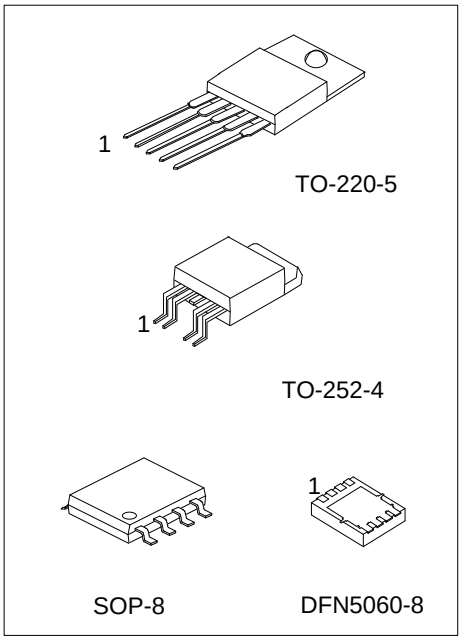
DUAL ENHANCEMENT MODE (N-CHANNEL / P-CHANNEL)



■ DESCRIPTION

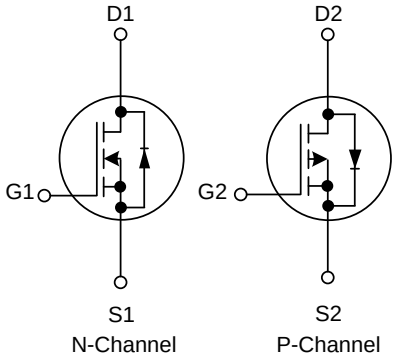
The UTC **UTT10NP06** incorporates a N-channel MOSFET and a P-channel MOSFET，it uses UTC's advanced technology to provide customers a minimum on-state resistance, high switching speed, low gate charge and cost effectiveness.

The UTC **UTT10NP06** is universally applied in low voltage applications.

■ FEATURES

*N-CHANNEL
$R_{DS(on)}$ ≤ 56mΩ @ V_{GS}=10V, I_D=5.0A
$R_{DS(on)}$ ≤ 64mΩ @ V_{GS}=4.5V, I_D=5.0A
*P-CHANNEL
$R_{DS(on)}$ ≤ 68mΩ @ V_{GS}=10V, I_D=5.0A
$R_{DS(on)}$ ≤ 88mΩ @ V_{GS}=4.5V, I_D=5.0A
* High switching speed

■ SYMBOL



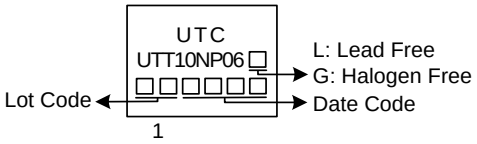
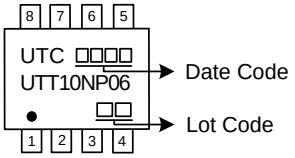
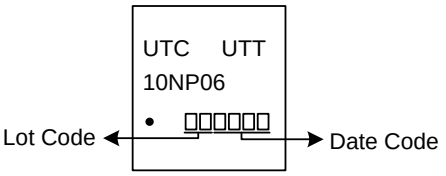
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT10NP06L-TA5-T	UTT10NP06G-TA5-T	TO-220-5	S1	G1	D1D2	S2	G2	-	-	-	Tube
UTT10NP06L-TN4-R	UTT10NP06G-TN4-R	TO-252-4	S1	G1	D1D2	S2	G2	-	-	-	Tape Reel
UTT10NP06L-S08-R	UTT10NP06G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UTT10NP06L-K08-5060-R	UTT10NP06G-K08-5060-R	DFN5060-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

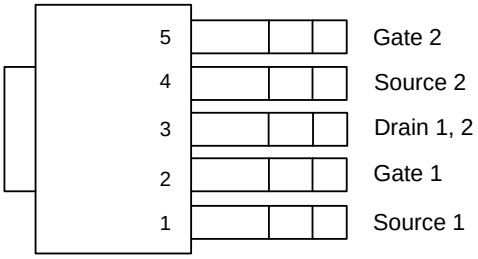
Note: Pin Assignment: G: Gate D: Drain S: Source

UTT10NP06G-TA5-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube, R: Tape Reel (2) TA5:TO-220-5, TN4: TO-252-4, S08: SOP-8 K08-5060: DFN5060-8 (3) G: Halogen Free and Lead Free, L: Lead Free

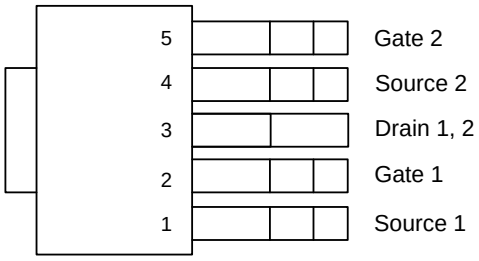
■ MARKING

PACKAGE	MARKING
TO-220-5 TO-252-4	
SOP-8	
DFN5060-8	

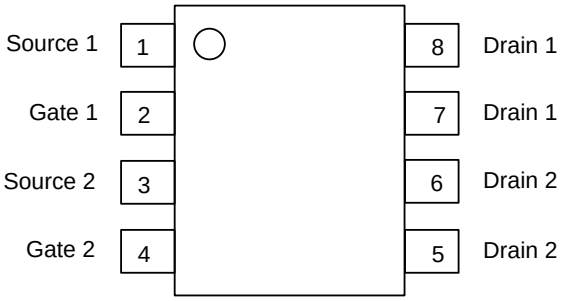
■ PIN CONFIGURATION



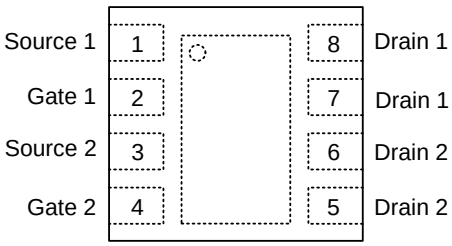
TO-220-5



TO-252-4



SOP-8



Top View
DFN5060-8

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS N-CHANNEL	RATINGS P-CHANNEL	UNIT
Drain-Source Voltage			V_{DSS}	60	-60	V
Gate-Source Voltage			V_{GSS}	±20	±20	V
Drain Current	Continuous	T_C=25°C	I_D	10	-10	A
	Pulsed (Note 2)		I_{DM}	20	-20	A
Power Dissipation	T_A=25°C	TO-220-5	P_D	2		W
		TO-252-4		2		W
		SOP-8		1.25		W
		DFN5060-8		1.9		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. Pulse width limited by maximum junction temperature.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220-5	θ_{JA}	62.5	°C/W
	TO-252-4		62.5 (Note)	°C/W
	SOP-8		100 (Note)	°C/W
	DFN5060-8		65 (Note)	°C/W

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

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

N-Channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V, T_J=25°C			1	μA
			V_{DS}=48V, V_{GS}=0V, T_J=125°C			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V			+100	nA
	Reverse		V_{GS}=-20V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance (Note)		$R_{DS(ON)}$	V_{GS}=10V, I_D=5.0A			56	mΩ
			V_{GS}=4.5V, I_D=5.0A			64	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		818		pF
Output Capacitance		C_{OSS}			80		pF
Reverse Transfer Capacitance		C_{RSS}			60		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note)		Q_G	V_{GS}=10V, V_{DS}=30V, I_D=10A		20		nC
Gate to Source Charge		Q_{GS}			3.6		nC
Gate to Drain Charge		Q_{GD}			4.2		nC
Turn-ON Delay Time (Note)		$t_{D(ON)}$	V_{DS}=30V, V_{GS}=10V, I_D=10A, R_G=3.3Ω		12		ns
Rise Time		t_R			15		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			35		ns
Fall-Time		t_F			17		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage (Note)		V_{SD}	I_S=1.7A, V_{GS}=0V			1.2	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

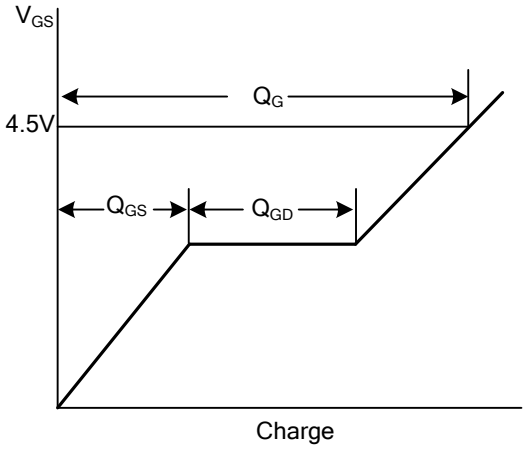
P-Channel

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-60V, V_{GS}=0V, T_J=25°C			-1	μA
			V_{DS}=-48V, V_{GS}=0V, T_J=125°C			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V			+100	nA
	Reverse		V_{GS}=-20V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-5.0A			68	mΩ
			V_{GS}=-4.5V, I_D=-5.0A			88	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		1780		pF
Output Capacitance		C_{OSS}			124		pF
Reverse Transfer Capacitance		C_{RSS}			100		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note)		Q_G	V_{GS}=-10V, V_{DS}=-30V, I_D=-10A		38		nC
Gate to Source Charge		Q_{GS}			5		nC
Gate to Drain Charge		Q_{GD}			6.5		nC
Turn-ON Delay Time (Note)		$t_{D(ON)}$	V_{DS}=-30V, V_{GS}=-10V, I_D=-10A, R_G=3.3Ω		23		ns
Rise Time		t_R			15		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			55		ns
Fall-Time		t_F			16.4		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage (Note)		V_{SD}	I_S=-1.7A, V_{GS}=0V			-1.2	V

Note: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

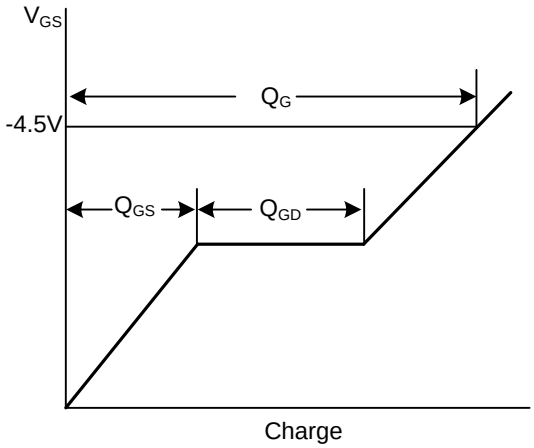
■ TEST CIRCUITS AND WAVEFORMS

N-CHANNEL



Gate Charge Waveforms

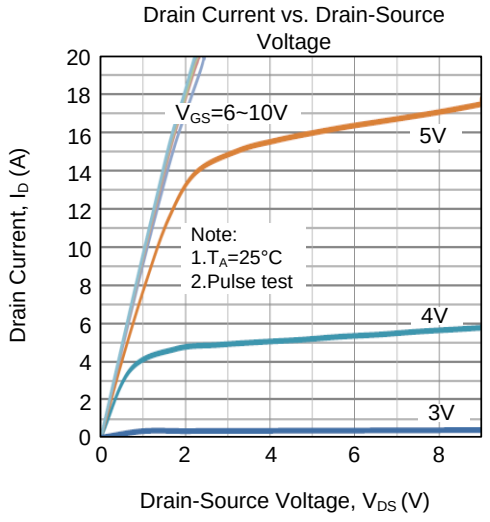
P-CHANNEL

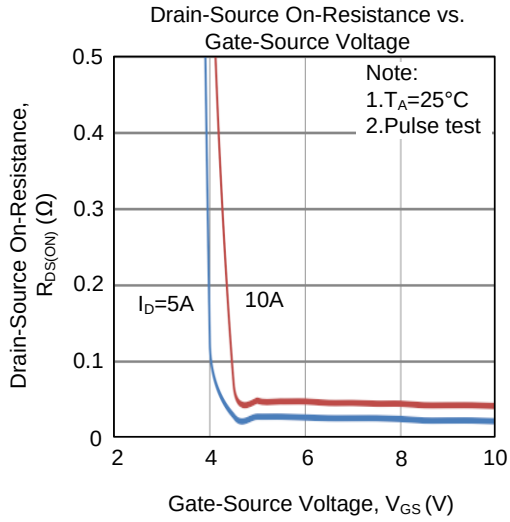


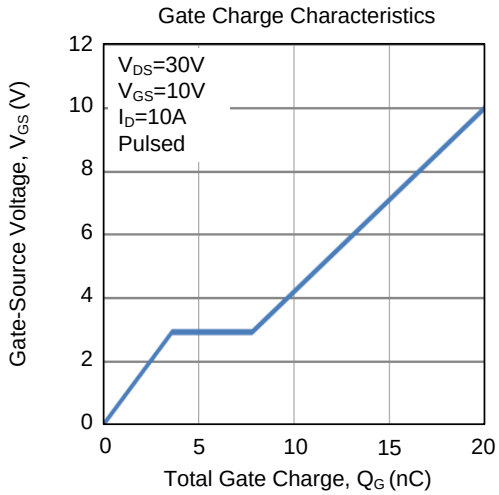
Gate Charge Waveforms

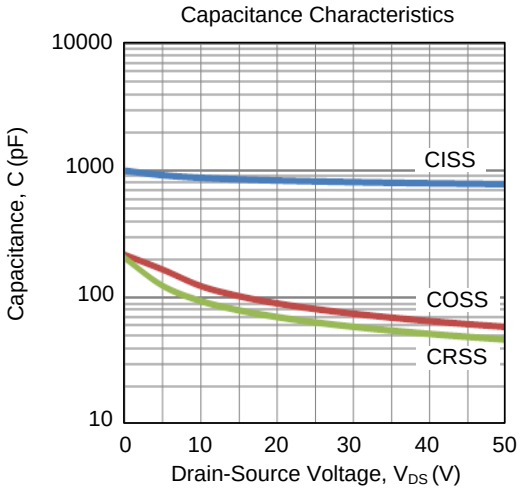
■ TYPICAL CHARACTERISTICS

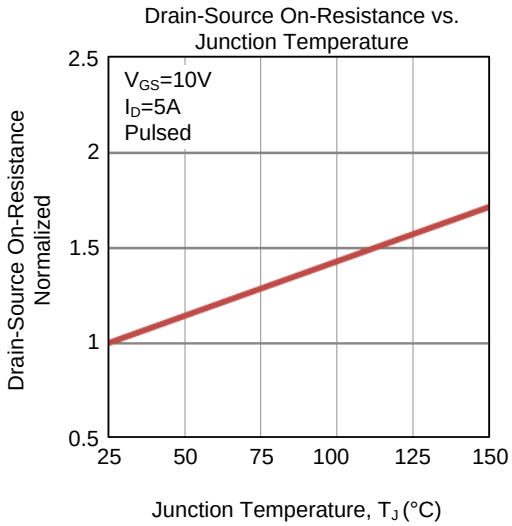
N-CHANNEL

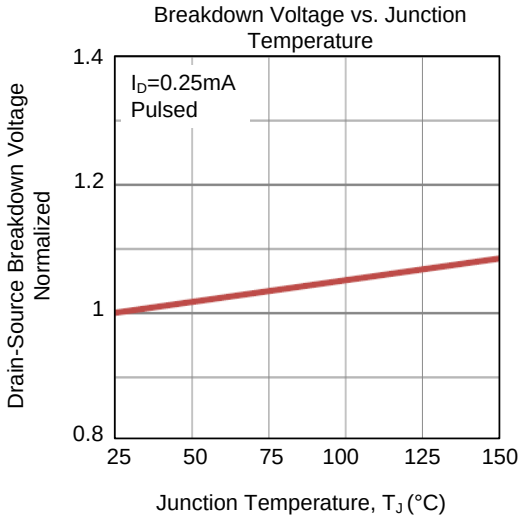






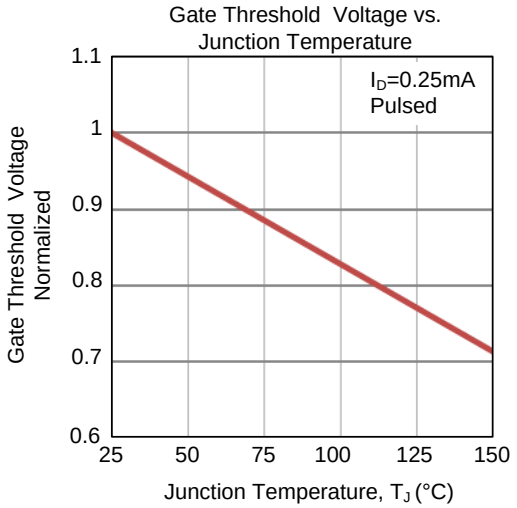


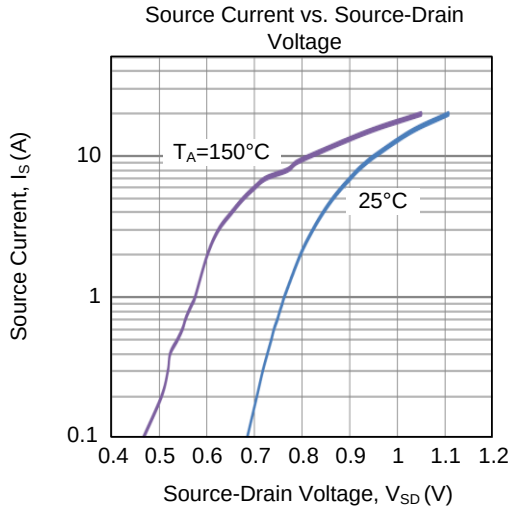


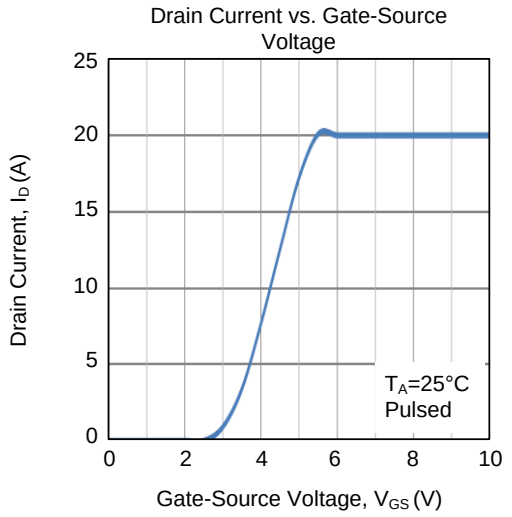


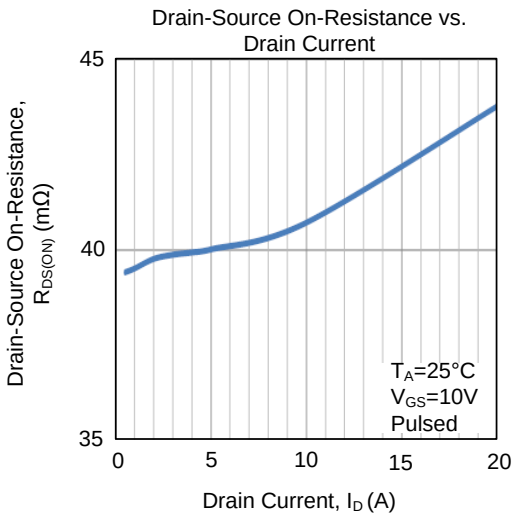
■ TYPICAL CHARACTERISTICS (Cont.)

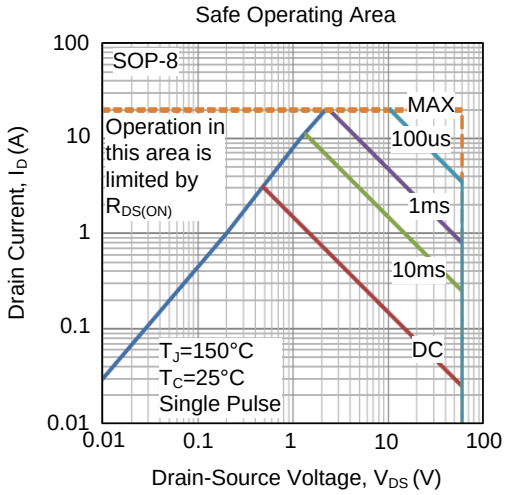
N-CHANNEL





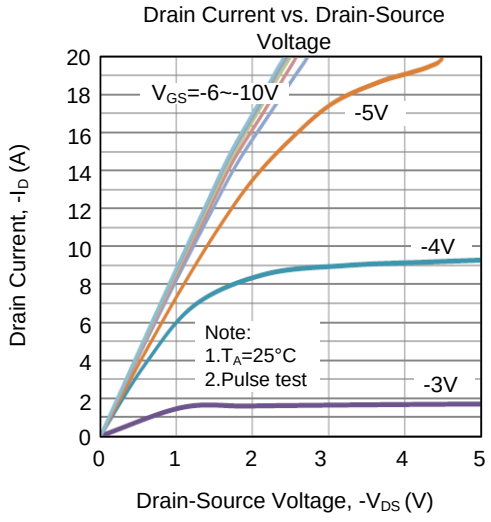


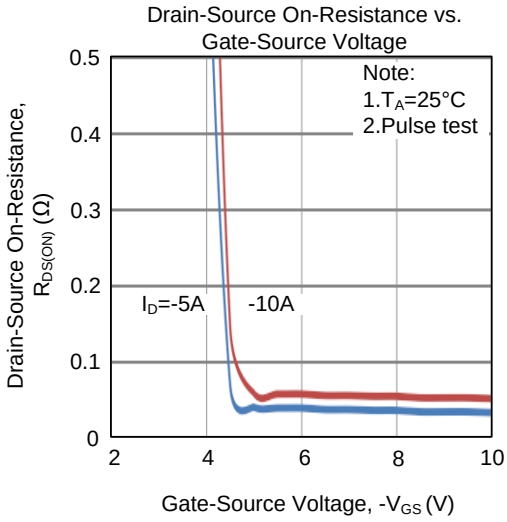


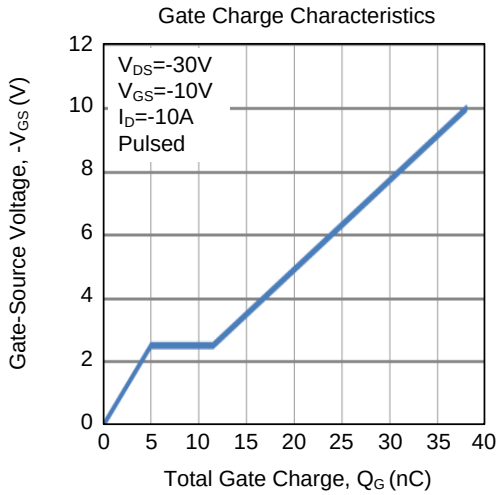


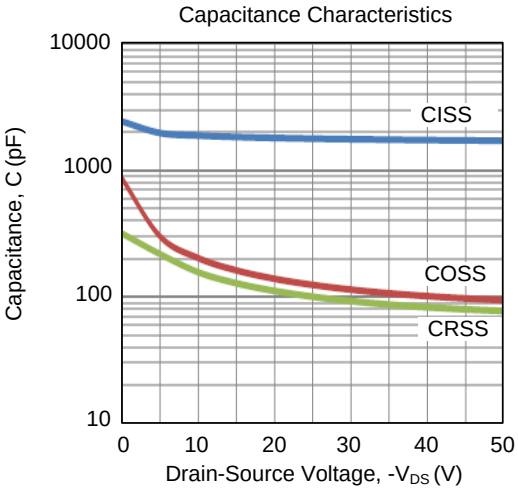
■ TYPICAL CHARACTERISTICS (Cont.)

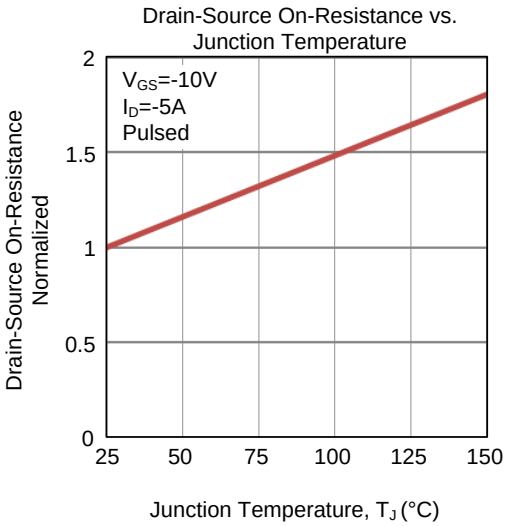
P-CHANNEL

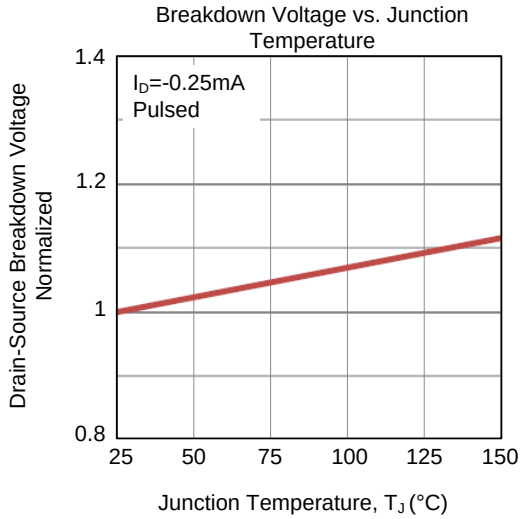






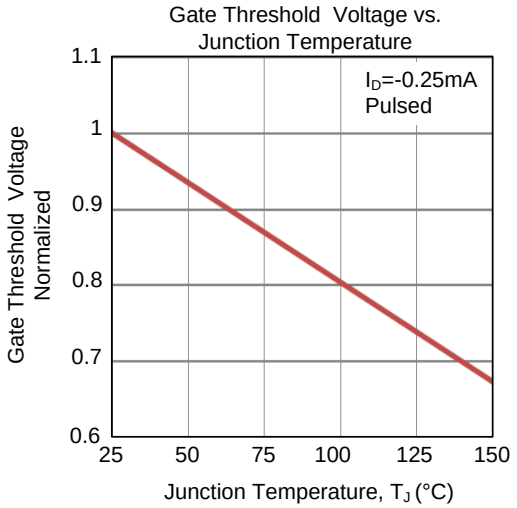


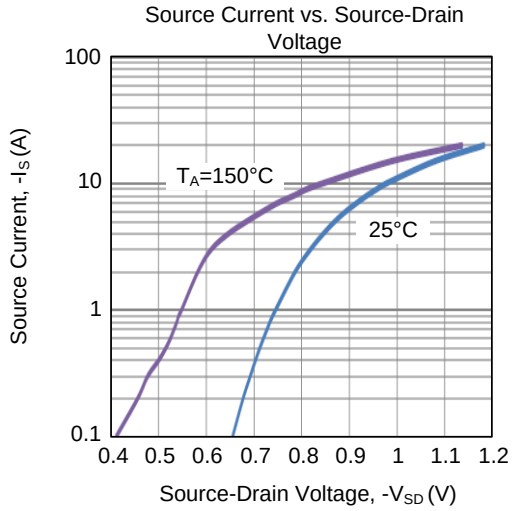


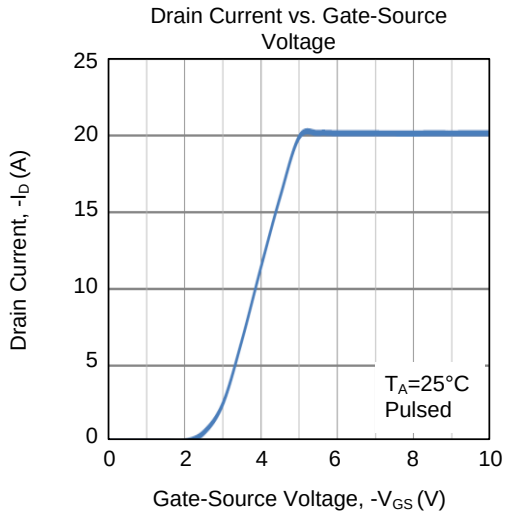


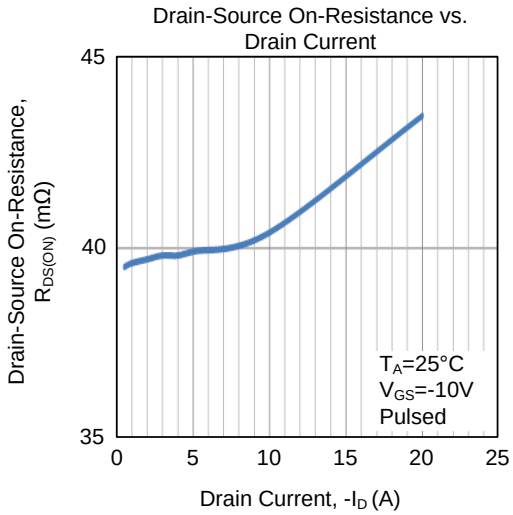
■ TYPICAL CHARACTERISTICS (Cont.)

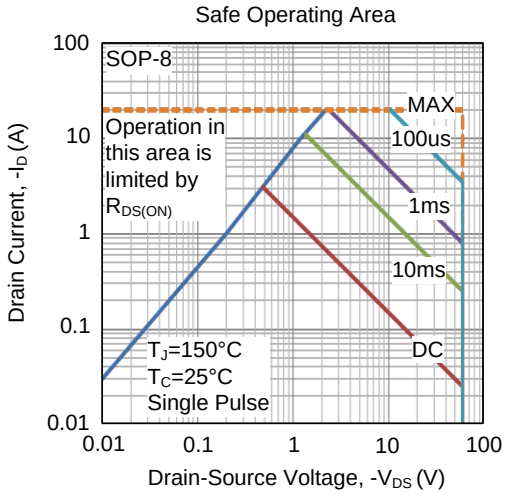
P-CHANNEL











■ TYPICAL CHARACTERISTICS (Cont.)