



UTT10NP06

Power MOSFET

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

$R_{DS(on)} \leq 56m\Omega @ V_{GS}=10V, I_D=5.0A$

$R_{DS(on)} \leq 64m\Omega @ V_{GS}=4.5V, I_D=5.0A$

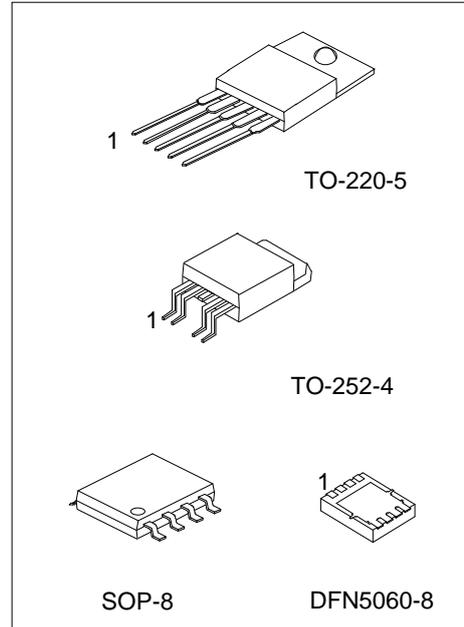
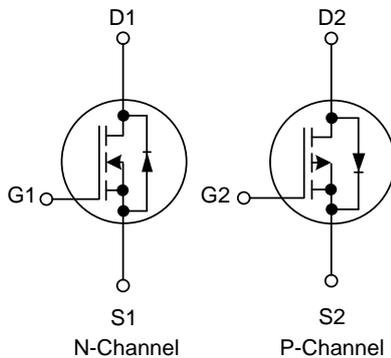
*P-CHANNEL

$R_{DS(on)} \leq 68m\Omega @ V_{GS}=10V, I_D=5.0A$

$R_{DS(on)} \leq 88m\Omega @ V_{GS}=4.5V, I_D=5.0A$

* 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

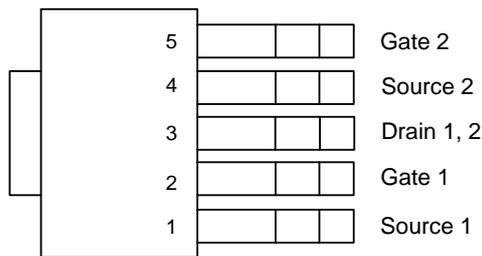
Note: Pin Assignment: G: Gate D: Drain S: Source

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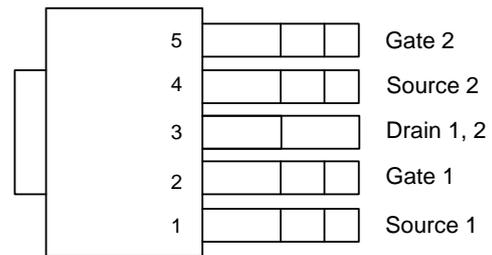
MARKING

PACKAGE	MARKING
TO-220-5 TO-252-4	<p>UTC UTT10NP06 □ □□□□ □ Lot Code ← → Date Code</p> <p>L: Lead Free G: Halogen Free</p>
SOP-8	<p>UTC □□□□ → Date Code UTT10NP06 □ □□□□ → Lot Code</p>
DFN5060-8	<p>UTC UTT 10NP06 • □□□□ □ Lot Code ← → Date Code</p>

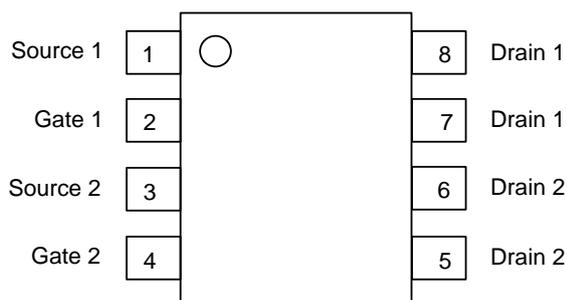
PIN CONFIGURATION



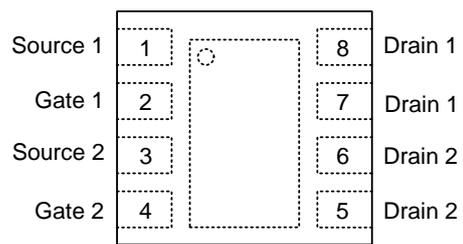
TO-220-5



TO-252-4



SOP-8



Top View
DFN5060-8

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER			SYMBOL	RATINGS		UNIT
				N-CHANNEL	P-CHANNEL	
Drain-Source Voltage			V_{DSS}	60	-60	V
Gate-Source Voltage			V_{GSS}	± 20	± 20	V
Drain Current	Continuous	$T_C=25^\circ\text{C}$	I_D	10	-10	A
	Pulsed (Note 2)		I_{DM}	20	-20	A
Power Dissipation	$T_A=25^\circ\text{C}$	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		$^\circ\text{C}$
Storage Temperature Range			T_{STG}	-55 ~ +150		$^\circ\text{C}$

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			
	TO-252-4	62.5 (Note)	$^\circ\text{C/W}$	
	SOP-8	100 (Note)	$^\circ\text{C/W}$	
	DFN5060-8	65 (Note)	$^\circ\text{C/W}$	

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

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

N-Channel

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60			V	
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			1	μA	
		$V_{DS}=48\text{V}, V_{GS}=0\text{V}, T_J=125^\circ\text{C}$			10	μA	
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20\text{V}$			+100	nA
	Reverse			$V_{GS}=-20\text{V}$			-100
ON CHARACTERISTICS							
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V	
Static Drain-Source On-State Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=5.0\text{A}$			56	m Ω	
		$V_{GS}=4.5\text{V}, I_D=5.0\text{A}$			64	m Ω	
DYNAMIC PARAMETERS							
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1.0\text{MHz}$		818		pF	
Output Capacitance	C_{OSS}			80		pF	
Reverse Transfer Capacitance	C_{RSS}			60		pF	
SWITCHING PARAMETERS							
Total Gate Charge (Note)	Q_G	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, I_D=10\text{A}$		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)	$t_{D(ON)}$	$V_{DS}=30\text{V}, V_{GS}=10\text{V}, I_D=10\text{A}, R_G=3.3\Omega$		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}	$I_S=1.7\text{A}, V_{GS}=0\text{V}$			1.2	V	

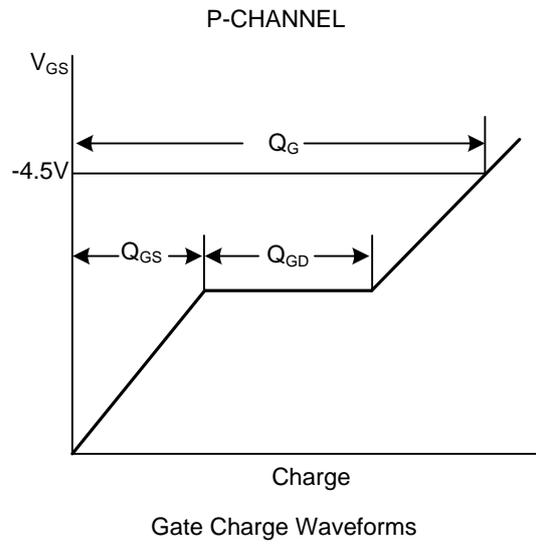
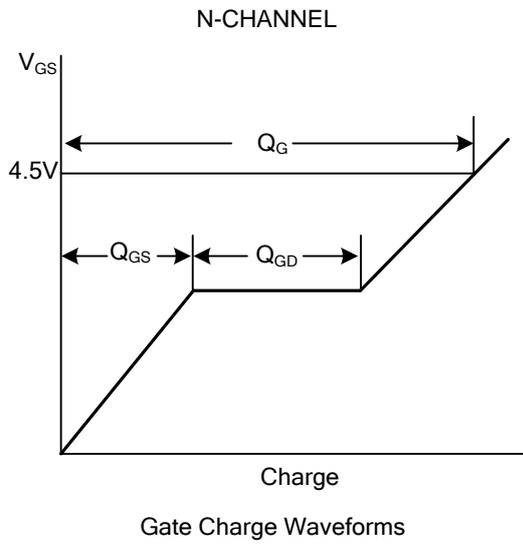
■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = -250\mu A, V_{GS} = 0V$	-60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = -60V, V_{GS} = 0V, T_J = 25^\circ C$			-1	μA
		$V_{DS} = -48V, V_{GS} = 0V, T_J = 125^\circ C$			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}			+100	nA
	Reverse					
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note)	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -5.0A$			68	m Ω
		$V_{GS} = -4.5V, I_D = -5.0A$			88	m Ω
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)	$t_{D(ON)}$	$V_{DS} = -30V, V_{GS} = -10V, I_D = -10A, R_G = 3.3\Omega$		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

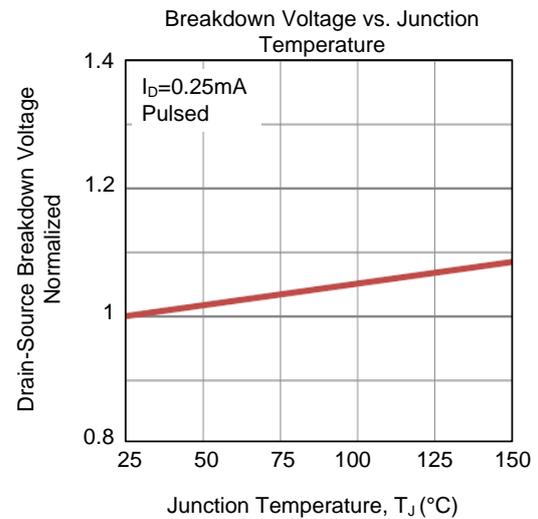
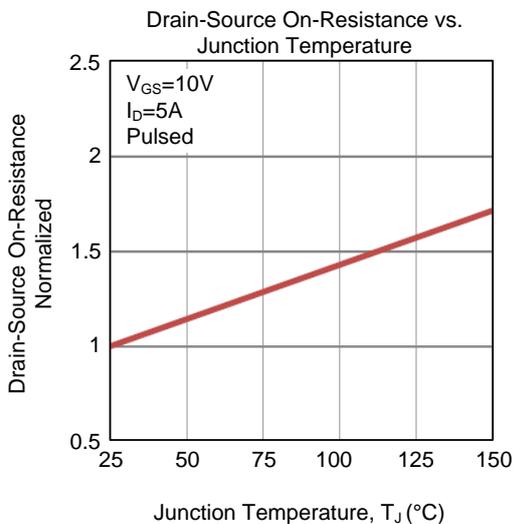
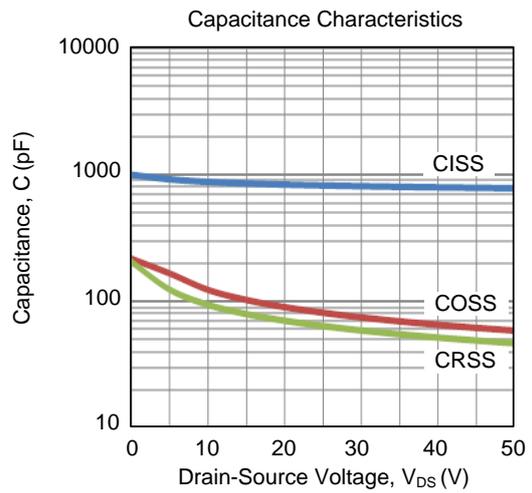
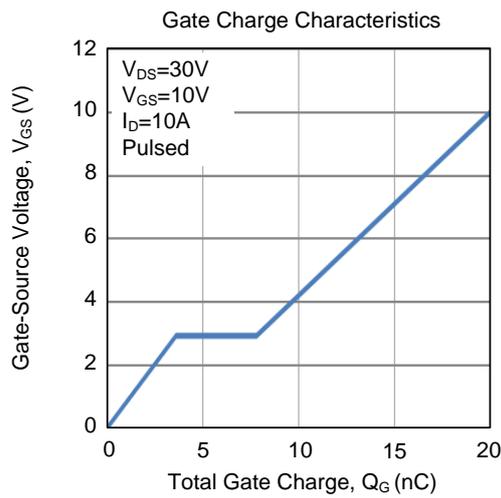
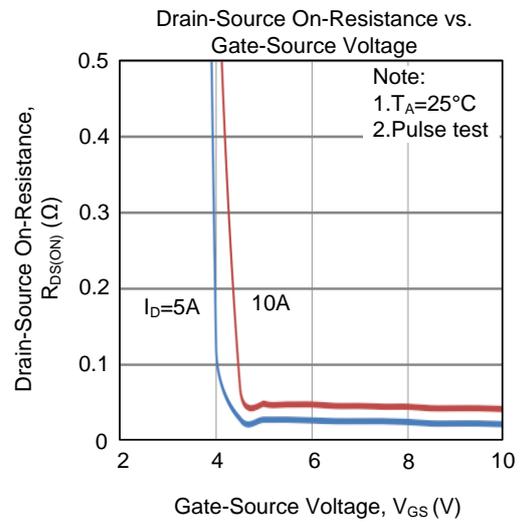
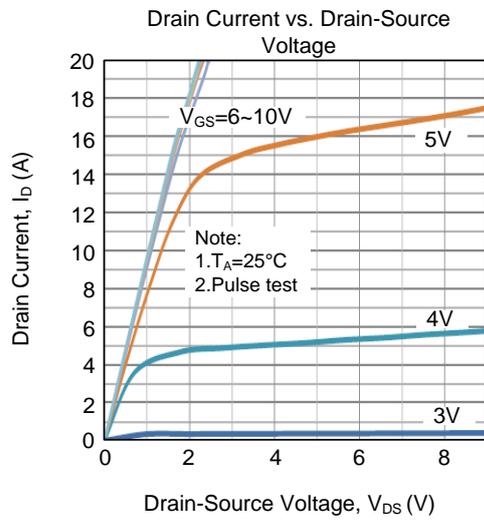
Note: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

■ TEST CIRCUITS AND WAVEFORMS



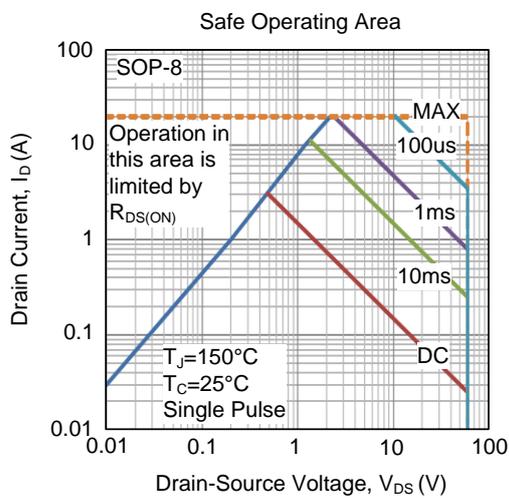
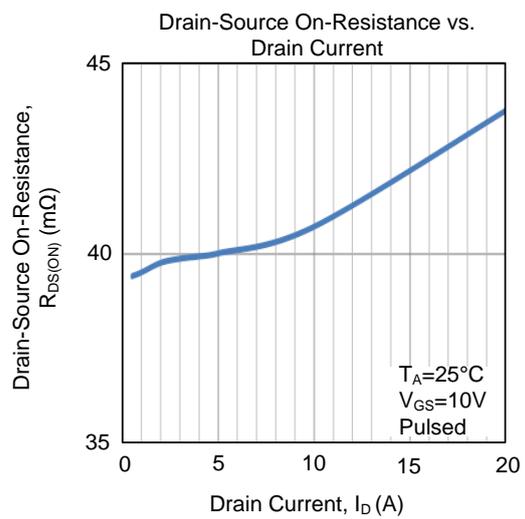
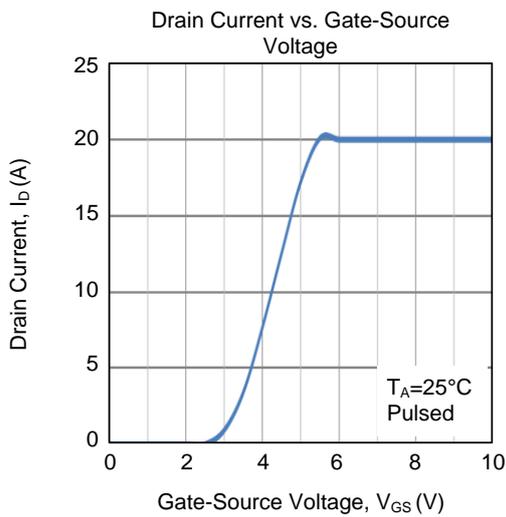
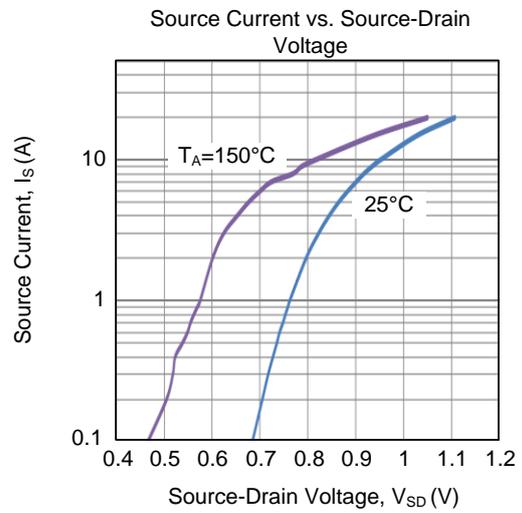
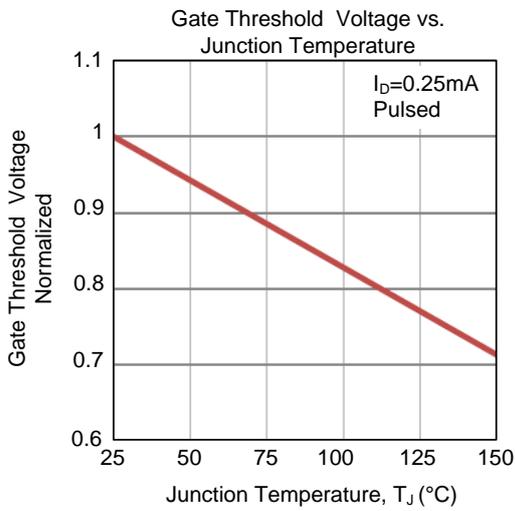
TYPICAL CHARACTERISTICS

N-CHANNEL



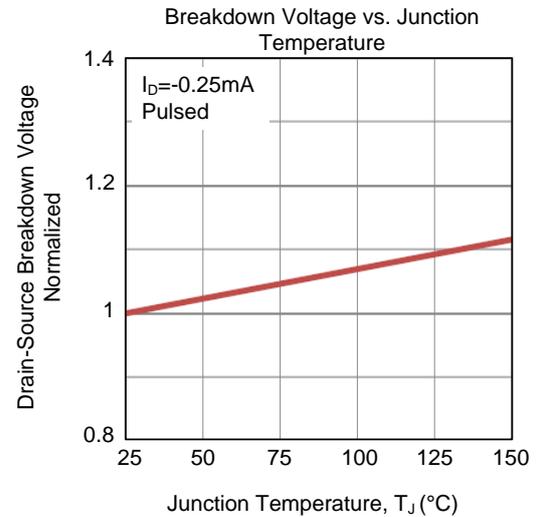
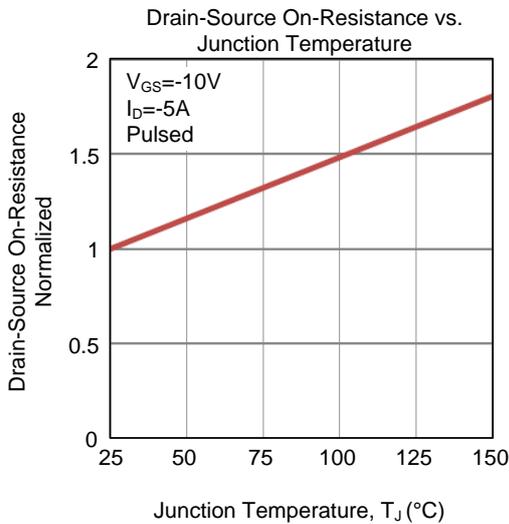
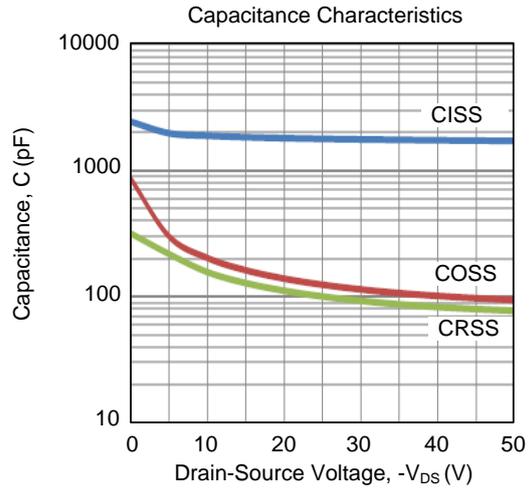
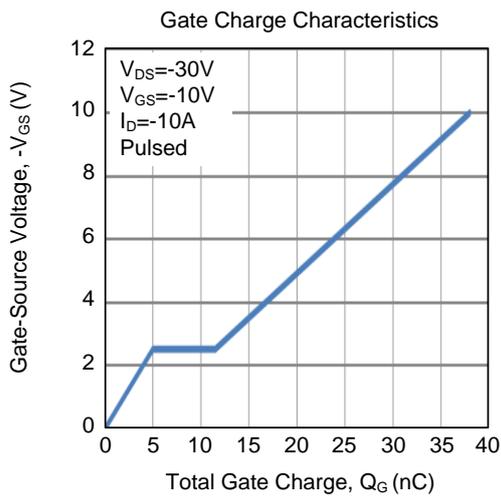
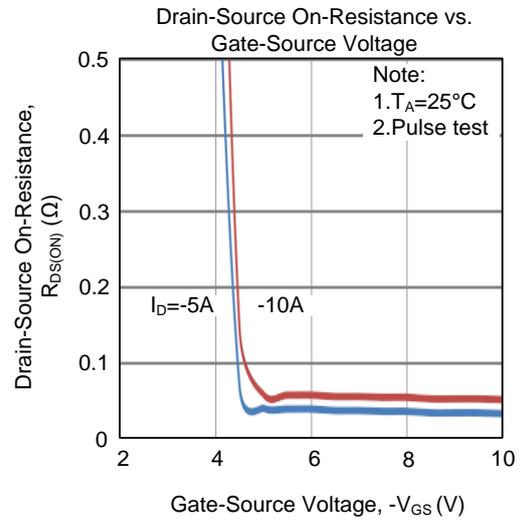
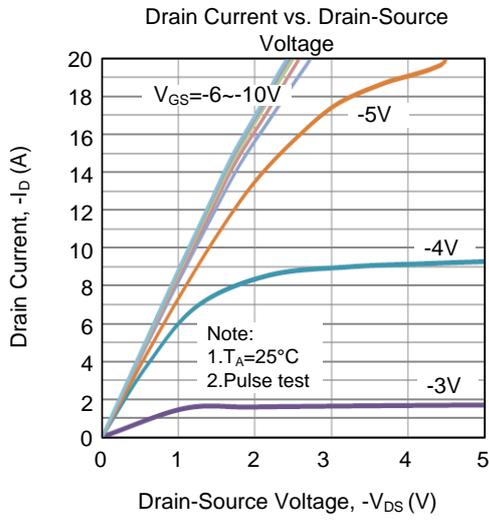
■ TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL



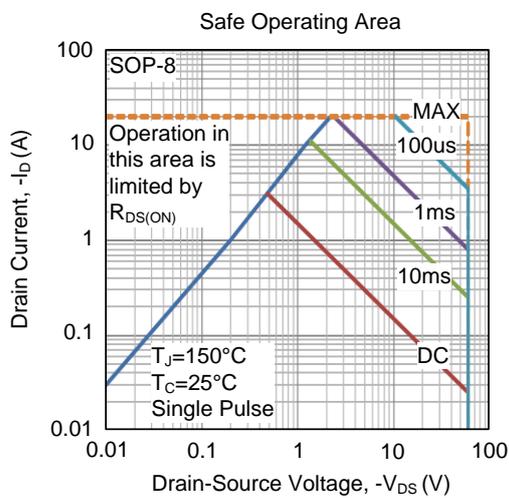
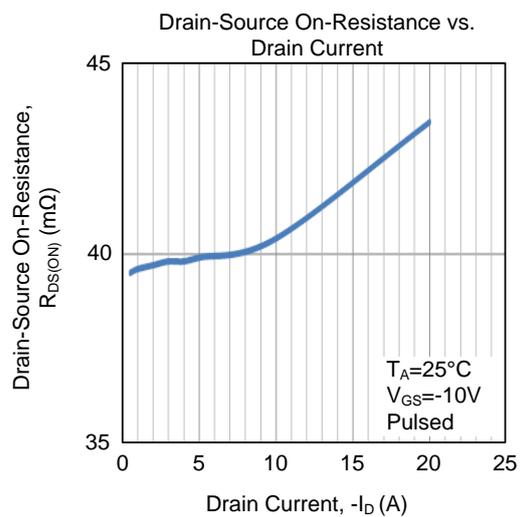
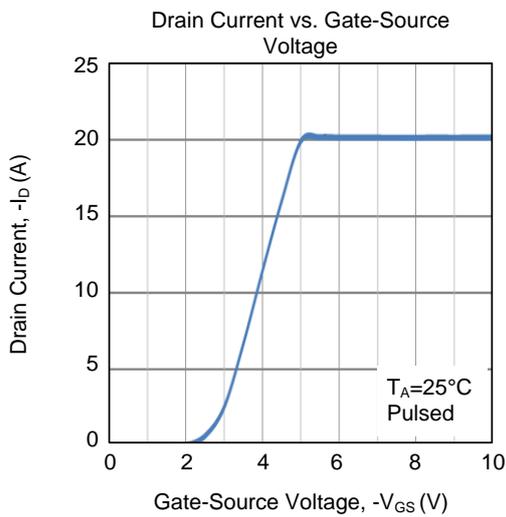
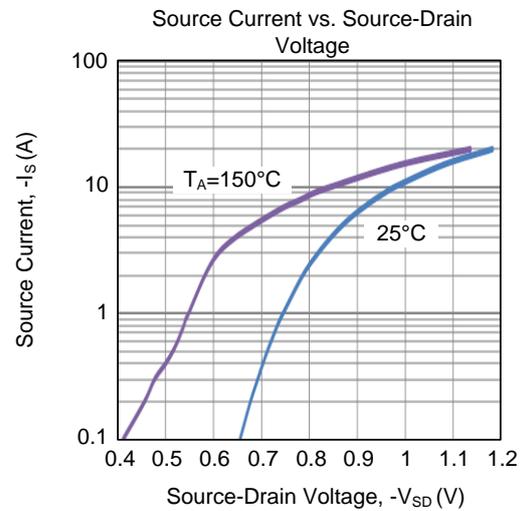
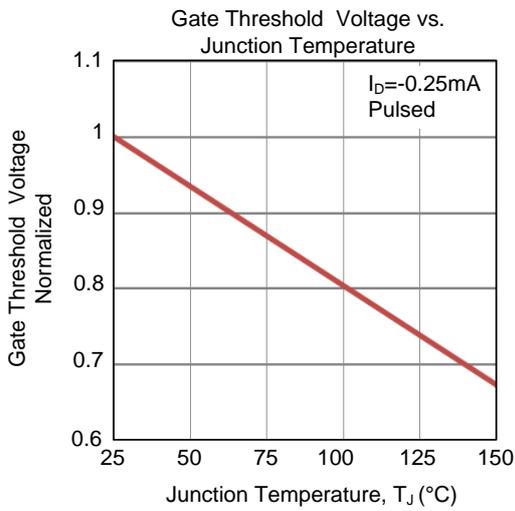
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL

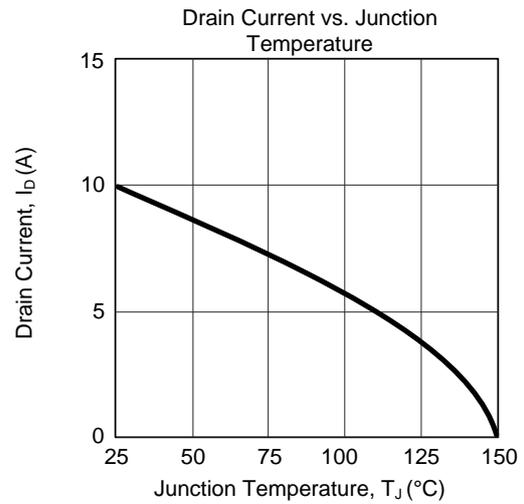
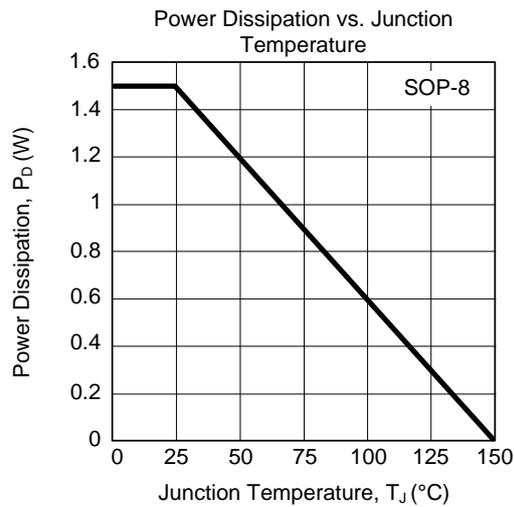


TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)



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