



## UD606

Power MOSFET

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

#### DESCRIPTION

The **UD606** can provide excellent  $R_{DS(ON)}$  and low gate charge by using advanced trench technology MOSFETs. The **UD606** may be used in H-bridge, inverters and other applications.

#### FEATURES

\* N-Channel: 40V/8A

$R_{DS(ON)} < 33m\Omega @ V_{GS} = 10V, I_D = 8A$

$R_{DS(ON)} < 55m\Omega @ V_{GS} = 4.5V, I_D = 6A$

\* P-Channel: -40V/-8A

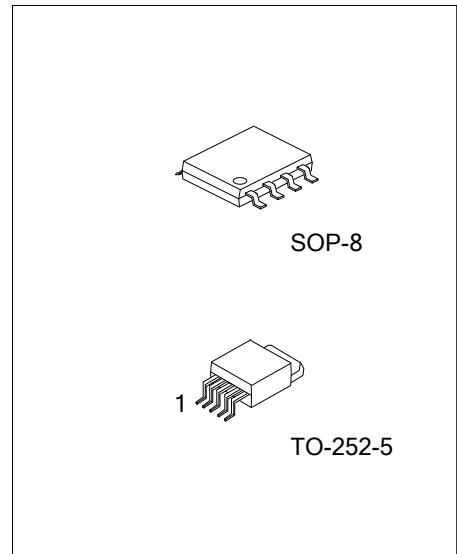
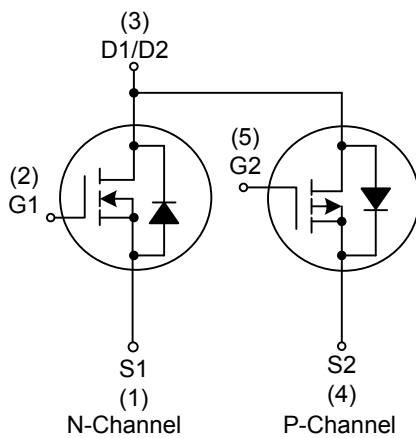
$R_{DS(ON)} < 50m\Omega @ V_{GS} = -10V, I_D = -8A$

$R_{DS(ON)} < 70m\Omega @ V_{GS} = -4.5V, I_D = -4A$

\* Super high dense cell design

\* Reliable and rugged

#### SYMBOL

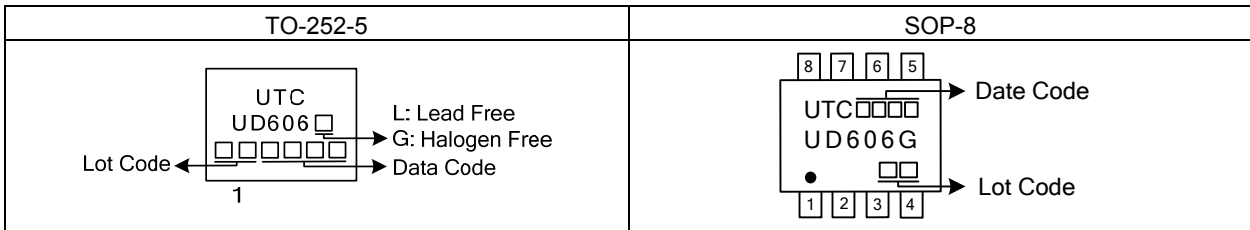


#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UD606L-TN5-R	UD606G-TN5-R	TO-252-5	S1	G1	D1/D2	S2	G2	-	-	-	Tape Reel
-	UD606G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

UD606L-TN5-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) TN5: TO-252-5, S08: SOP-8 (3) L: Lead Free, G: Halogen Free and Lead Free
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## MARKING



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

**N-Channel:**

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	40	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note3)	$T_C=25^\circ\text{C}$	$I_D$	8	A
Pulsed Drain Current (Note3)	$T_C=25^\circ\text{C}$	$I_{DM}$	30	A
Power Dissipation	TO-252-5	$P_D$	2	W
	SOP-8		1.25	W
Junction Temperature		$T_J$	+175	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +175	$^\circ\text{C}$

**P-Channel:**

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	-40	V
Gate-Source Voltage		$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note3)	$T_C=25^\circ\text{C}$	$I_D$	-8	A
Pulsed Drain Current (Note3)	$T_C=25^\circ\text{C}$	$I_{DM}$	-30	A
Power Dissipation	TO-252-5	$P_D$	2	W
	SOP-8		1.25	W
Power Dissipation		$P_D$	2.5	W
Junction Temperature		$T_J$	+175	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +175	$^\circ\text{C}$

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 DATA

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT
Junction to Ambient	N-Channel	TO-252-5	$\theta_{JA}$	50	60	$^\circ\text{C/W}$
		SOP-8		70	100	$^\circ\text{C/W}$
	P-Channel	TO-252-5		40	50	$^\circ\text{C/W}$
		SOP-8		68	100	$^\circ\text{C/W}$

■ 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> =250μA	40			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =32V, V <sub>GS</sub> =0V			1	μA
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> =250μA	1	2.3	3	V
Drain-Source On-State Resistance (Note2)	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8A			33	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A			55	mΩ
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, f=1MHz		580		pF
Output Capacitance	C <sub>OSS</sub>			100		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			87		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note2)	t <sub>D(ON)</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω I <sub>D</sub> =1A		30		ns
Turn-ON Rise Time	t <sub>R</sub>			30		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			140		ns
Turn-OFF Fall Time	t <sub>F</sub>			70		ns
Total Gate Charge (Note2)	Q <sub>G</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =8A		85		nC
Gate-Source Charge	Q <sub>GS</sub>			9		nC
Gate-Drain Charge	Q <sub>GD</sub>			7		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	I <sub>S</sub>				8	A
Reverse Recovery Time	t <sub>RR</sub>	I <sub>F</sub> =8A, di/dt=100A/μs		22.9		ns
Reverse Recovery Charge	Q <sub>RR</sub>				18.3	

■ ELECTRICAL CHARACTERISTICS(Cont.)

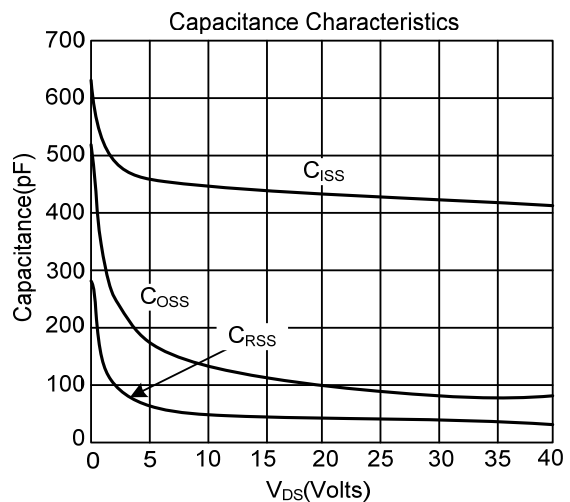
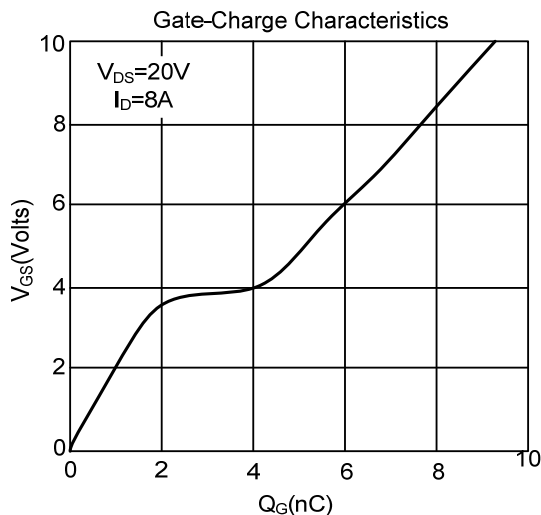
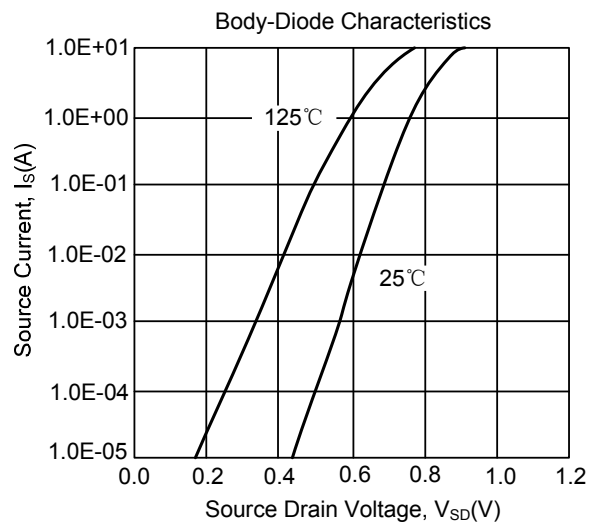
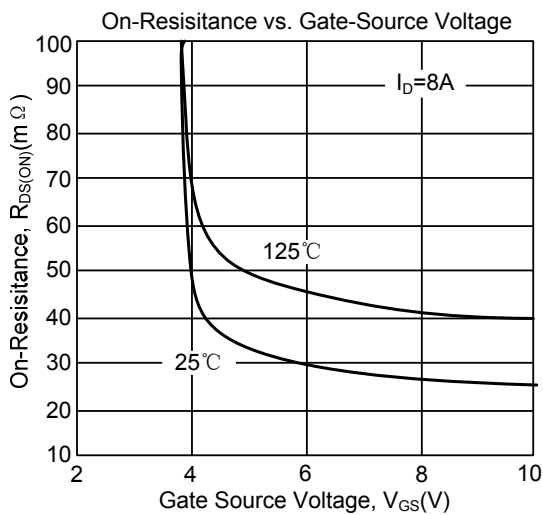
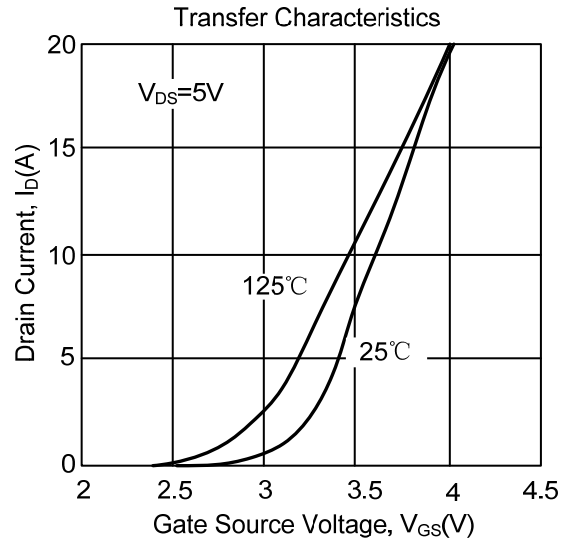
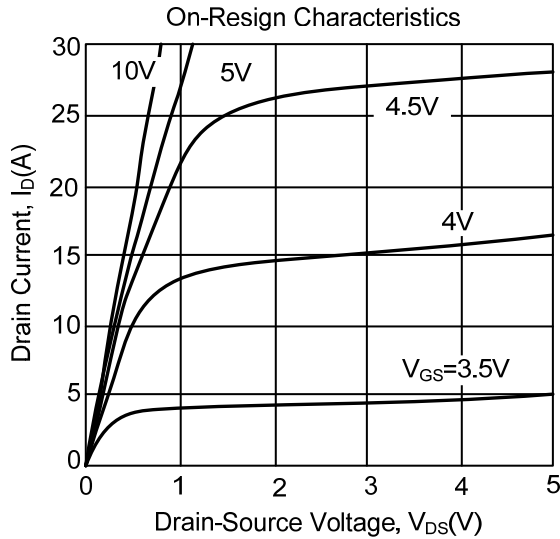
**P-CHANNEL**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-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	-1.8	-3	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-8A$		35	50	m $\Omega$
		$V_{GS}=-4.5V, I_D=-4A$		55	70	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-20V, f=1.0MHz$		657		pF
Output Capacitance	$C_{OSS}$			143		pF
Reverse Transfer Capacitance	$C_{RSS}$			63		pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	$V_{DS}=-20V, V_{GS}=-10V,$ $R_G=3\Omega, R_L=2.5\Omega$		8		ns
Turn-ON Rise Time	$t_R$			12.2		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			24		ns
Turn-OFF Fall Time	$t_F$			12.5		ns
Total Gate Charge (Note2)	$Q_G$	$V_{DS}=-20V, V_{GS}=-10V, I_D=-8A$		14.1		nC
Gate-Source Charge	$Q_{GS}$			2.2		nC
Gate-Drain Charge	$Q_{GD}$			4.1		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	$I_S$				-8	A
Reverse Recovery Time	$t_{RR}$	$I_F=-8A, dI/dt=100A/\mu s$		23.2		ns
Reverse Recovery Charge	$Q_{RR}$				18.2	

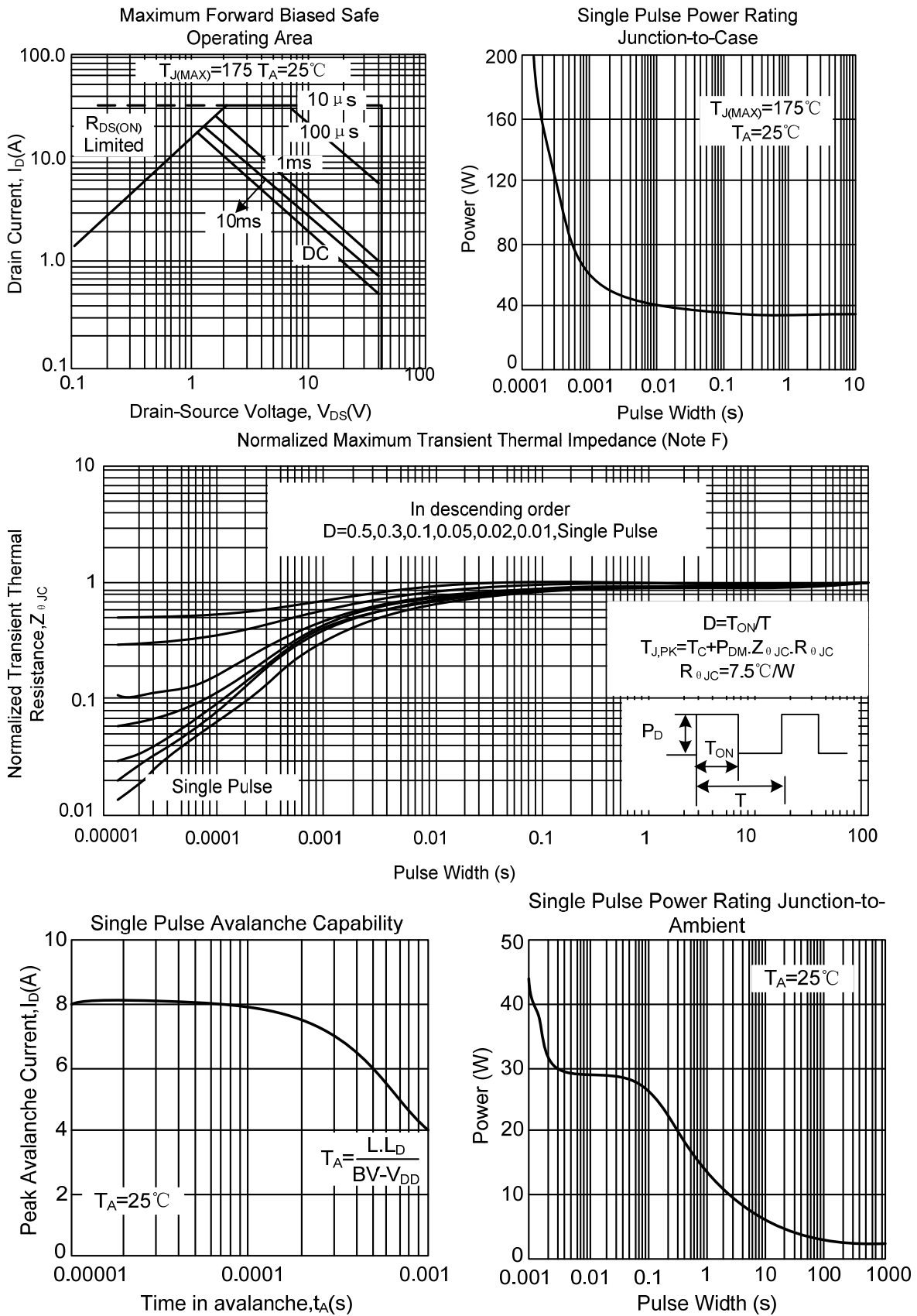
- Notes: 1. Pulse width limited by  $T_{J(MAX)}$   
 2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 0.5\%$ .  
 3. Surface Mounted on  $1in^2$  pad area,  $t \leq 10sec$ .

## ■ TYPICAL CHARACTERISTICS

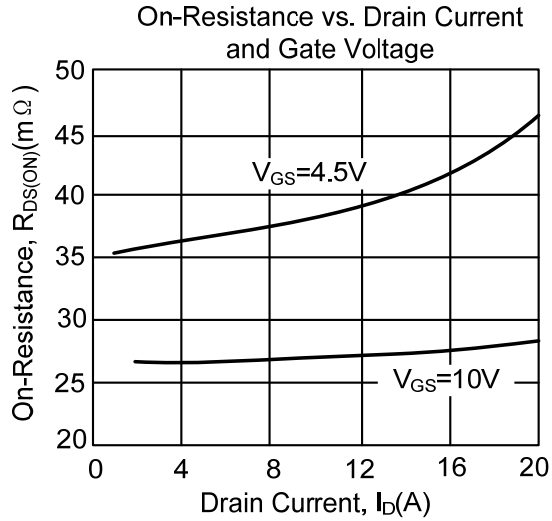
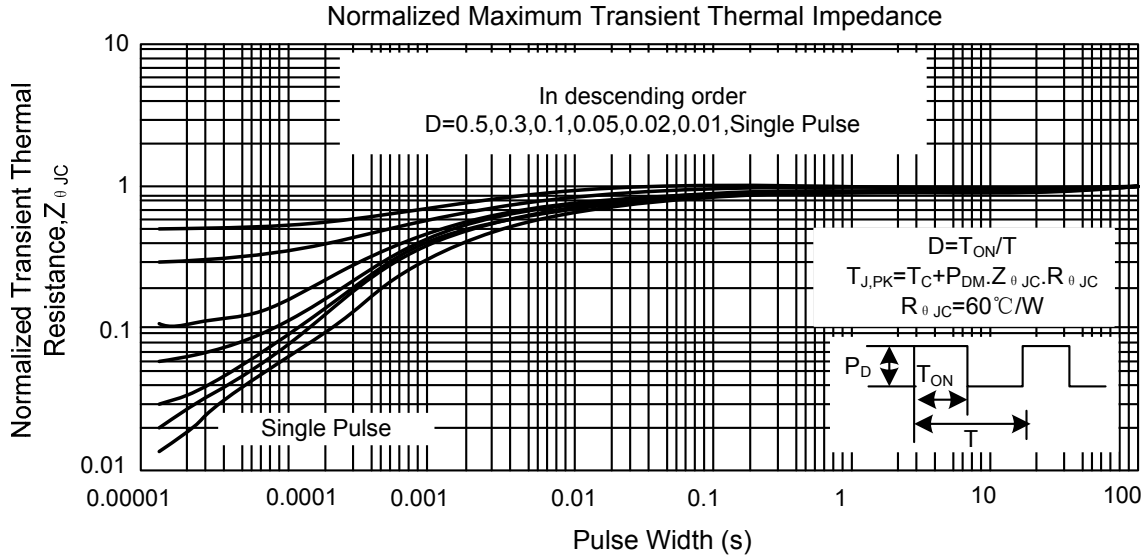
### N-CHANNEL



■ TYPICAL CHARACTERISTICS(Cont.)



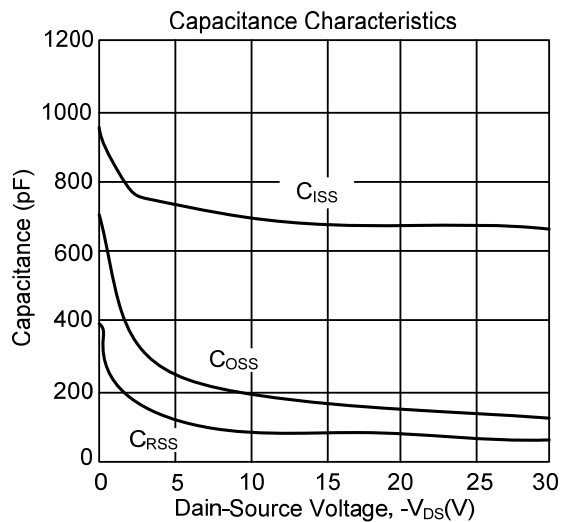
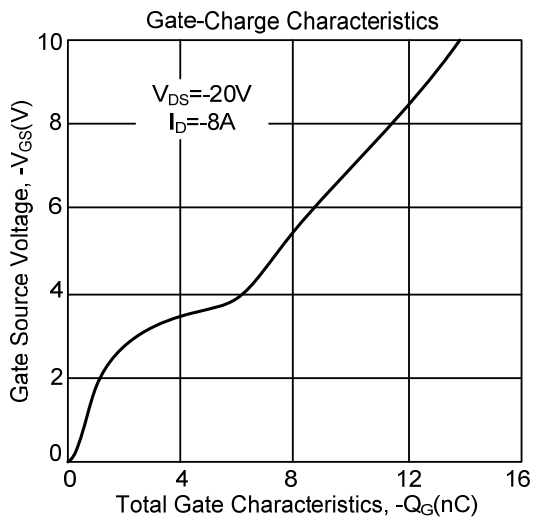
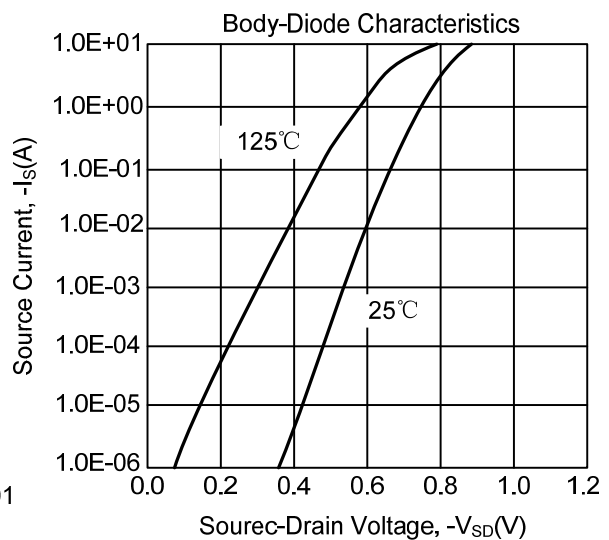
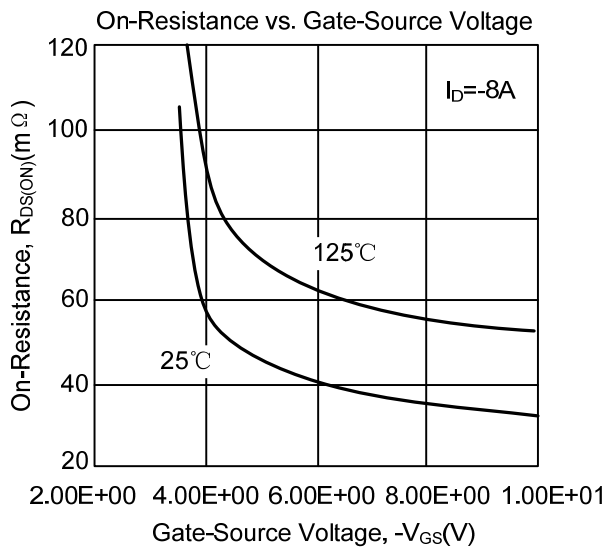
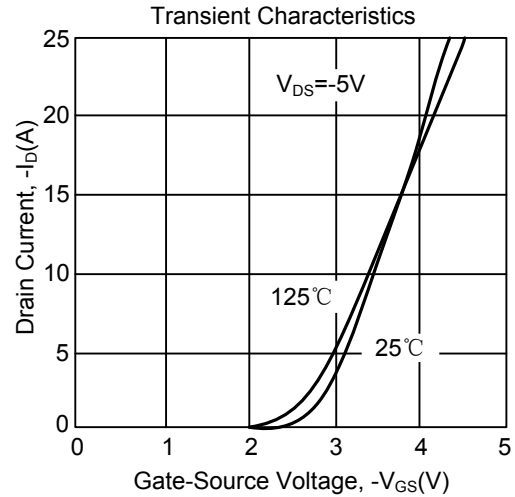
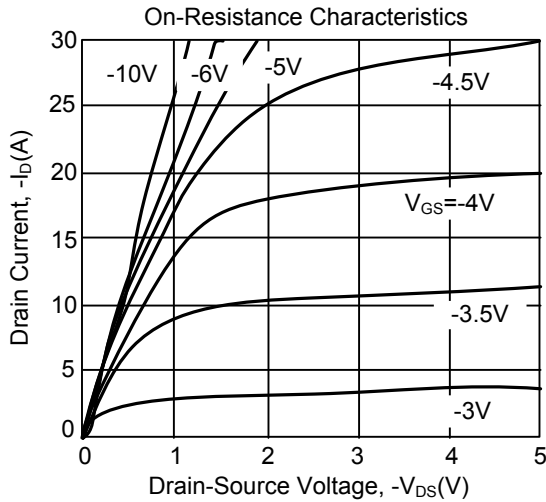
■ TYPICAL CHARACTERISTICS(Cont.)



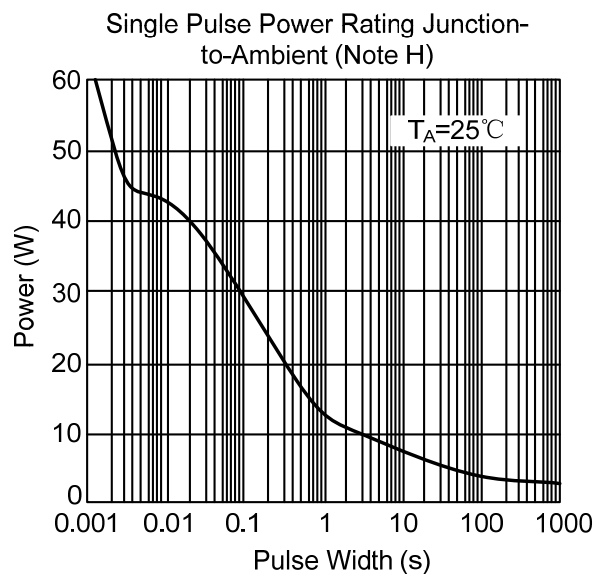
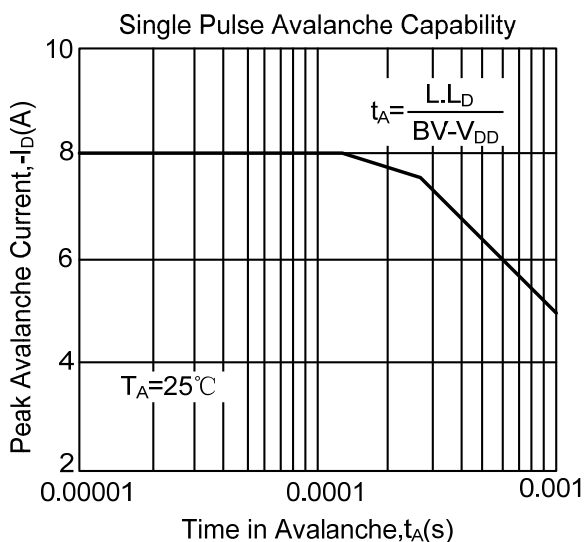
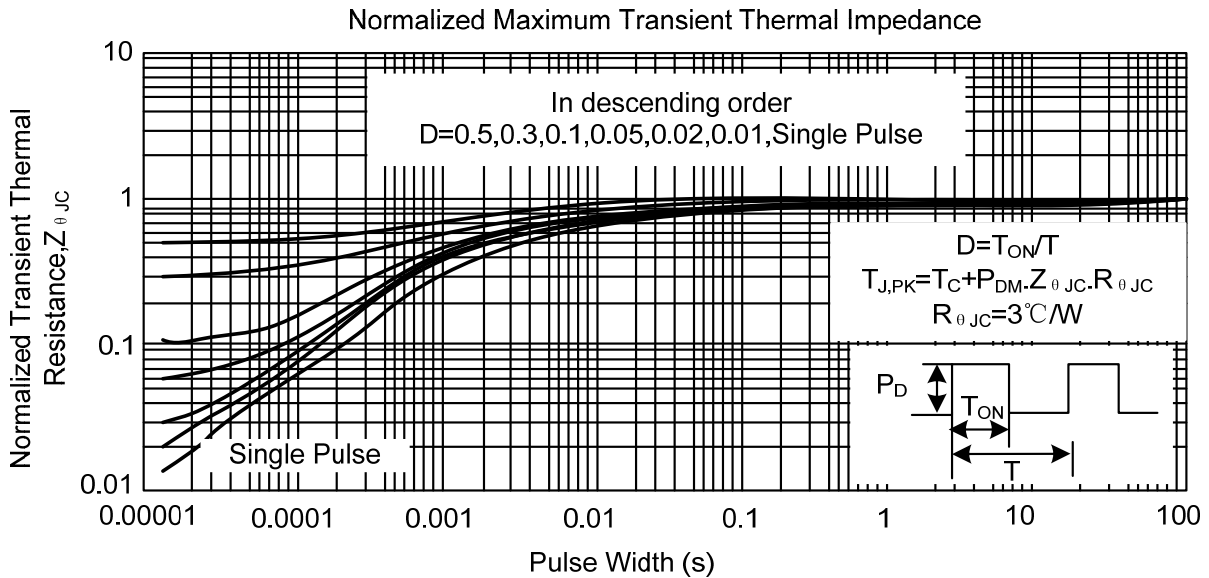
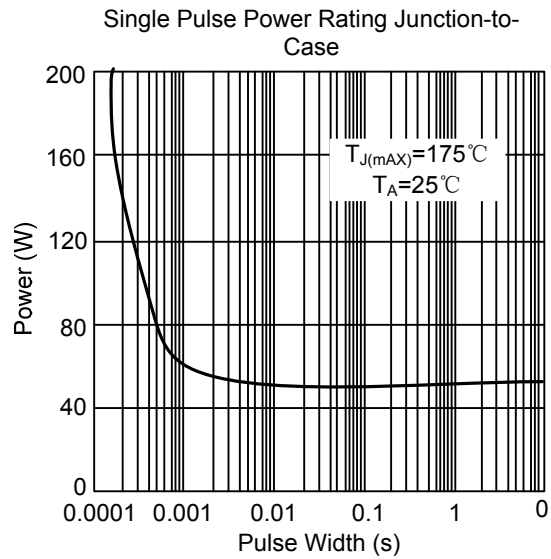
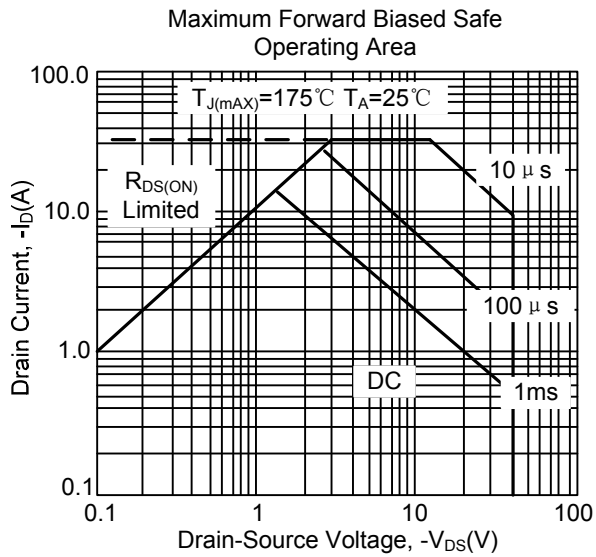


## ■ TYPICAL CHARACTERISTICS(Cont.)

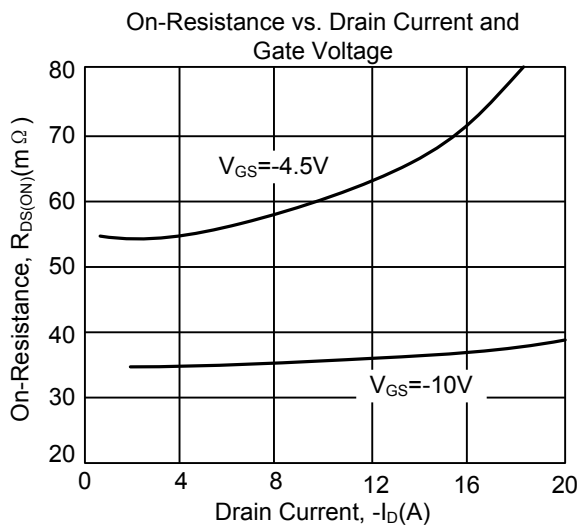
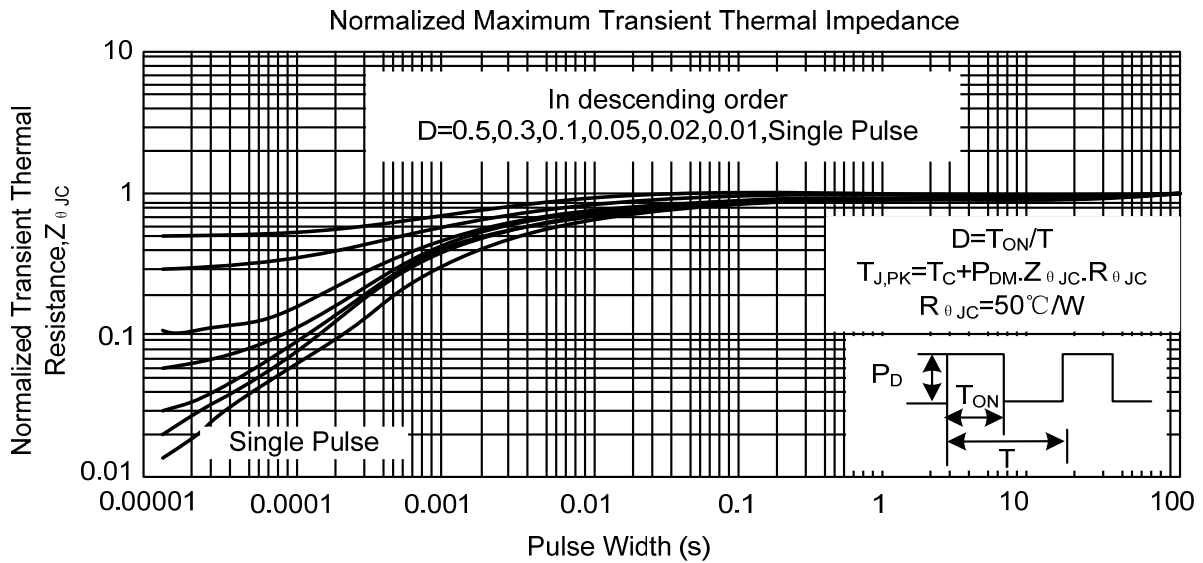
### P-CHANNEL:



## TYPICAL CHARACTERISTICS(Cont.)



■ TYPICAL CHARACTERISTICS(Cont.)



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