



UD606

Power MOSFET

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

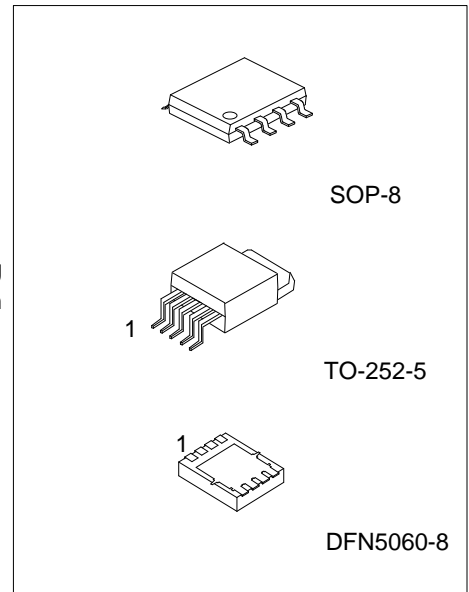
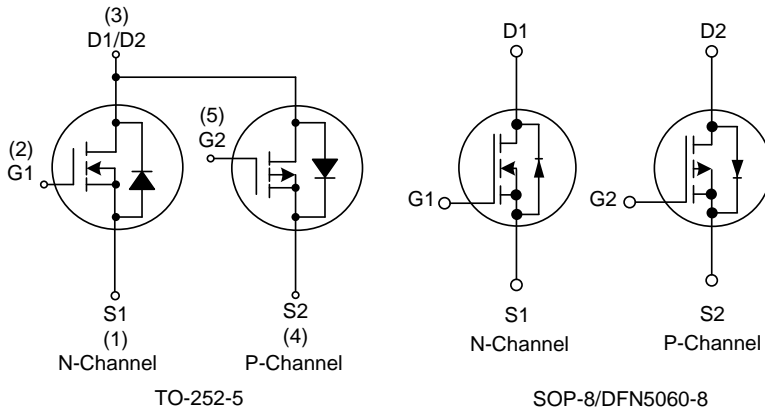
DESCRIPTION

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
 $R_{DS(ON)} \leq 33 \text{ m}\Omega @ V_{GS} = 10V, I_D = 8.0A$
 $R_{DS(ON)} \leq 55 \text{ m}\Omega @ V_{GS} = 4.5V, I_D = 6.0A$
- * P-Channel: -40V/-8A
 $R_{DS(ON)} \leq 50 \text{ m}\Omega @ V_{GS} = -10V, I_D = -8.0A$
 $R_{DS(ON)} \leq 70 \text{ m}\Omega @ V_{GS} = -4.5V, I_D = -4.0A$
- * Super high dense cell design
- * Reliable and rugged

SYMBOL



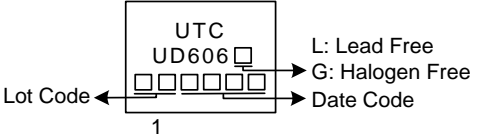
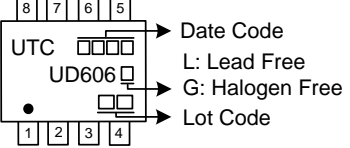
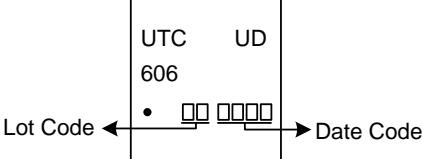
ORDERING INFORMATION

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
UD606L-S08-R	UD606G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UD606L-K08-5060-R	UD606G-K08-5060-R	DFN5060-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>UD606G-TN5-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) TN5: TO-252-5, S08: SOP-8</p> <p>K08-5060: DFN5060-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
--	--

■ MARKING

PACKAGE	MARKING
TO-252-5	 <p>Marking diagram for TO-252-5 package. The marking area contains the text 'UTC' and 'UD606' followed by a small square. Below this is a row of five squares. An arrow labeled 'Lot Code' points to the first square, and an arrow labeled 'Date Code' points to the last square. A '1' is centered below the row of squares. To the right of the marking area, the text 'L: Lead Free' and 'G: Halogen Free' is present.</p>
SOP-8	 <p>Marking diagram for SOP-8 package. The marking area contains the text 'UTC' and 'UD606' followed by a small square. Above the text are four squares labeled 8, 7, 6, 5. Below the text are four squares labeled 1, 2, 3, 4. An arrow labeled 'Date Code' points to the squares 8-5, and an arrow labeled 'Lot Code' points to the squares 1-4. To the right of the marking area, the text 'L: Lead Free' and 'G: Halogen Free' is present.</p>
DFN5060-8	 <p>Marking diagram for DFN5060-8 package. The marking area contains the text 'UTC' and 'UD606' followed by a small square. Below this is a row of four squares. An arrow labeled 'Lot Code' points to the first square, and an arrow labeled 'Date Code' points to the last square.</p>

■ **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}	± 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
	DFN5060-8		1.57	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}	± 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
	DFN5060-8		1.57	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	θ_{JA}		50	60	$^\circ\text{C/W}$
		SOP-8			70	100	$^\circ\text{C/W}$
		DFN5060-8			65	80	$^\circ\text{C/W}$
	P-Channel	TO-252-5			40	50	$^\circ\text{C/W}$
		SOP-8			68	100	$^\circ\text{C/W}$
		DFN5060-8			63	80	$^\circ\text{C/W}$

Note: Device mounted on FR-4 substrate P_c board, 2oz copper, with 1inch square copper plate.

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

N-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	2.3	3.0	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=8.0A$			33	m Ω
		$V_{GS}=4.5V, I_D=6.0A$			55	m Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=20V, f=1MHz$		580		pF
Output Capacitance	C_{OSS}			100		pF
Reverse Transfer Capacitance	C_{RSS}			87		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note2)	Q_G	$V_{DS}=20V, V_{GS}=10V, I_D=8A$		85		nC
Gate-Source Charge	Q_{GS}			9		nC
Gate-Drain Charge	Q_{GD}			7		nC
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	$V_{DS}=20V, V_{GS}=10V, R_G=3\Omega$ $I_D=1A$		30		ns
Turn-ON Rise Time	t_R			30		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			140		ns
Turn-OFF Fall Time	t_F			70		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current	I_S				8	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	$I_S=1A, V_{GS}=0V$		0.76	1	V
Reverse Recovery Time	t_{rr}	$I_F=8A, di/dt=100A/\mu s$		22.9		ns
Reverse Recovery Charge	Q_{rr}				18.3	

■ ELECTRICAL CHARACTERISTICS(Cont.)

P-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.8	-3.0	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-8.0A$		35	50	$m\Omega$
		$V_{GS}=-4.5V, I_D=-4.0A$		55	70	$m\Omega$
DYNAMIC CHARACTERISTICS						
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
SWITCHING CHARACTERISTICS						
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
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
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Continuous Forward Current	I_S				-8	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	$I_S=-1A, V_{GS}=0V$		-0.75	-1	V
Reverse Recovery Time	t_{rr}	$I_F=-8A, di/dt=100A/\mu s$		23.2		ns
Reverse Recovery Charge	Q_{rr}				18.2	

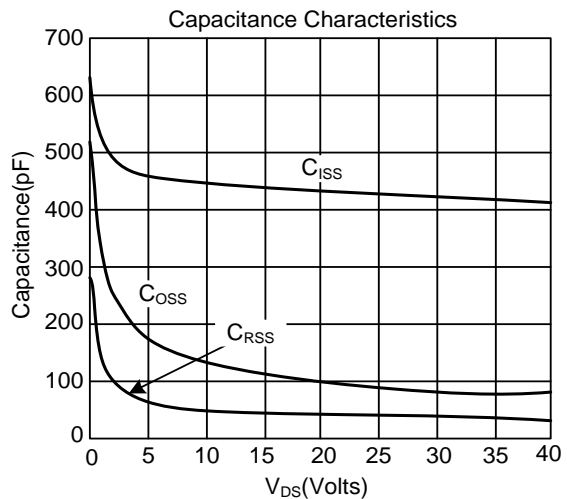
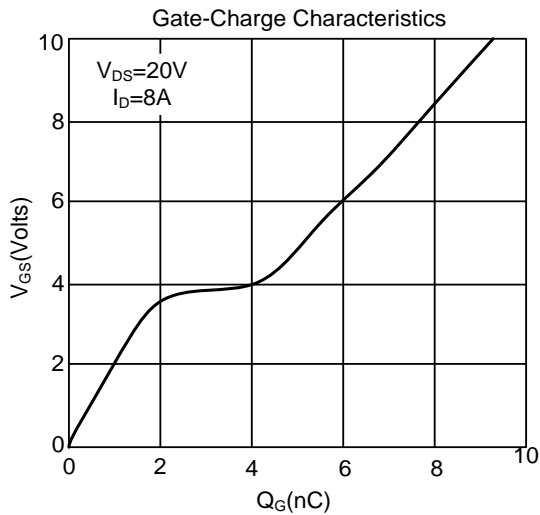
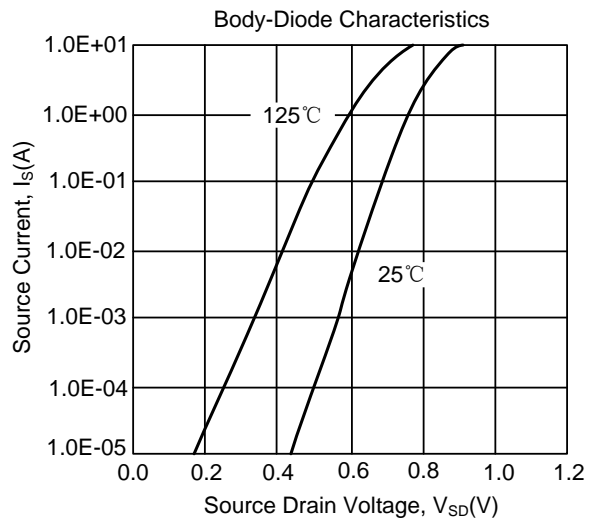
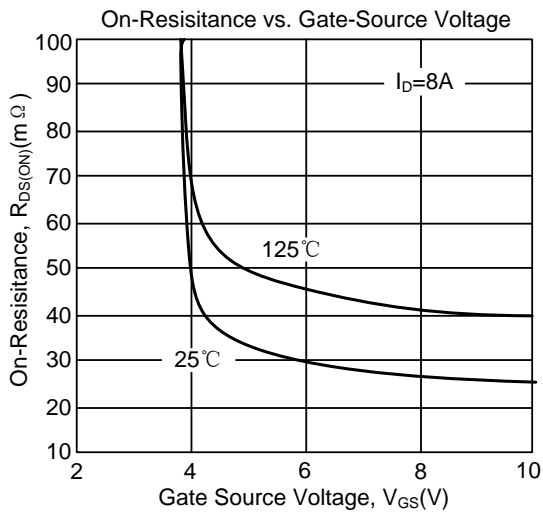
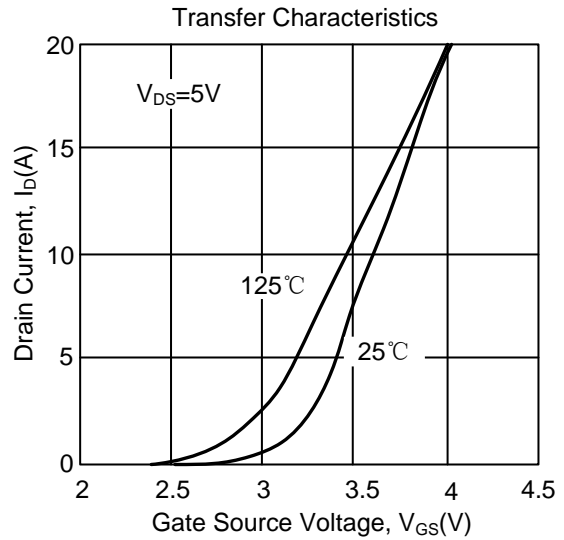
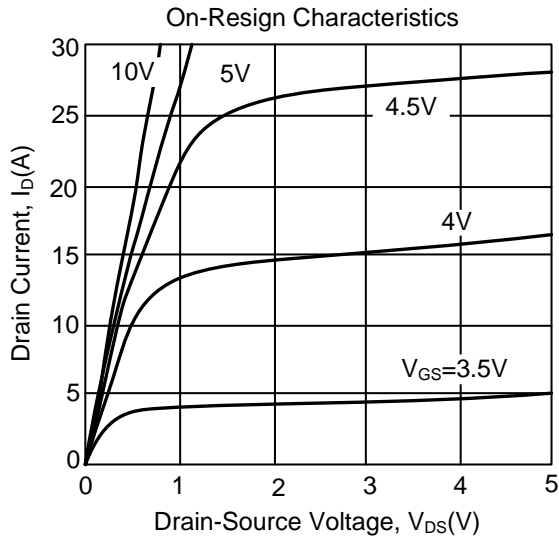
Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. Pulse width $\leq 300\mu s$, duty cycle $\leq 0.5\%$.

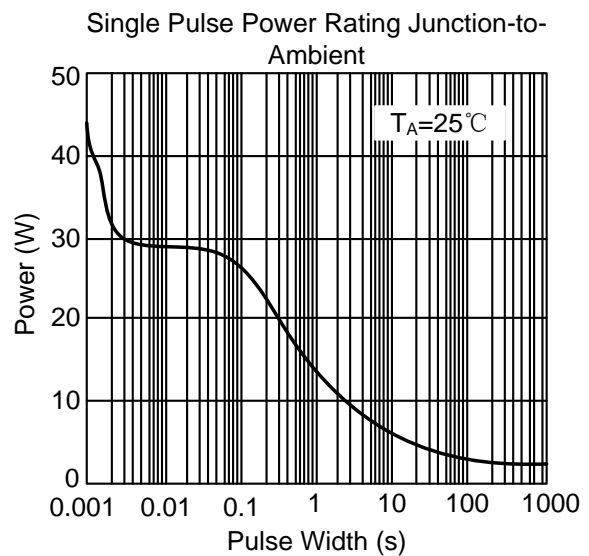
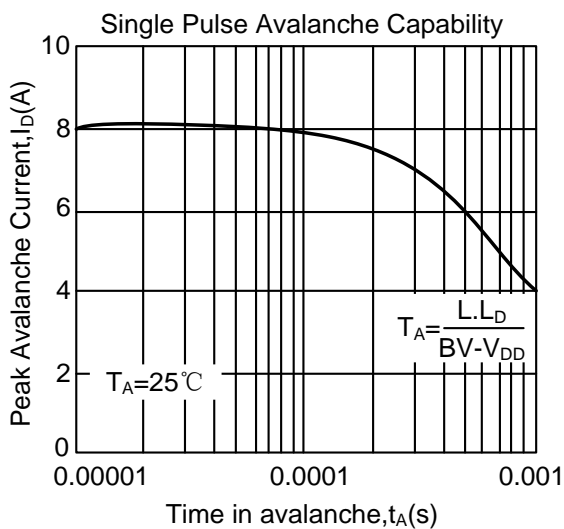
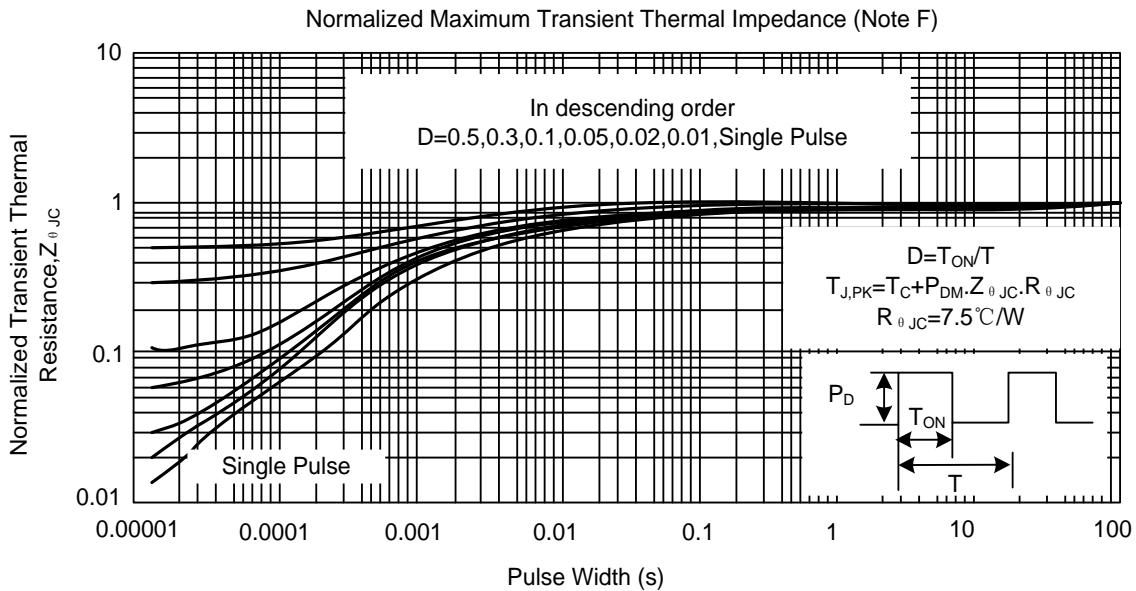
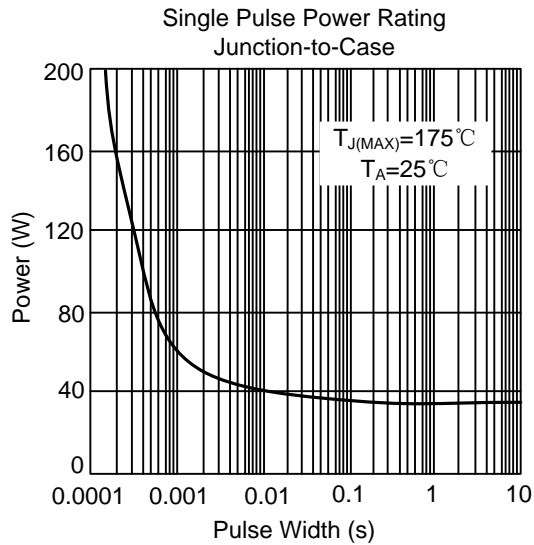
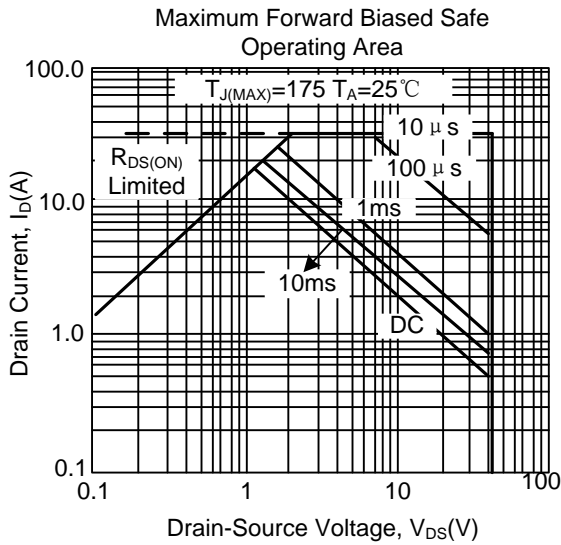
3. Surface Mounted on $1in^2$ pad area, $t \leq 10sec$.

■ TYPICAL CHARACTERISTICS

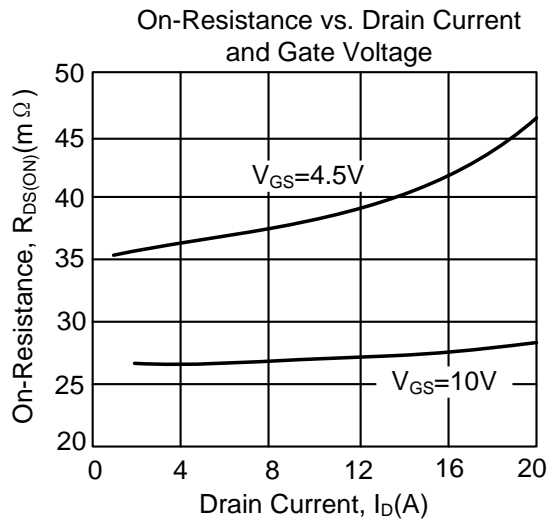
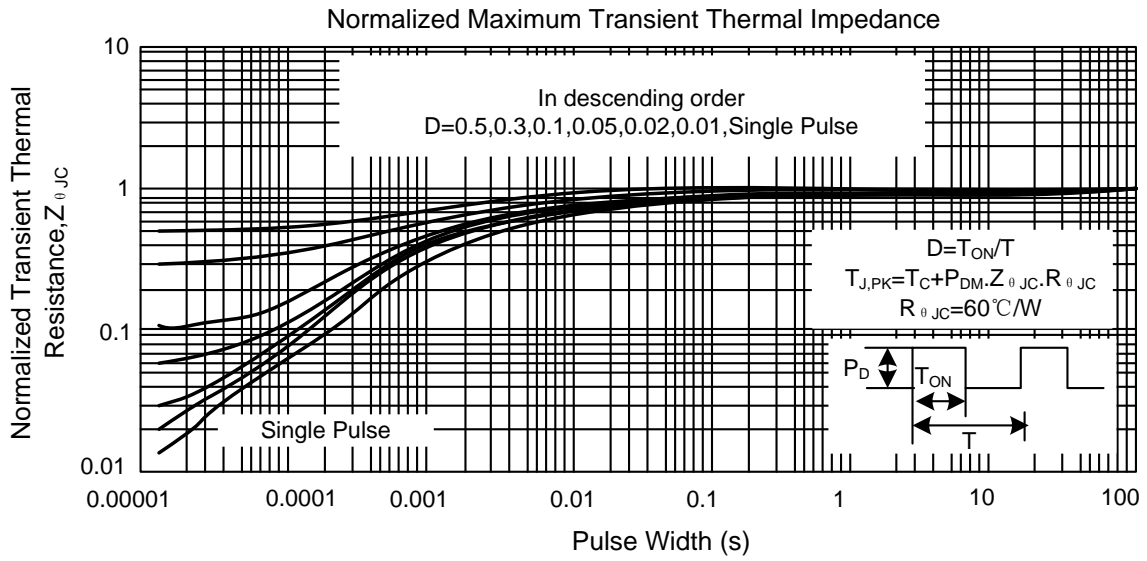
N-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)

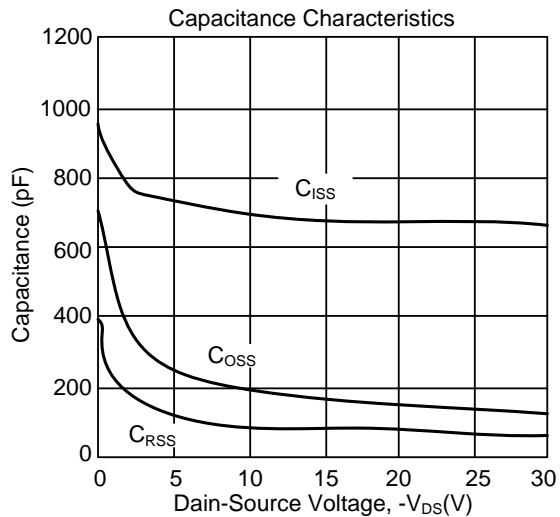
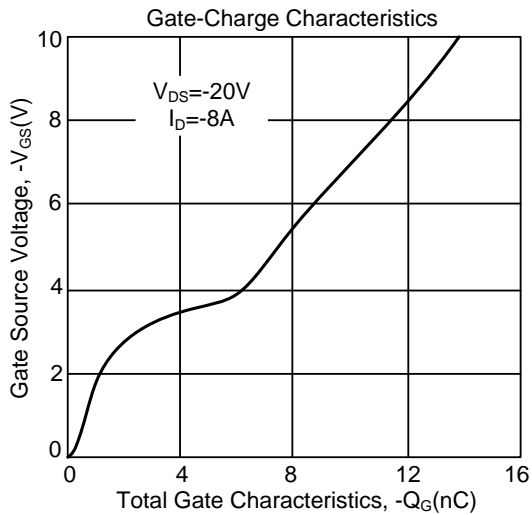
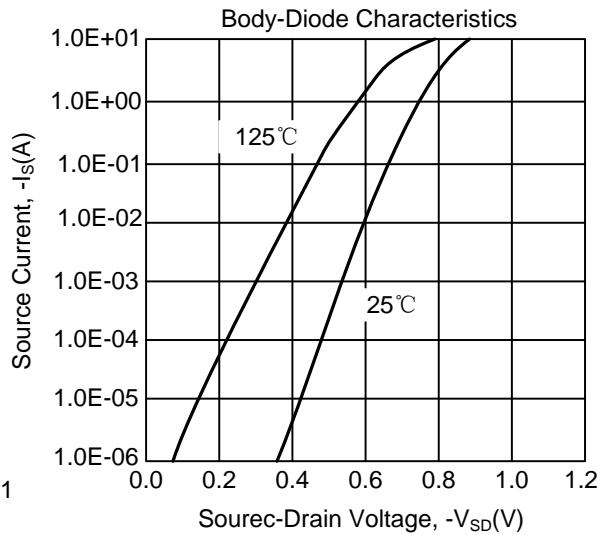
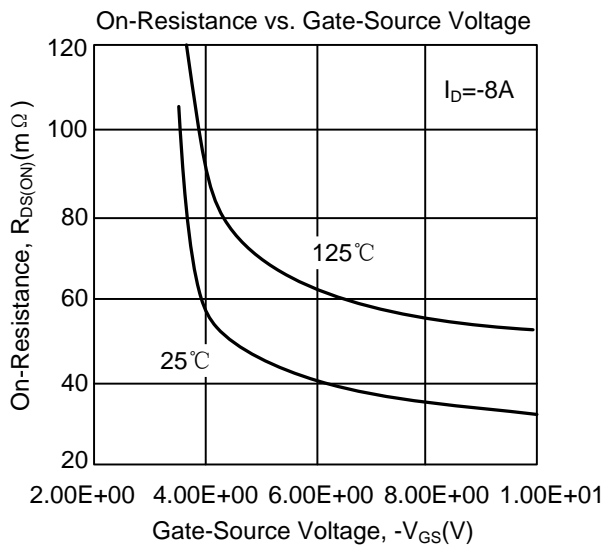
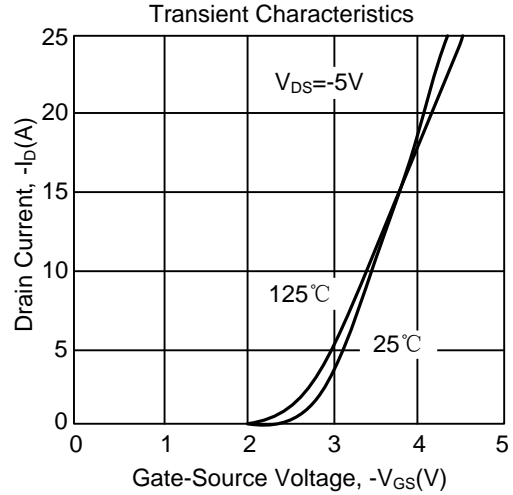
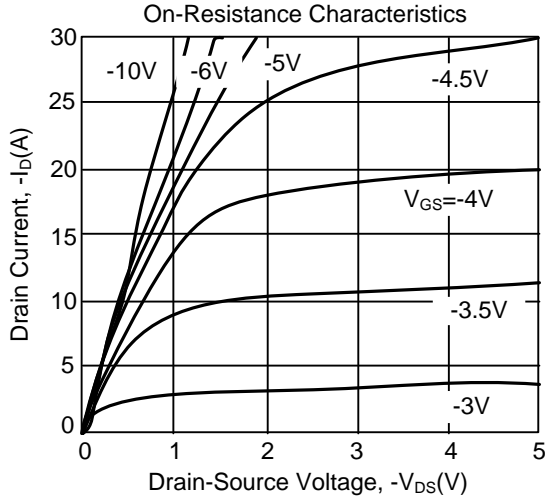


■ TYPICAL CHARACTERISTICS (Cont.)

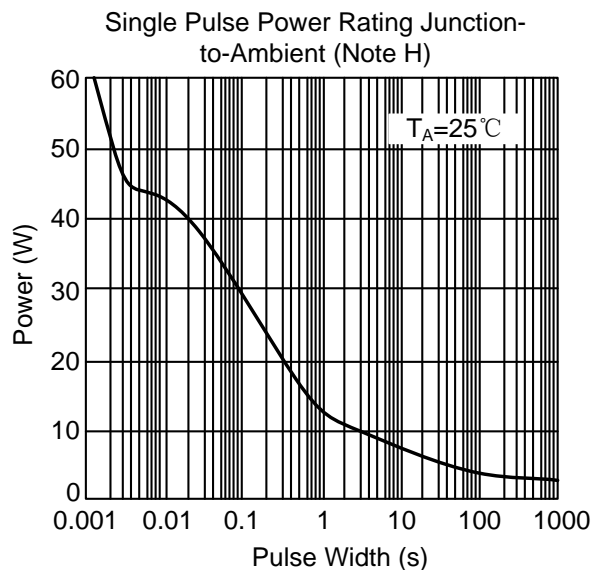
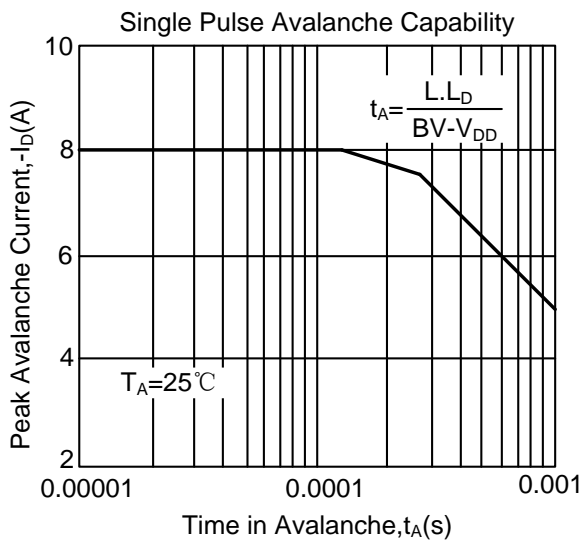
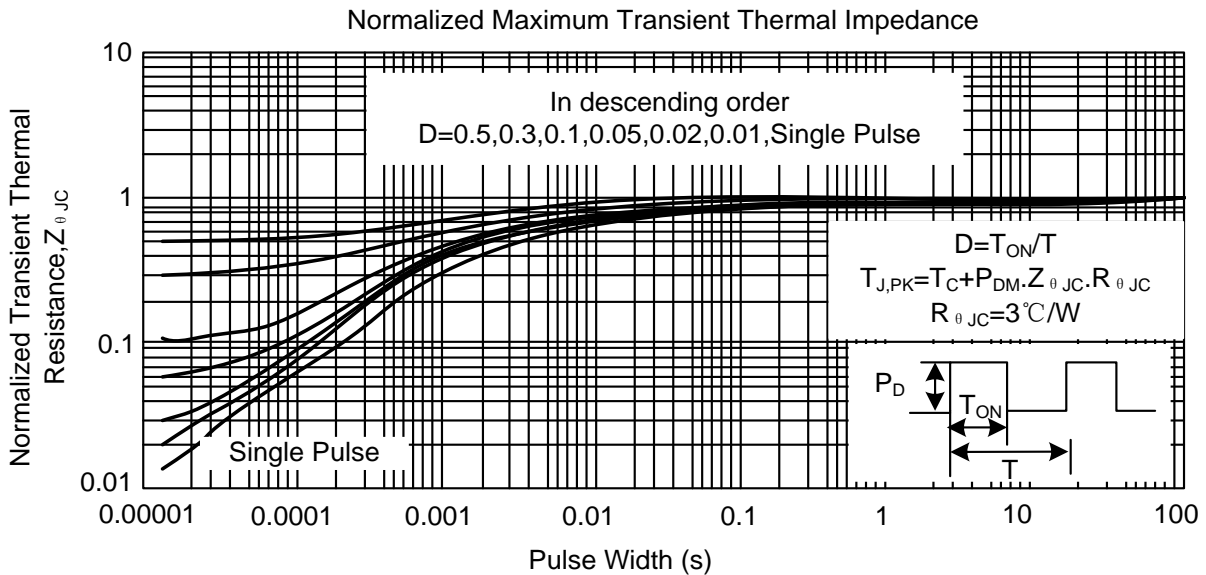
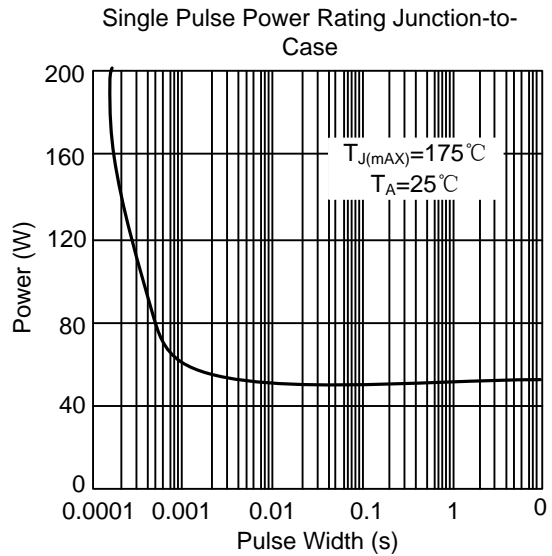
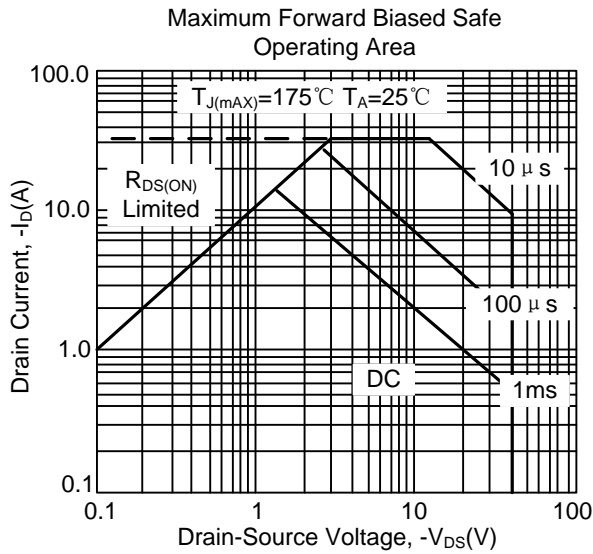


■ TYPICAL CHARACTERISTICS (Cont.)

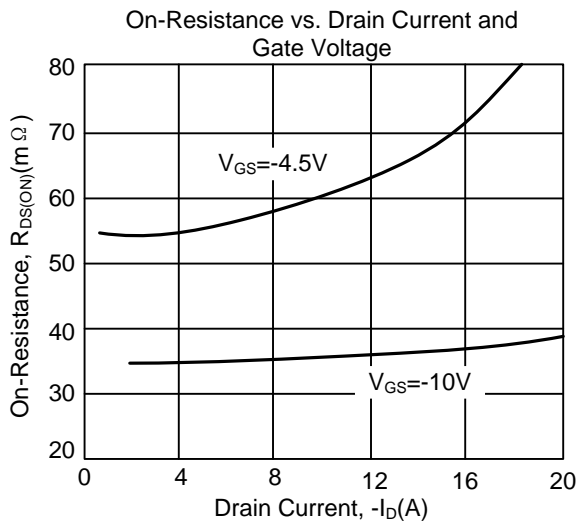
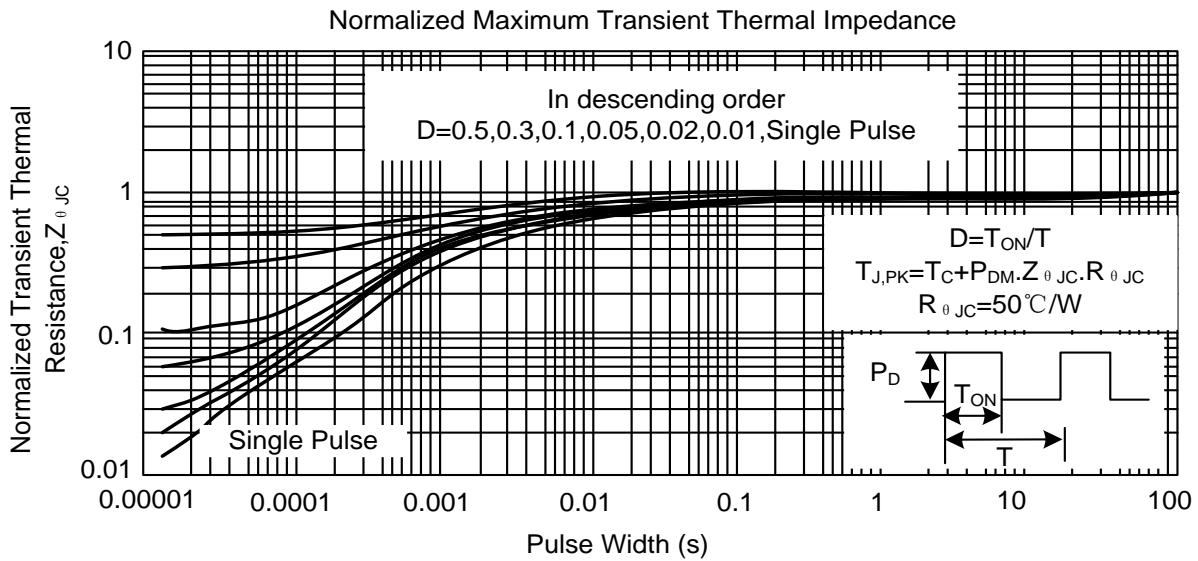
P-CHANNEL:



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.