

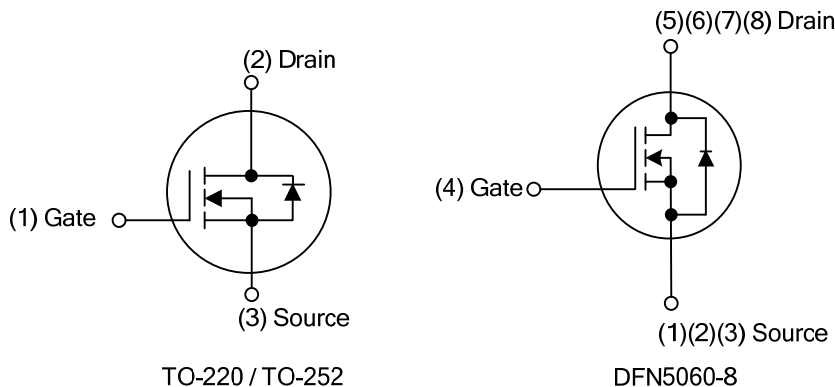
**UTT31N10M****Power MOSFET****31A, 100V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UTT31N10M** is a N-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance, etc.

The UTC **UTT31N10M** is suitable for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

FEATURES

- * $R_{DS(ON)} < 18.5\text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=20\text{A}$
- $R_{DS(ON)} < 21\text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=18\text{A}$
- * High frequency switching performance

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT31N10ML-TA3-R	UTT31N10MG-TA3-R	TO-220	G	D	S	-	-	-	-	-	Tube
UTT31N10ML-TN3-R	UTT31N10MG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT31N10MG-K08-5060-R	UTT31N10MG-K08-5060-R	DFN5060-8	S	S	S	G	D	D	D	D	Tape Reel

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

UTT31N10MG-TA3-R 		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252 K08-5060: DFN5060-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-252	DFN5060-8
UTC UTT31N10M □ □ □ □ □ □ Lot Code ← → Data Code 1 L: Lead Free G: Halogen Free	UTC UTT 31N10M • □ □ □ □ □ Lot Code ← → Date Code

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	100	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current	T _C =25°C	I _D	31	A	
	T _C =100°C		21.5	A	
Pulsed Drain Current (Note 3)			I _{DM}	80	A
Continuous Drain Current	T _A =25°C	I _{DSM}	6.5	A	
	T _A =70°C		5	A	
Avalanche Current (Note 3)			I _{AS}	18	A
Avalanche energy L=0.1mH (Note 3)			E _{AS}	60	mJ
Power Dissipation (Note 2)	T _C =25°C	TO-220	P _D	125	W
		TO-252		53.5	W
		DFN5060-8		13.6	W
Power Dissipation (Note 1)	T _A =25°C	TO-220		2	W
		TO-252		2.5	W
		DFN5060-8		1.92	W
Junction Temperature			T _J	-55 ~ +150	°C
Storage Temperature Range			T _{STG}	-55 ~ +150	°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. Repetitive Rating : Pulse width limited by junction temperature.

3. $L=0.1\text{mH}$, $I_{AS}=35\text{A}$, $V_{DD}=30\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD}\leq 15\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL CHARACTERISTICS

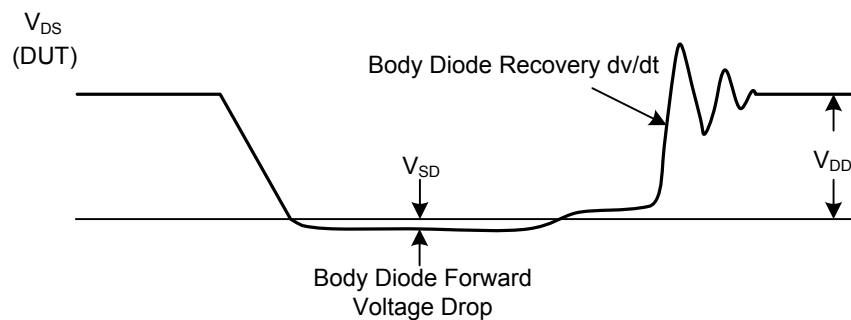
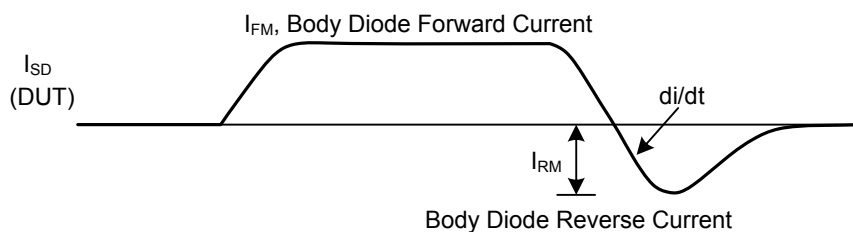
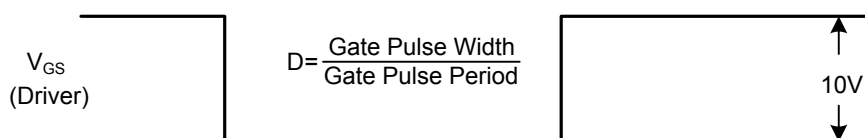
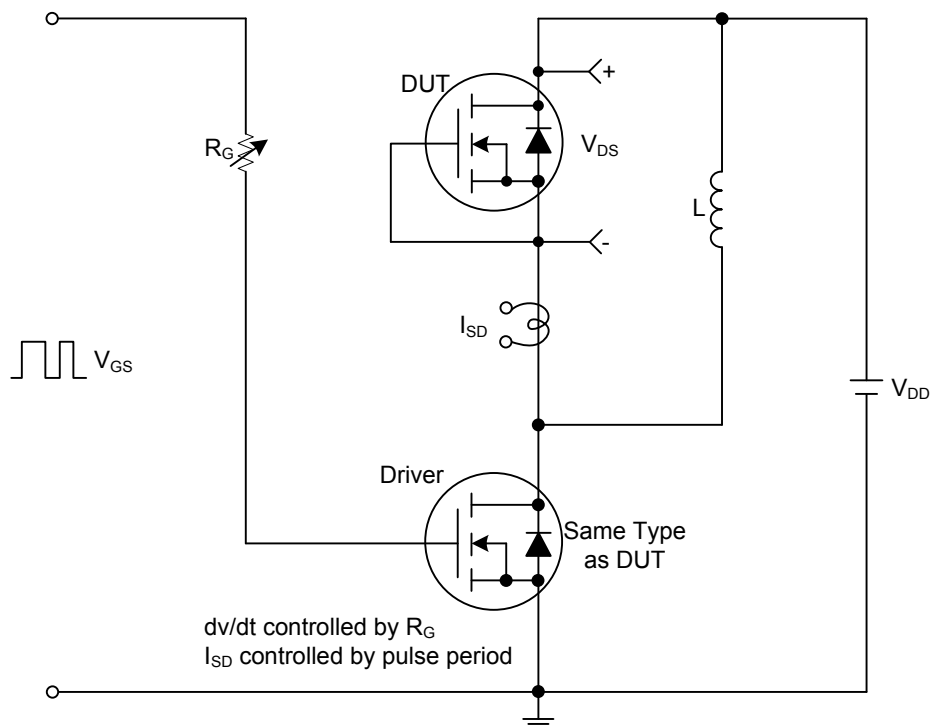
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-252		50	$^\circ\text{C}/\text{W}$
	DFN5060-8		65	$^\circ\text{C}/\text{W}$
Junction-to-Case	TO-220	θ_{JC}	1	$^\circ\text{C}/\text{W}$
	TO-252		2.8	$^\circ\text{C}/\text{W}$
	DFN5060-8		9.1	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	100			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
		V _{DS} =100V, V _{GS} =0V, T _J =55°C			5	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
On State Drain Current	I _{D(ON)}	V _{GS} =10V, V _{DS} =5V	80			A
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A			24	mΩ
		V _{GS} =10V, I _D =20A, T _J =125°C			42	mΩ
		V _{GS} =4.5V, I _D =18A			33	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A		40		S
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		5300		pF
Output Capacitance	C _{OSS}			350		pF
Reverse Transfer Capacitance	C _{RSS}			20		pF
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	0.5	1.1	1.7	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =20A, I _G =3mA (Note 1, 2)		76		nC
Gate to Source Charge	Q _{GS}			22		nC
Gate to Drain Charge	Q _{GD}			9		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} = 30V, V _{GS} = 10V, I _D = 0.5A, R _G = 25Ω (Note 1, 2)		110		ns
Rise Time	t _R			85		ns
Turn-OFF Delay Time	t _{D(OFF)}			1100		ns
Fall-Time	t _F			210		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				31	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				80	A
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V			1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F =20A, dI/dt=100A/μs		44		ns
Body Diode Reverse Recovery Charge	Q _{rr}			61		nC

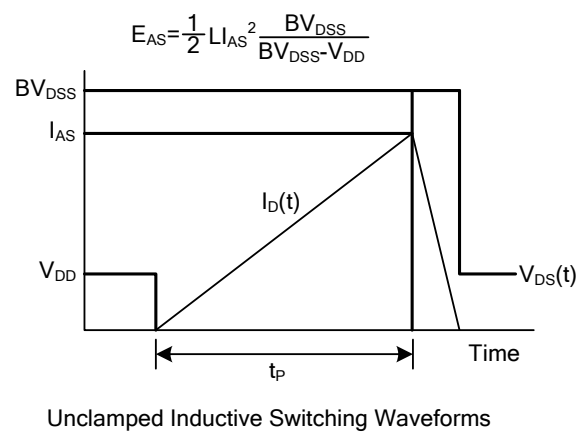
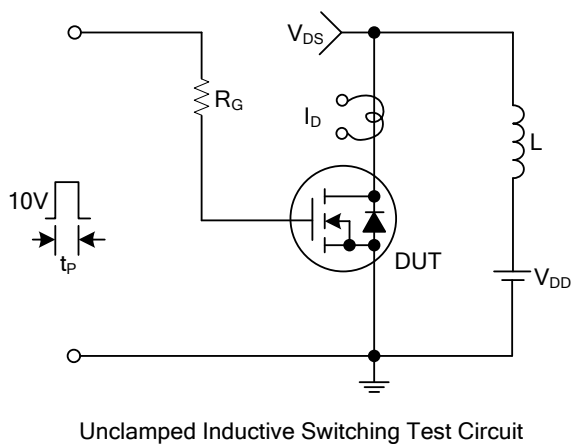
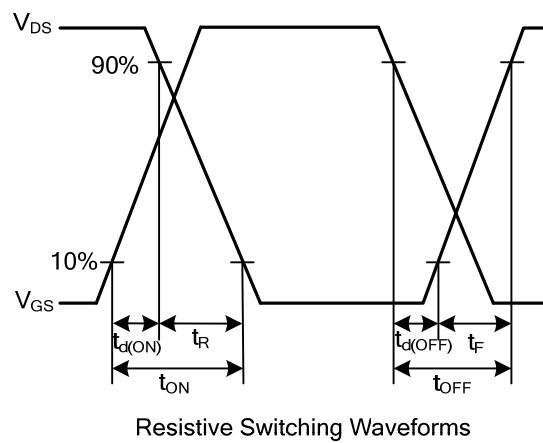
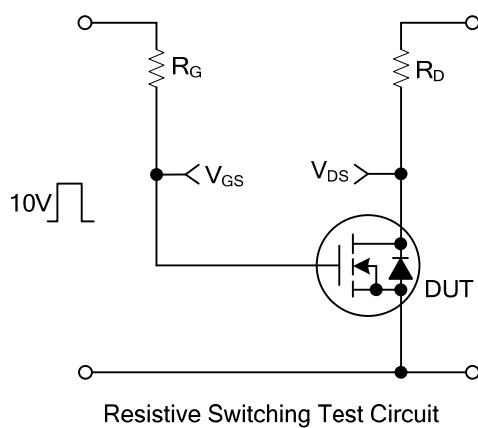
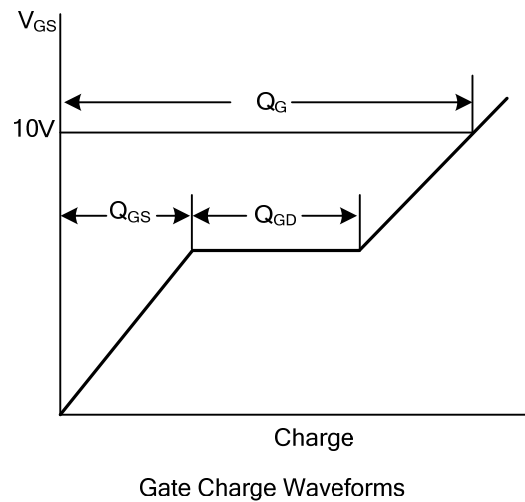
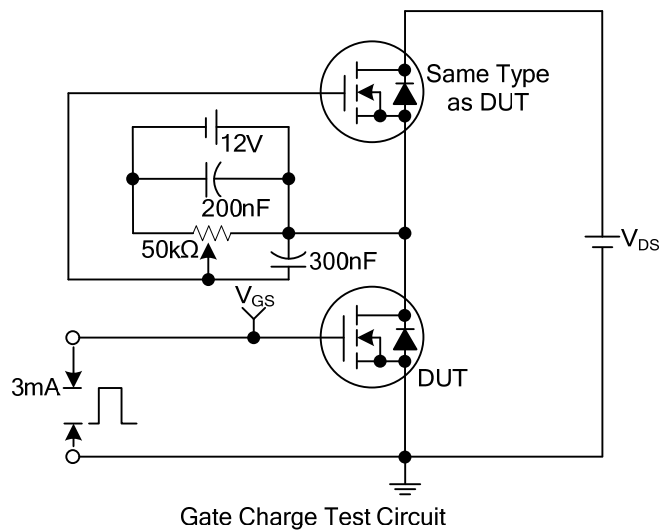
- Notes: 1. The value of θ_{JA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The Power dissipation P_{DSM} is based on θ_{JA} and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
2. The power dissipation P_D is based on T_{J(MAX)}=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.
4. The θ_{JA} is the sum of the thermal impedance from junction to case θ_{JC} and case to ambient.

■ TEST CIRCUITS AND WAVEFORMS

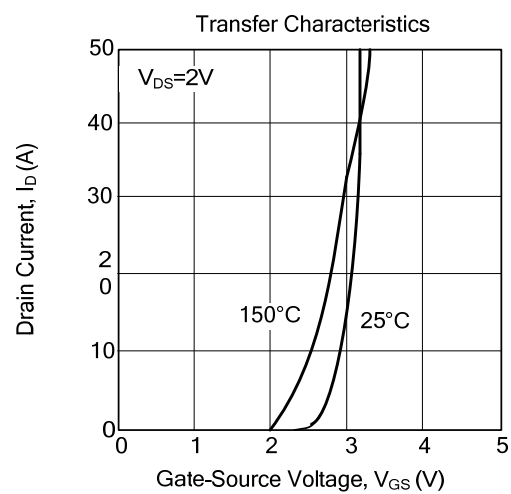
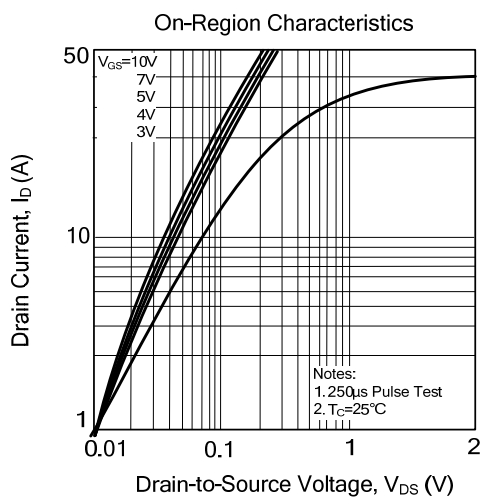
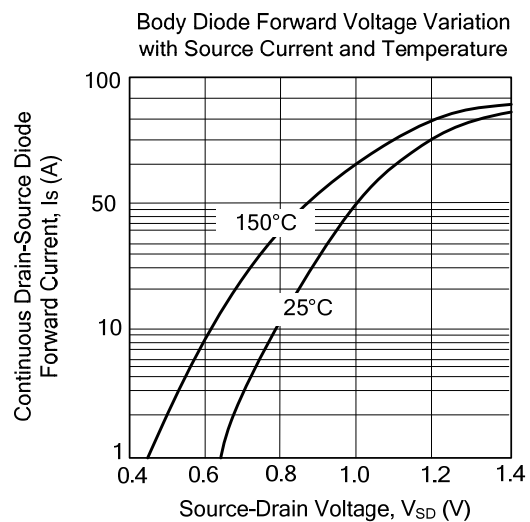
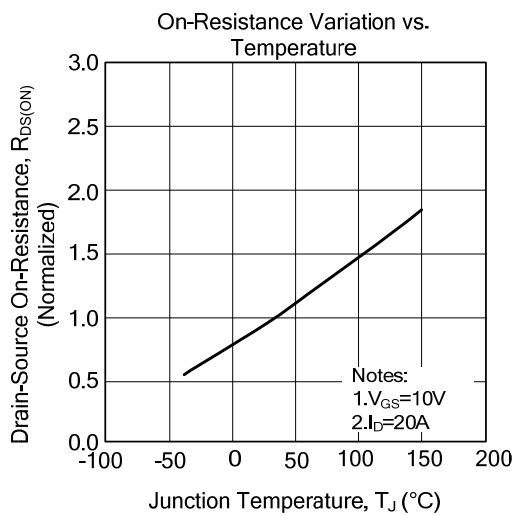
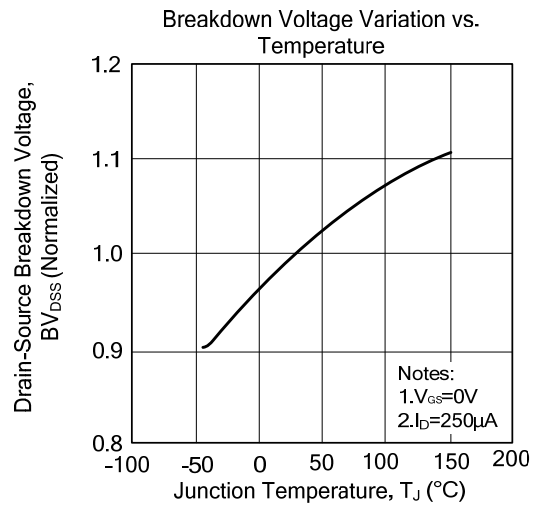
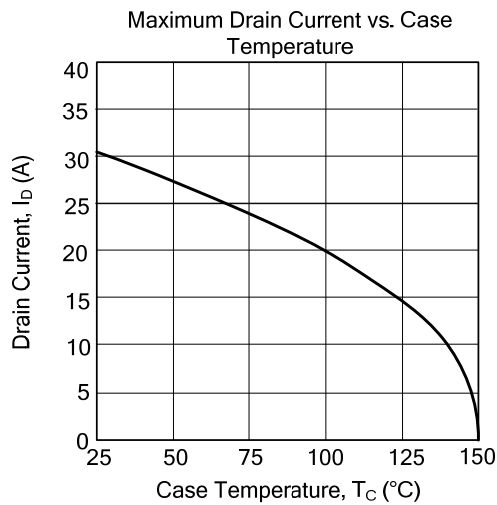


Peak Diode Recovery dv/dt Test Circuit and Waveforms

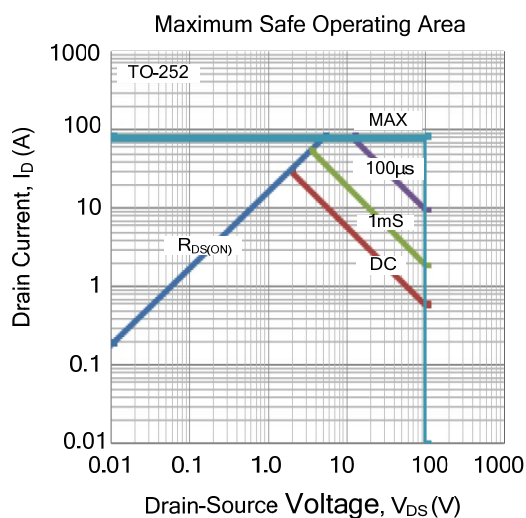
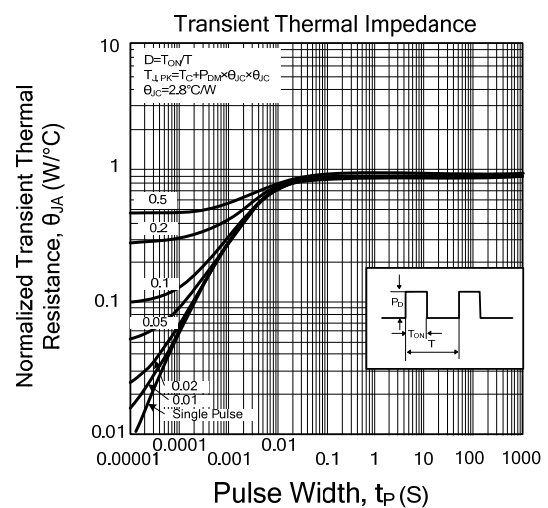
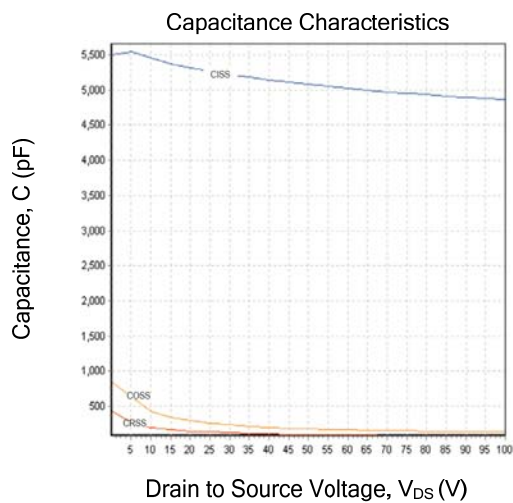
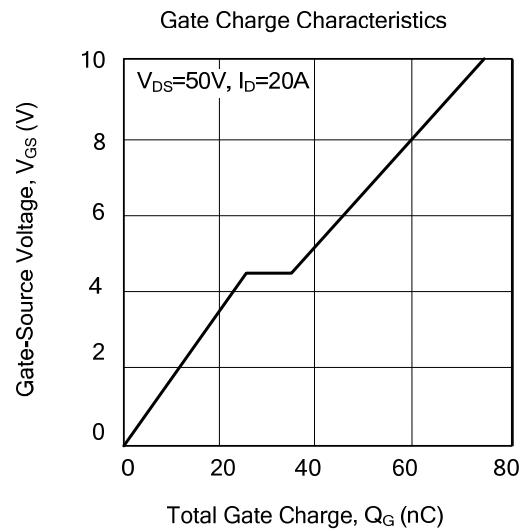
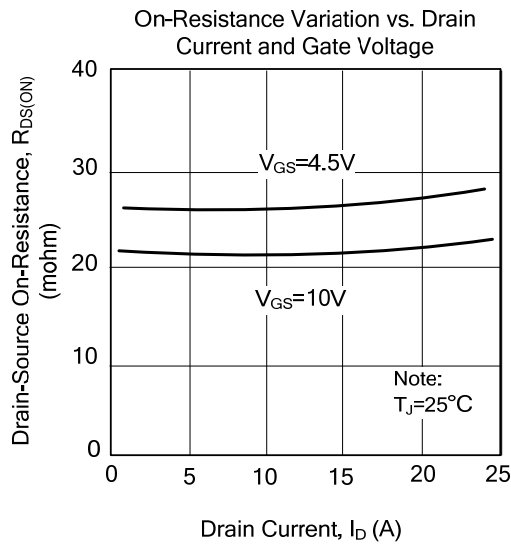
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



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