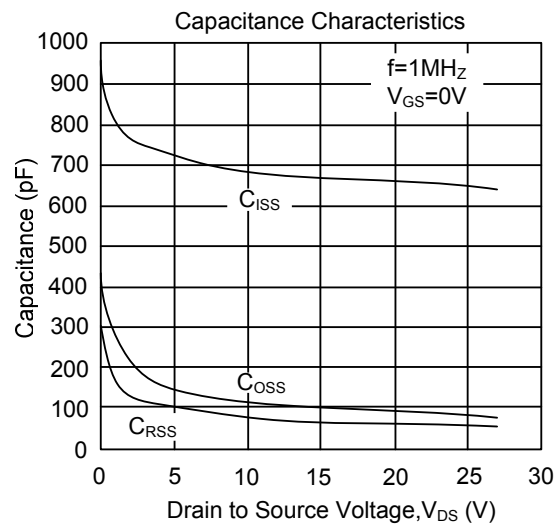
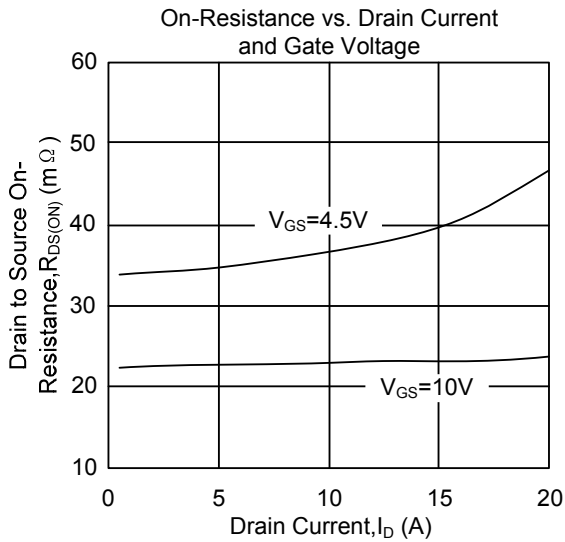
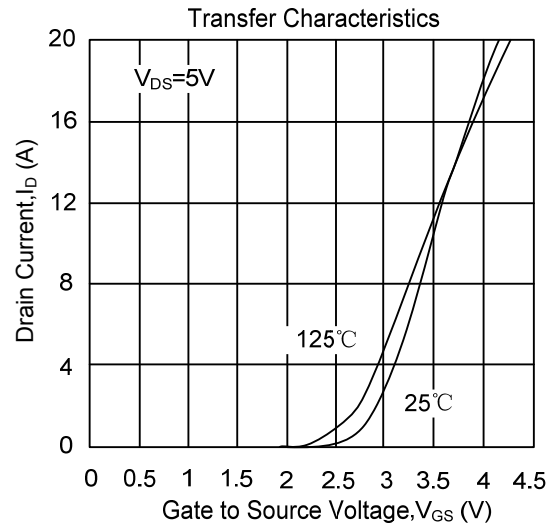
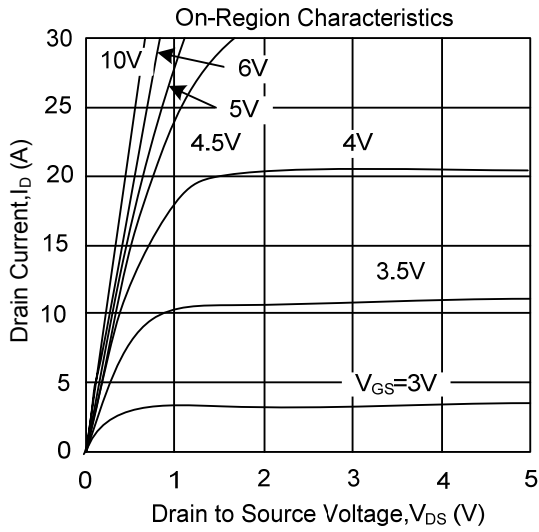
■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage(Note2)	$V_{SD}$	$I_S = -1A, V_{GS} = 0V$		-0.76	-1	V
Diode Continuous Forward Current (Note3)	$I_S$				-4.2	A
Reverse Recovery Time	$t_{RR}$	$I_{DS} = -6A, di/dt = 100A/\mu s$		20		ns
Reverse Recovery Charge	$Q_{RR}$			8.8		nC

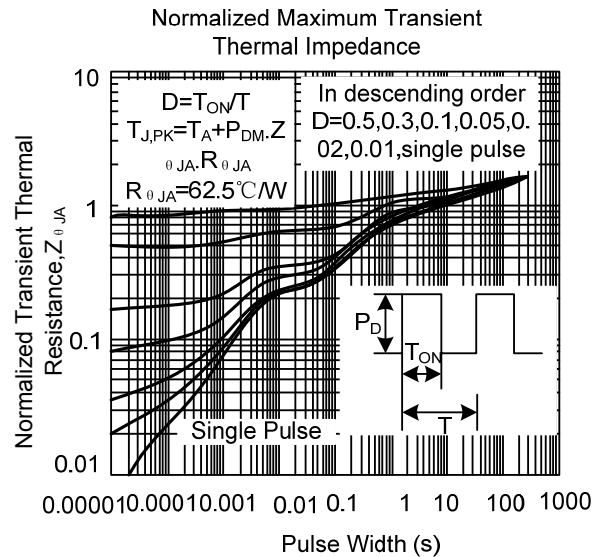
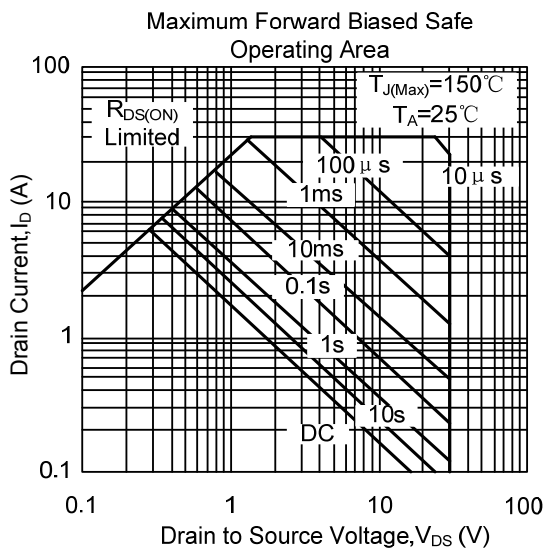
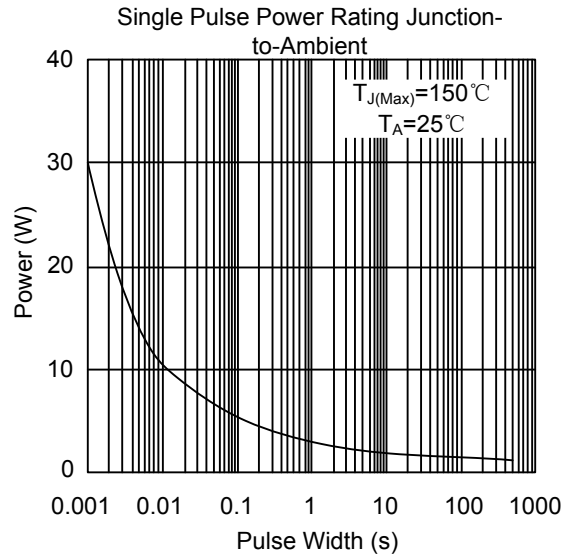
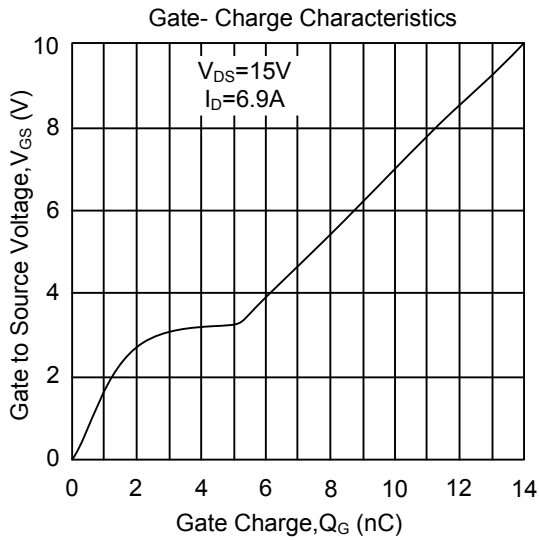
- Notes: 1. Pulse width limited by  $T_{J(MAX)}$   
 2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .  
 3. Surface Mounted on  $1in^2$  pad area,  $t \leq 10sec$ .

## ■ TYPICAL CHARACTERISTICS

### N-CHANNEL

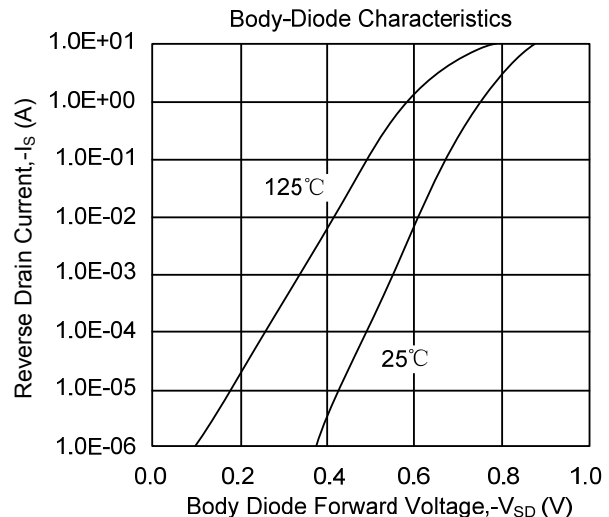
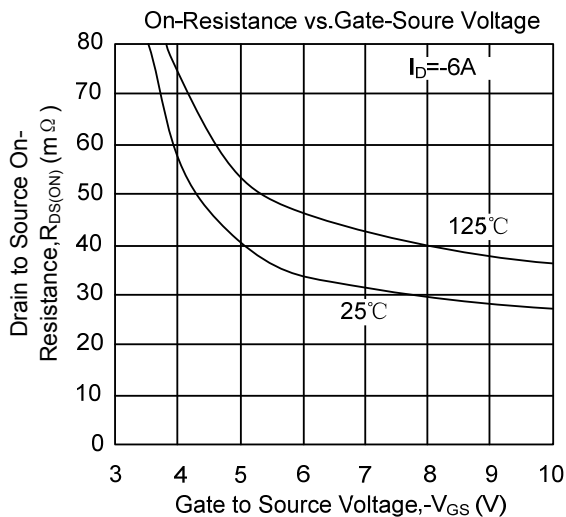
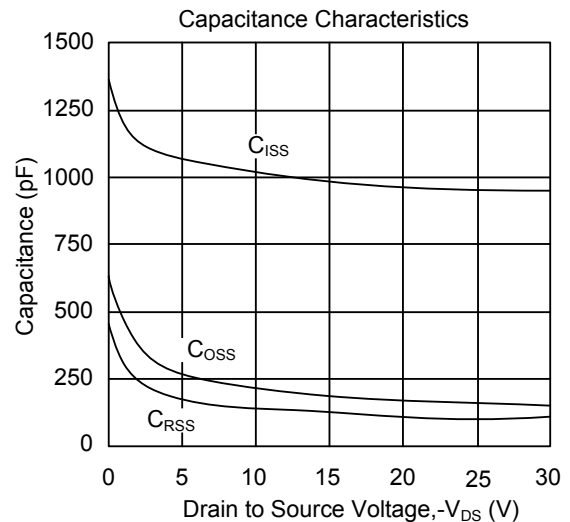
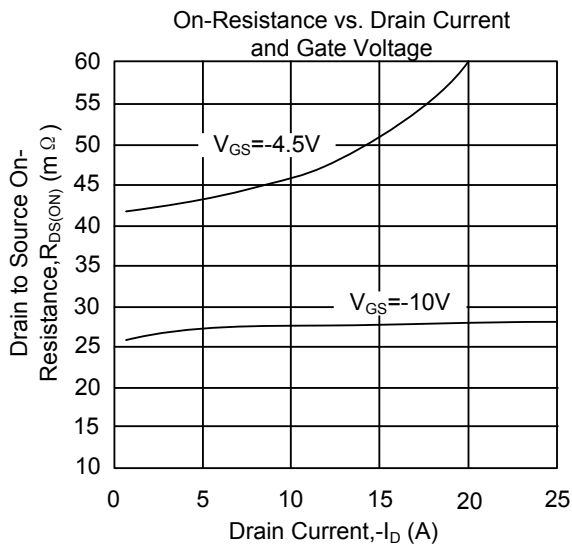
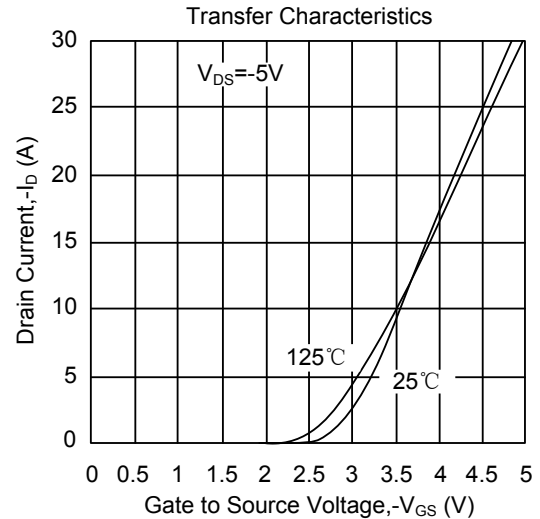
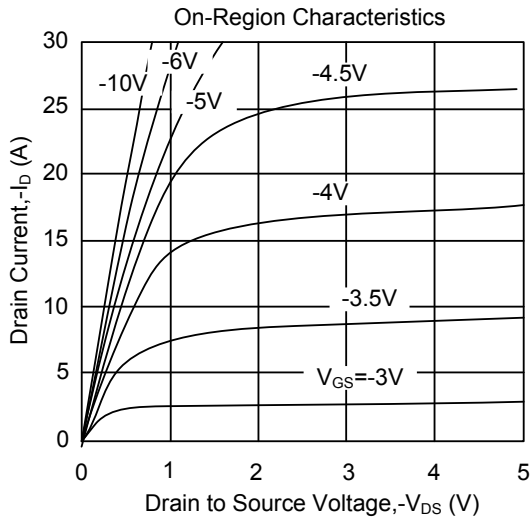


■ TYPICAL CHARACTERISTICS(Cont.)



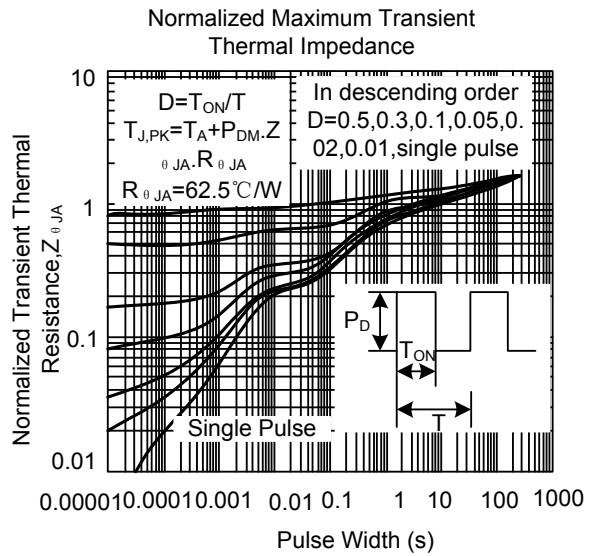
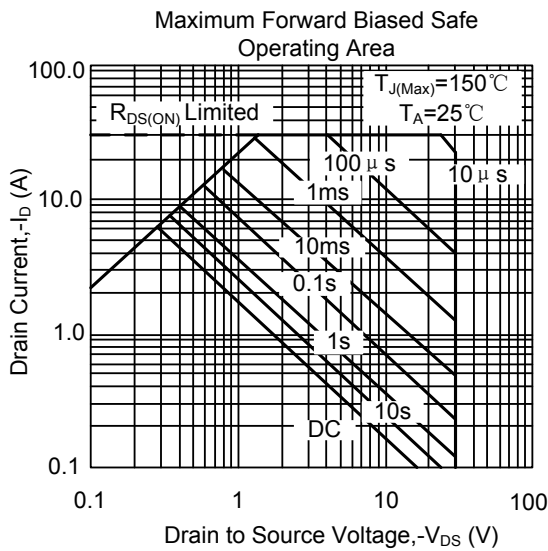
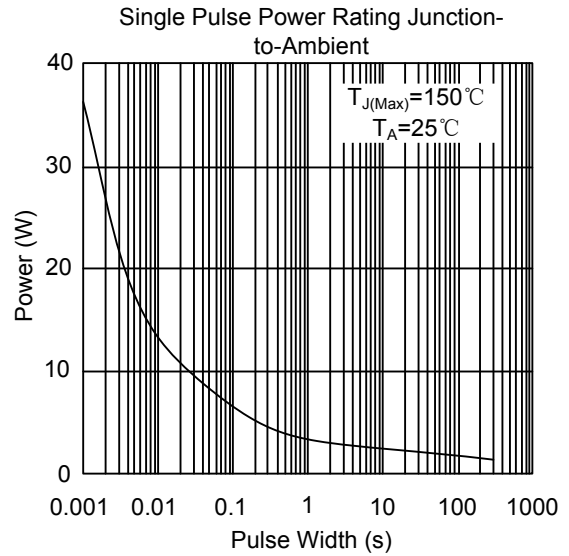
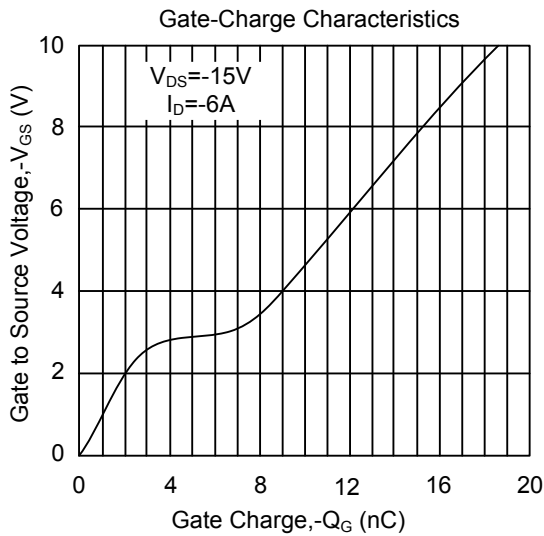
## ■ TYPICAL CHARACTERISTICS(Cont.)

### P-CHANNEL





### TYPICAL CHARACTERISTICS(Cont.)



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