



# UD4614

**Power MOSFET**

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

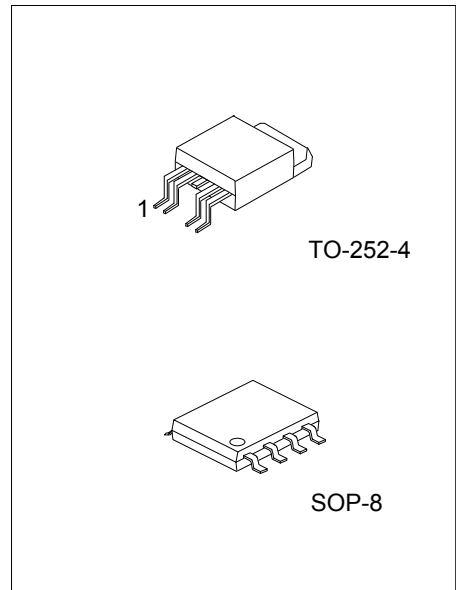
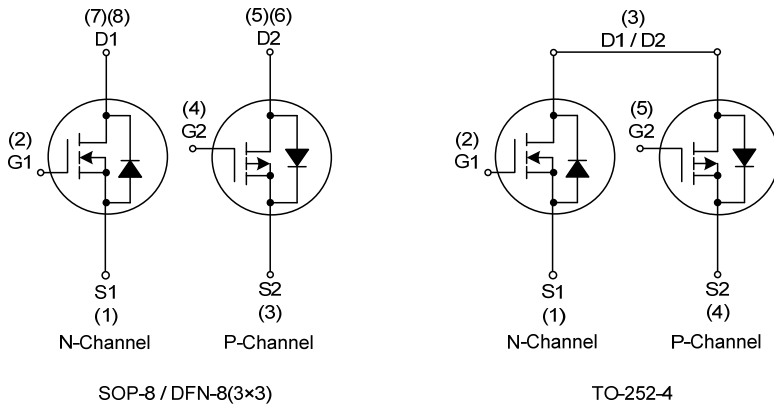
■ DESCRIPTION

The UTC **UD4614** can provide excellent  $R_{DS(ON)}$  and low gate charge by using advanced trench technology MOSFETs. The UTC **UD4614** may be used in H-bridge, inverters and other applications.

■ FEATURES

- \* N-Channel: 40V/6A  
 $R_{DS(ON)} < 23.2m\Omega$  (typ.) @  $V_{GS} = 10V$   
 $R_{DS(ON)} < 32.6m\Omega$  (typ.) @  $V_{GS} = 4.5V$
- \* P-Channel: -40V/-5A  
 $R_{DS(ON)} < 34.7m\Omega$  (typ.) @  $V_{GS} = -10V$   
 $R_{DS(ON)} < 50.6m\Omega$  (typ.) @  $V_{GS} = -4.5V$
- \* Super high dense cell design
- \* Reliable and Rugged

■ SYMBOL

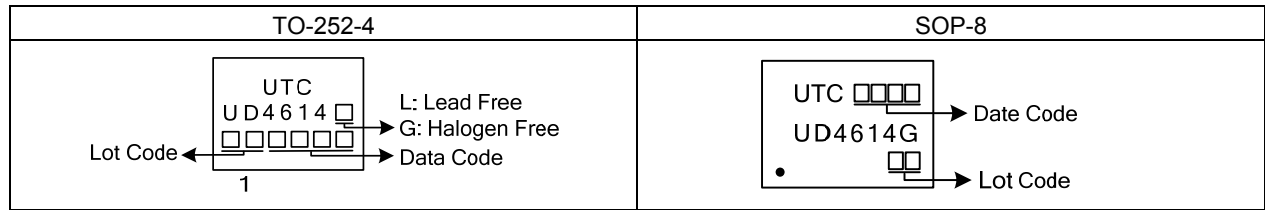


■ ORDERING INFORMATION

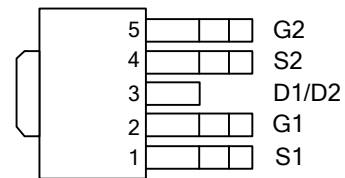
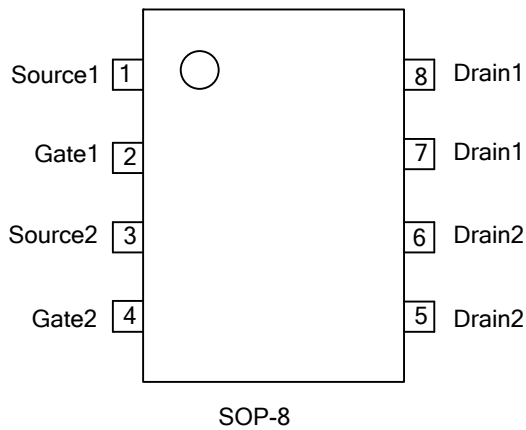
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UD4614L-TN4-R	UD4614G-TN4-R	TO-252-4	Tape Reel
-	UD4614G-S08-R	SOP-8	Tape Reel

<p>UD4614L-TN4-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p>	<p>(1) R: Tape Reel (2) TN4: TO-252-4, S08: SOP-8 (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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■ MARKING



■ PIN CONFIGURATION



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

**N-Channel:**

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note3)		$I_D$	6	A
Pulsed Drain Current (Note3)		$I_{DM}$	20	A
Power Dissipation	$T_A=25^\circ\text{C}$	TO-252-4	3.125	W
		SOP-8	2	W
	$T_A=70^\circ\text{C}$	TO-252-4	2	W
		SOP-8	1.28	W
Junction Temperature		$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

**P-Channel:**

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	-40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note3)		$I_D$	-5	A
Pulsed Drain Current (Note3)		$I_{DM}$	-20	A
Power Dissipation	$T_A=25^\circ\text{C}$	TO-252-4	3.125	W
		SOP-8	2	W
	$T_A=70^\circ\text{C}$	TO-252-4	2	W
		SOP-8	1.28	W
Junction Temperature		$T_J$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Note: 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.

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252-4	$\theta_{JA}$	40	$^\circ\text{C/W}$
	SOP-8		62.5	

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

■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

**N-CHANNEL**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=10mA$	40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=32V, V_{GS}=0V$			1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2.3	3	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6A$		23.2	31	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$		32.6	45	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=20V, f=1.0MHz$		780		pF
Output Capacitance	$C_{OSS}$			110		pF
Reverse Transfer Capacitance	$C_{RSS}$			86		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	$V_{DS}=20V, V_{GS}=10V,$ $R_G=3\Omega, I_D=1A$		32		ns
Turn-ON Rise Time	$t_R$			40		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			172		ns
Turn-OFF Fall Time	$t_F$			64		ns
Total Gate Charge (Note2)	$Q_G$	$V_{DS}=20V, V_{GS}=10V, I_D=6A$		95		nC
Gate-Source Charge	$Q_{GS}$			6.3		nC
Gate-Drain Charge	$Q_{GD}$			6.3		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage(Note2)	$V_{SD}$	$I_S=1A, V_{GS}=0V$		0.77	1	V
Diode Continuous Forward Current	$I_S$				3	A
Reverse Recovery Time	$t_{RR}$	$I_{DS}=6A, di/dt=100A/\mu s$		20.5		ns
Reverse Recovery Charge	$Q_{RR}$				14.5	

■ ELECTRICAL CHARACTERISTICS (Cont.)

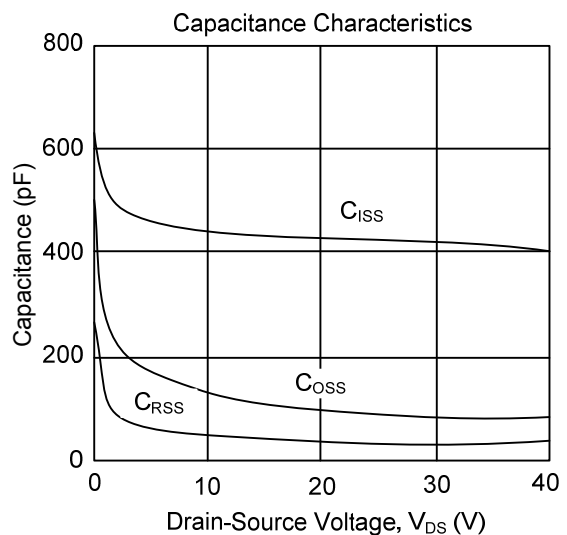
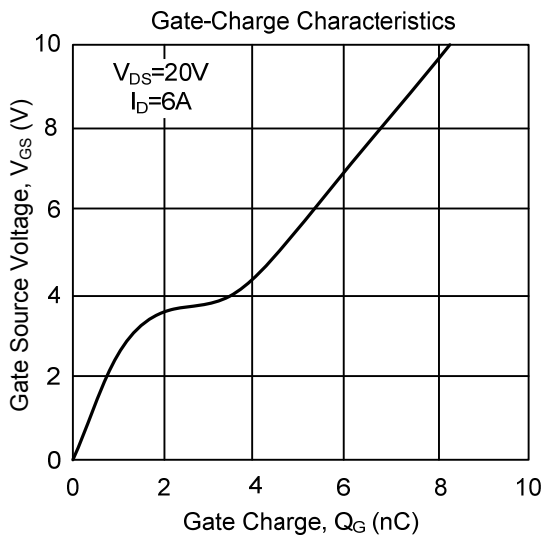
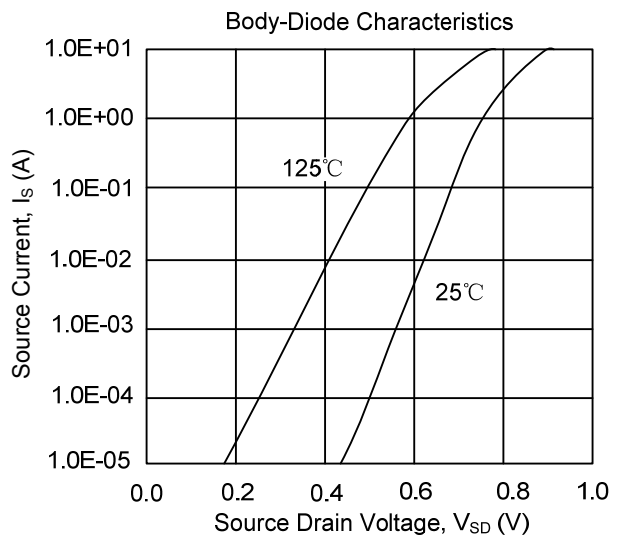
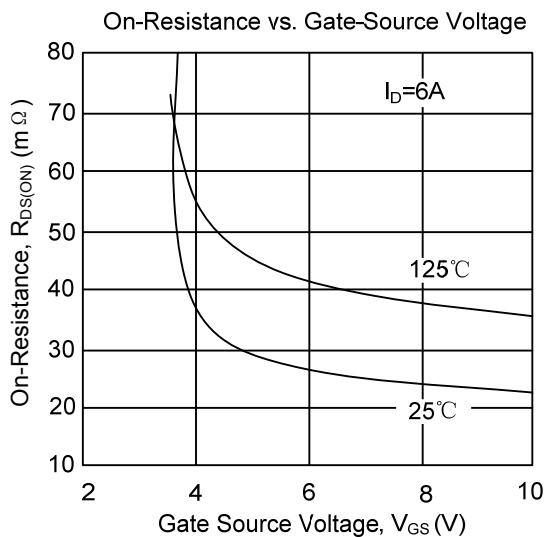
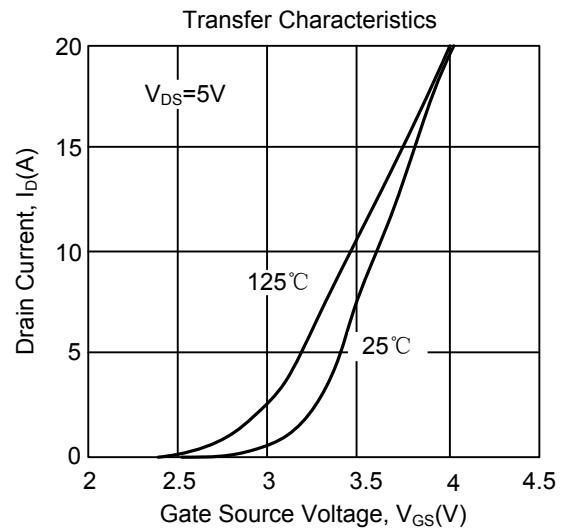
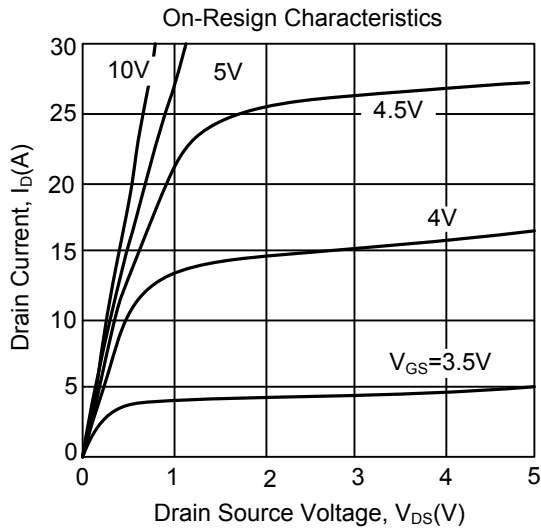
**P-CHANNEL**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-10mA$	-40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-32V, V_{GS}=0V$			-1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.9	-3	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-5A$		34.7	45	$m\Omega$
		$V_{GS}=-4.5V, I_D=-2A$		50.6	63	$m\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-20V, f=1.0MHz$		1120		pF
Output Capacitance	$C_{OSS}$			115		pF
Reverse Transfer Capacitance	$C_{RSS}$			91		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	$V_{DS}=-20V, V_{GS}=-10V,$ $R_G=3\Omega, I_D=1A$		34		ns
Turn-ON Rise Time	$t_R$			48		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			224		ns
Turn-OFF Fall Time	$t_F$			108		ns
Total Gate Charge (Note2)	$Q_G$	$V_{DS}=-20V, V_{GS}=-10V, I_D=-5A$		90		nC
Gate-Source Charge	$Q_{GS}$			5.8		nC
Gate-Drain Charge	$Q_{GD}$			5.3		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Drain-Source Diode Forward Voltage(Note2)	$V_{SD}$	$I_S=-1A, V_{GS}=0V$		-0.75	-1	V
Diode Continuous Forward Current	$I_S$				-3.2	A
Reverse Recovery Time	$t_{RR}$	$I_{DS}=-5A, di/dt=100A/\mu s$		22.3		ns
Reverse Recovery Charge	$Q_{RR}$				15.2	

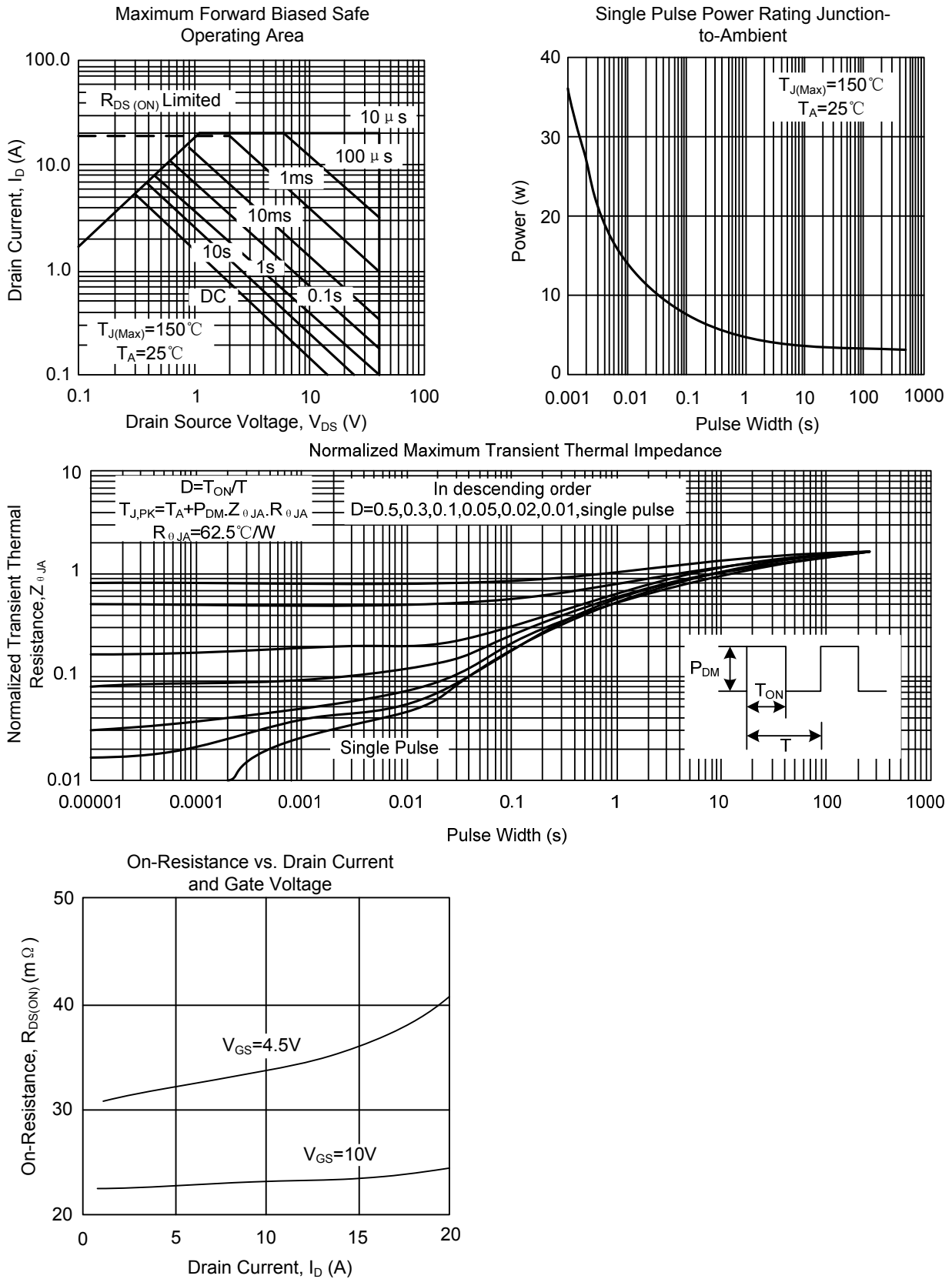
- Notes: 1. Pulse width limited by  $T_{J(MAX)}$   
 2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .  
 3. Surface Mounted on  $1in^2$  pad area,  $t \leq 10sec$ .

## TYPICAL CHARACTERISTICS

### N-CHANNEL

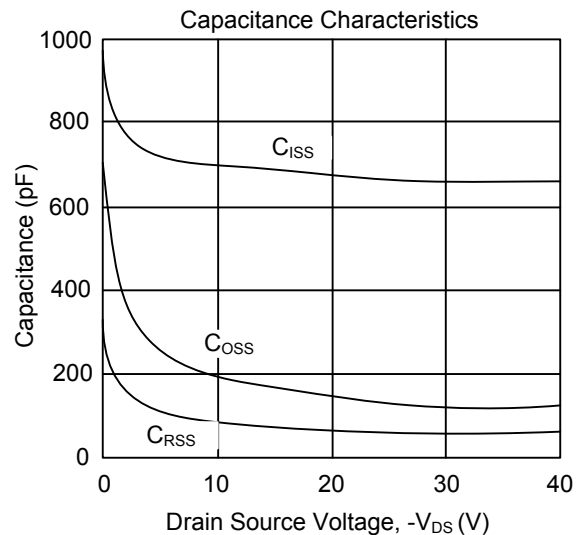
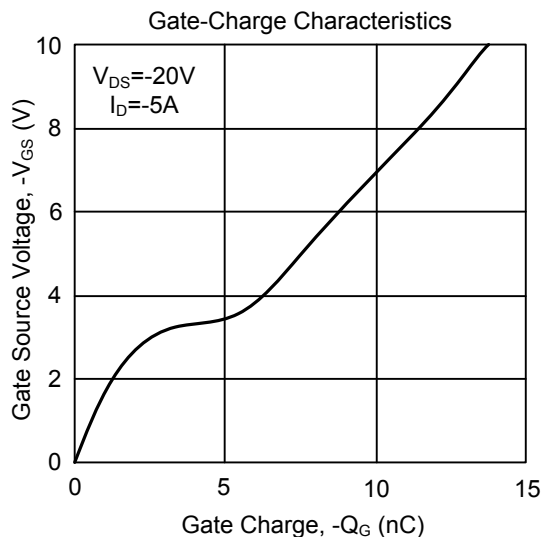
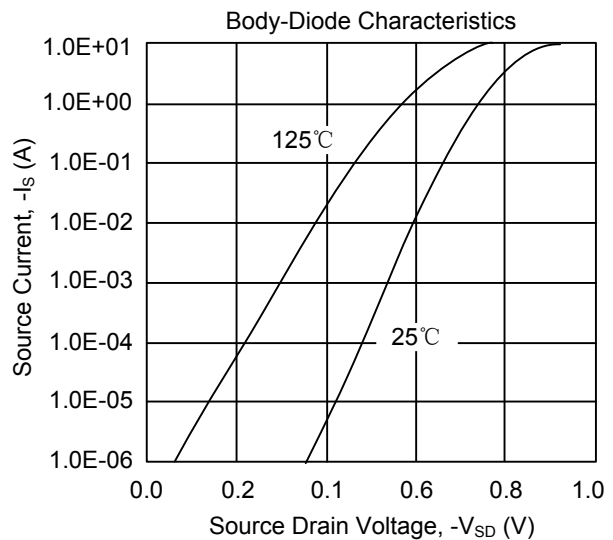
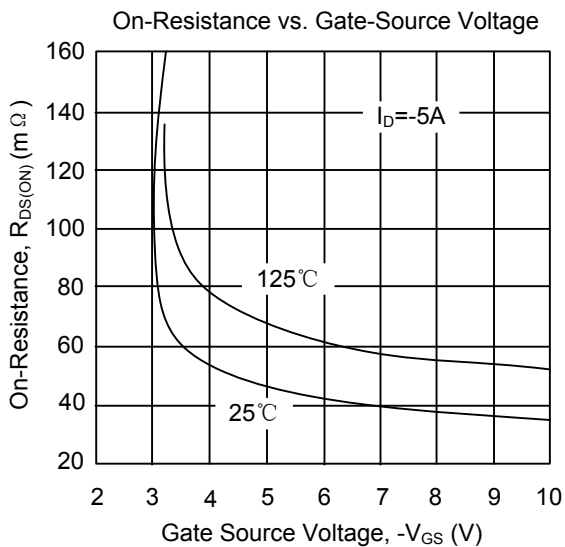
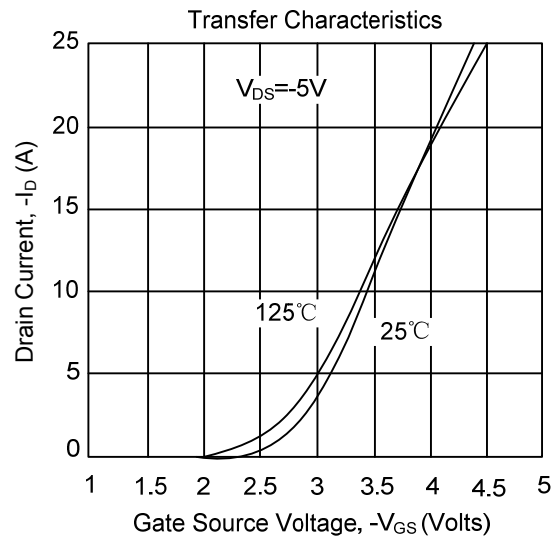
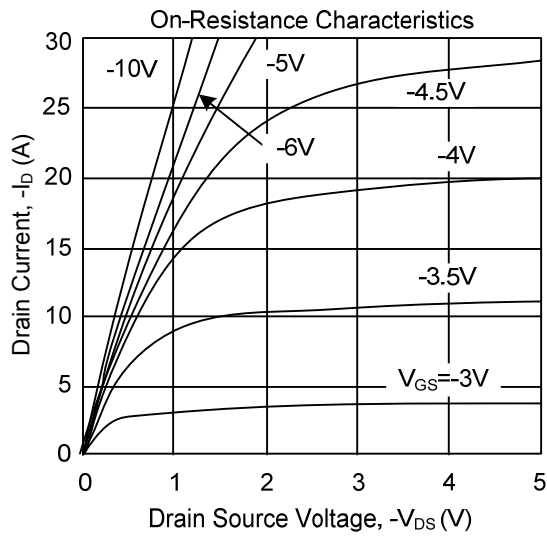


## ■ TYPICAL CHARACTERISTICS(Cont.)



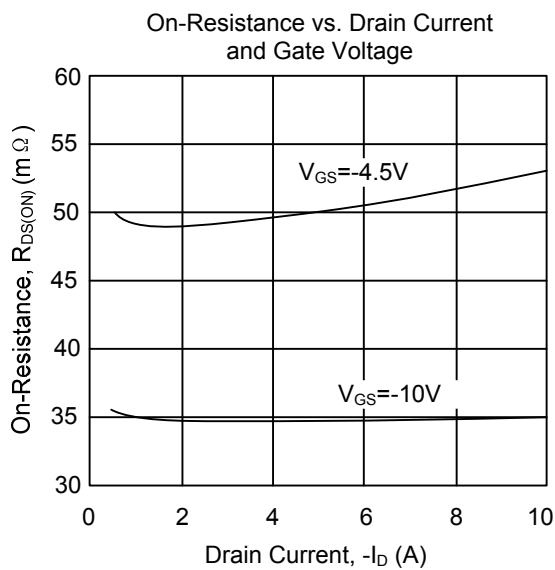
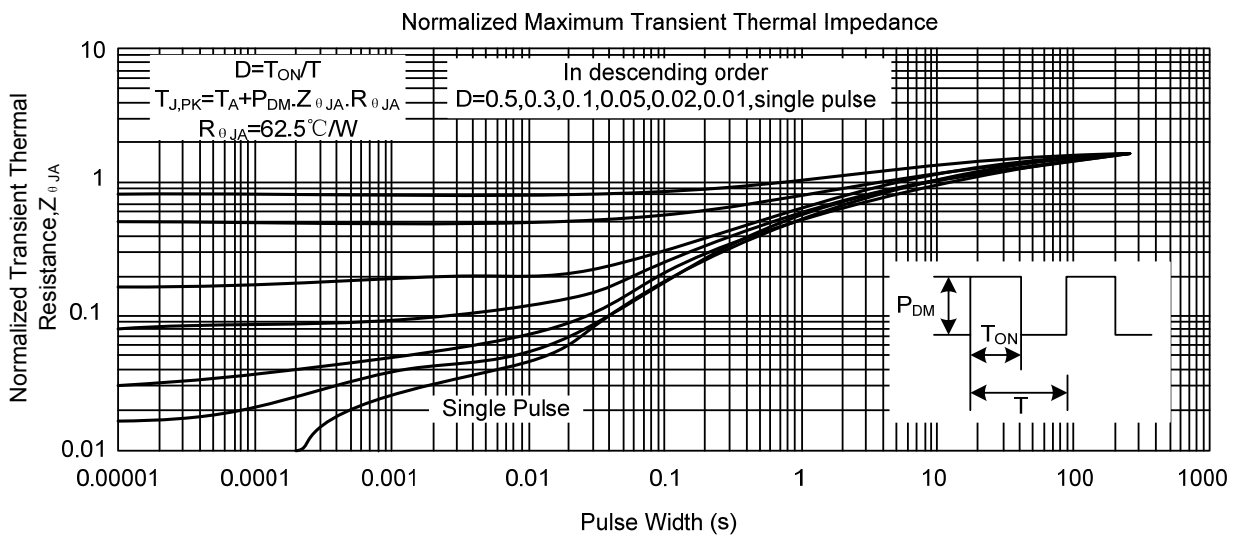
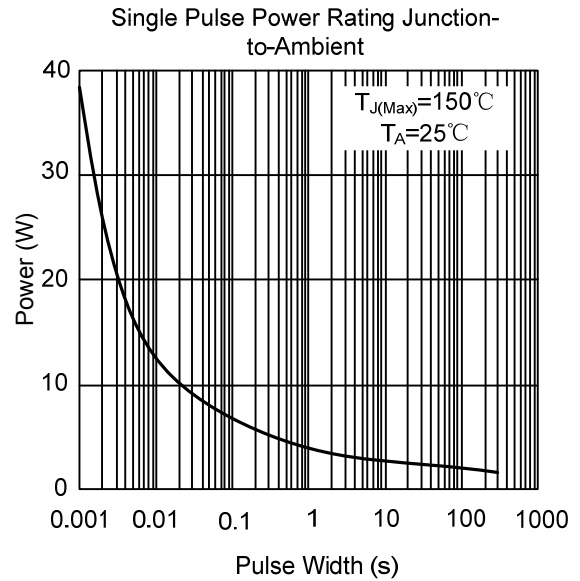
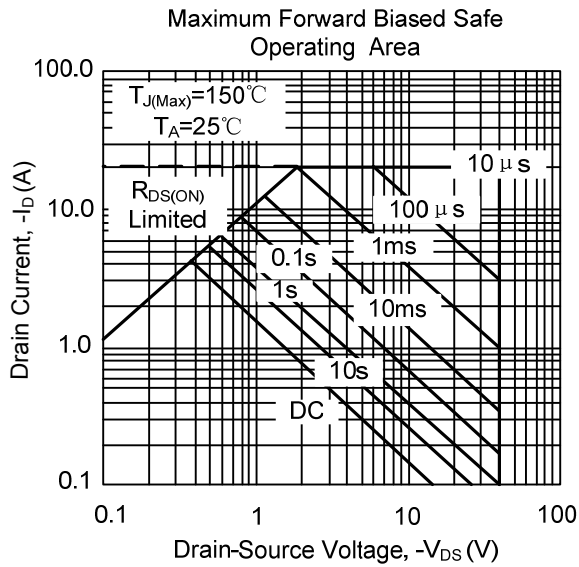
## ■ TYPICAL CHARACTERISTICS(Cont.)

### P-CHANNEL





■ TYPICAL CHARACTERISTICS(Cont.)



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