



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

■ DESCRIPTION

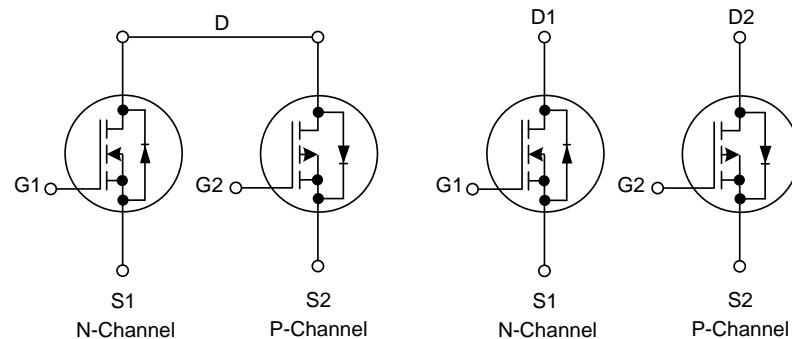
The UTC **UTT6NP10** incorporates an N-channel MOSFET and a P-channel MOSFET, it uses UTC's advanced technology to provide customers a minimum on-state resistance and high-speed switching, thereby enabling high-density mounting.

The UTC **UTT6NP10** is universally applied in high-speed switching, motor driver.

■ FEATURES

- * $R_{DS(on)} \leq 150 \text{ m}\Omega @ V_{GS}=10V, I_D=3.0A$
- $R_{DS(on)} \leq 200 \text{ m}\Omega @ V_{GS}=4.5V, I_D=3.0A$
- * $R_{DS(on)} \leq 155 \text{ m}\Omega @ V_{GS}=-10V, I_D=-3.0A$
- $R_{DS(on)} \leq 210 \text{ m}\Omega @ V_{GS}=-4.5V, I_D=-3.0A$
- * High switching speed

■ SYMBOL



TO-252-4

SOP-8/DFN5060-8

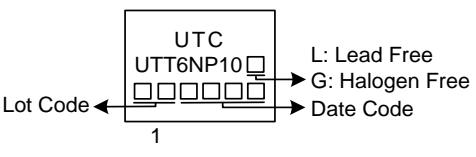
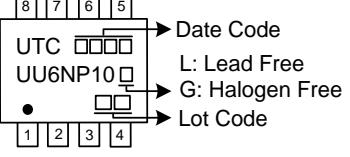
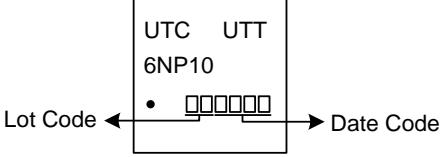
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT6NP10L-TN4-R	UTT6NP10G-TN4-R	TO-252-4	S1	G1	D	S2	G2	-	-	-	Tape Reel
UTT6NP10L-S08-R	UTT6NP10G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel
UTT6NP10L-K08-5060-R	UTT6NP10G-K08-5060-R	DFN5060-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

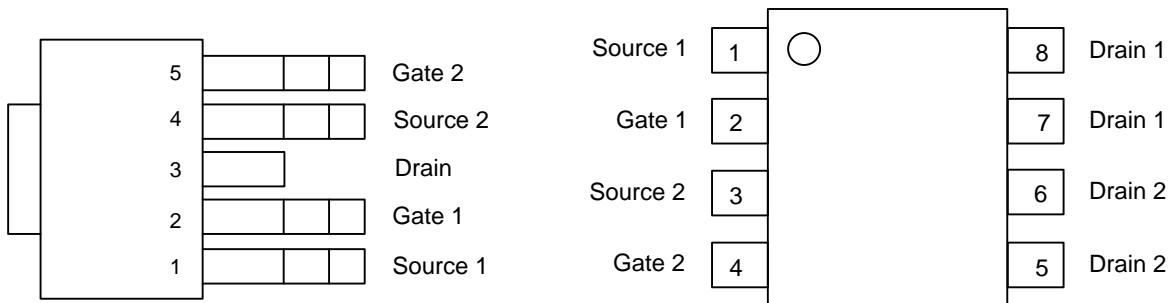
Note: Pin Assignment: G: Gate D: Drain S: Source

 UTT6NP10G-TN4-R	(1)R: Tape Reel (2)TN4: TO-252-4, S08: SOP-8, K08-5060: DFN5060-8 (3)G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING

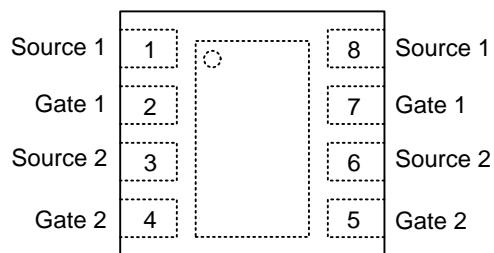
PACKAGE	MARKING
TO-252-4	 <p>1</p>
SOP-8	
DFN5060-8	

■ PIN CONFIGURATION



TO-252-4

SOP-8

Top View
DFN5060-8

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

PARAMETER	SYMBOL	RATINGS		UNIT	
		N-CHANNEL	P-CHANNEL		
Drain-Source Voltage	V_{DSS}	100	-100	V	
Gate-Source Voltage	V_{GSS}	± 20	± 20	V	
Drain Current	Continuous (Note 3)	I_D	6	-6	A
	Pulsed (Note 1)	I_{DM}	12	-12	A
Power Dissipation ($T_A=25^\circ\text{C}$)	TO-252-4	P_D	3.1	W	
	SOP-8		1.4	W	
	DFN5060-8		1.9	W	
Junction Temperature	T_J	$-55 \sim +150$		$^\circ\text{C}$	
Storage Temperature Range	T_{STG}	$-55 \sim +150$		$^\circ\text{C}$	

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	RATINGS		UNIT
Junction to Ambient	TO-252-4	θ_{JA}	40	$^\circ\text{C}/\text{W}$
	SOP-8		89.3	$^\circ\text{C}/\text{W}$
	DFN5060-8		65	$^\circ\text{C}/\text{W}$

Note: Device mounted on FR-4 substrate PC 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						
Drain-Source Leakage Current	I_{DSS}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	100			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$			10	μA
Forward		$V_{GS}=+20\text{V}$			+100	nA
Reverse		$V_{GS}=-20\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		3.0	V
Static Drain-Source On-State Resistance (Note 2)	$R_{DS(\text{ON})}$	$V_{GS}=10\text{V}, I_D=3.0\text{A}$			150	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}, I_D=3.0\text{A}$			200	$\text{m}\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}, V_{DS}=-25\text{V}, f=1.0\text{MHz}$		923		pF
Output Capacitance	C_{OSS}			54		pF
Reverse Transfer Capacitance	C_{RSS}			43		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	$V_{DS}=50\text{V}, V_{GS}=10\text{V}, I_D=6\text{A}$ (Note 1, 2)		23		nC
Gate to Source Charge	Q_{GS}			3.4		nC
Gate to Drain Charge	Q_{GD}			4.7		nC
Turn-ON Delay Time (Note 2)	$t_{D(\text{ON})}$	$V_{DD}=50\text{V}, V_{GS}=10\text{V},$ $I_D=6\text{A}, R_G=25\Omega$ (Note 1, 2)		3.5		ns
Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(\text{OFF})}$			22		ns
Fall-Time	t_F			17		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note 2)	V_{SD}	$I_S=6.0\text{A}, V_{GS}=0\text{V}$			1.3	V

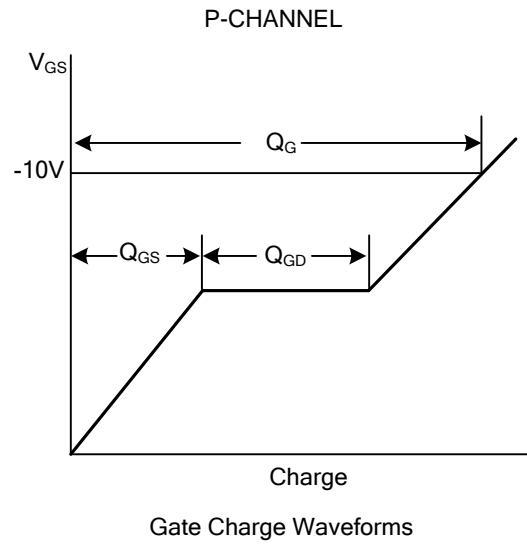
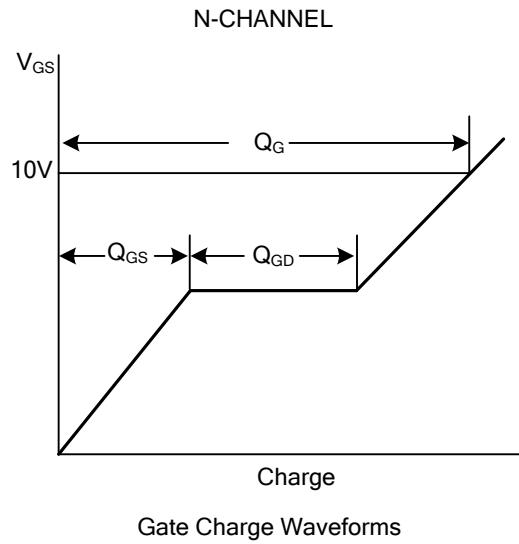
■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=-250\mu A, V_{GS}=0V$	-100			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-100V, V_{GS}=0V$			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20V, V_{GS}=0V$		+100	nA
	Reverse		$V_{GS}=-20V, V_{GS}=0V$		-100	nA
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 2)	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-3.0A$			155	$m\Omega$
		$V_{GS}=-4.5V, I_D=-3.0A$			210	$m\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=-25V, f=1.0MHz$		1650		pF
Output Capacitance	C_{OSS}			90		pF
Reverse Transfer Capacitance	C_{RSS}			62		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	$V_{DS}=-50V, V_{GS}=-10V, I_D=-6A$ (Note 1, 2)		34		nC
Gate to Source Charge	Q_{GS}			5.2		nC
Gate to Drain Charge	Q_{GD}			5.5		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	$V_{DD}=-50V, V_{GS}=-10V,$ $I_D=-6A, R_G=3.3\Omega$ (Note 1, 2)		6.5		ns
Rise Time	t_R			17		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			37		ns
Fall-Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note 2)	V_{SD}	$I_S=-6.0A, V_{GS}=0V$			-1.3	V

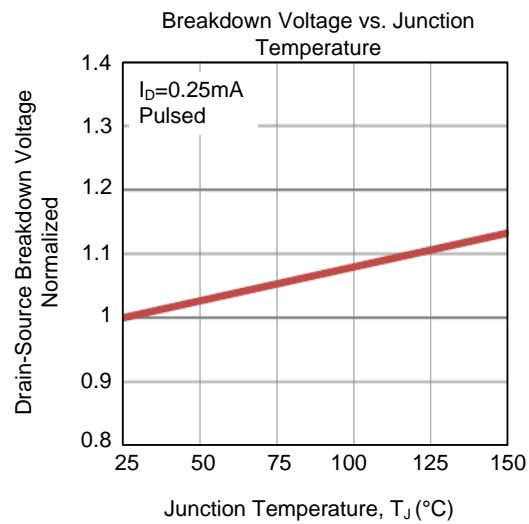
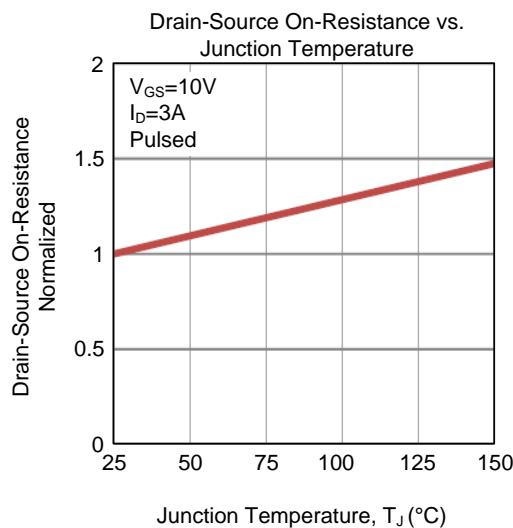
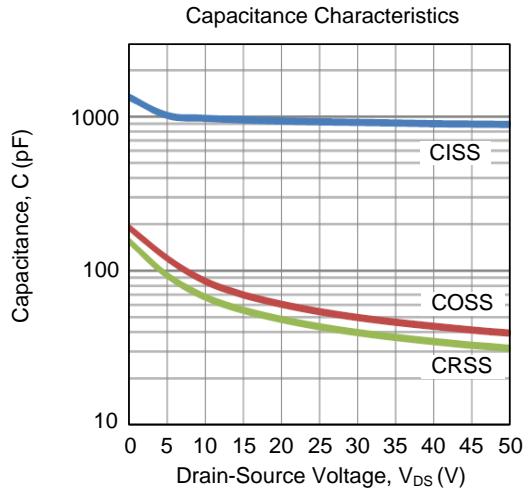
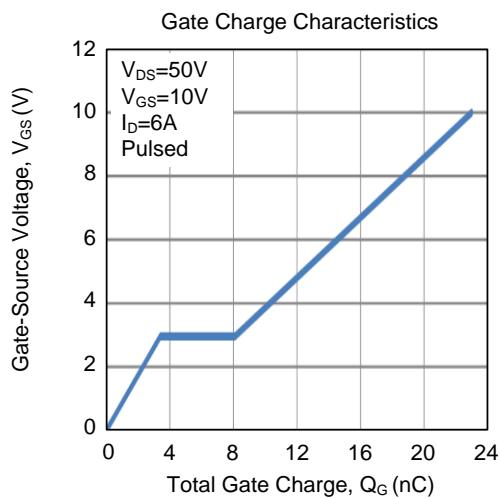
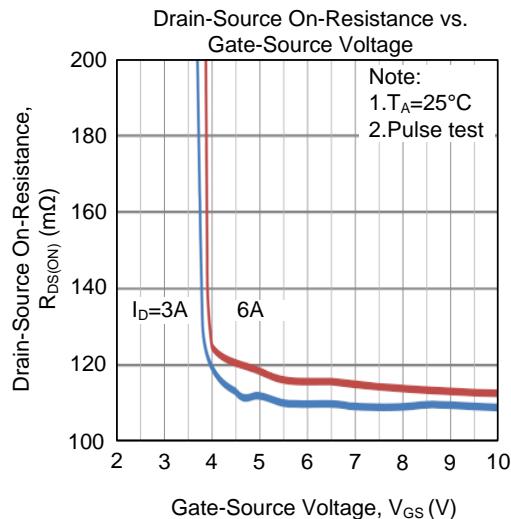
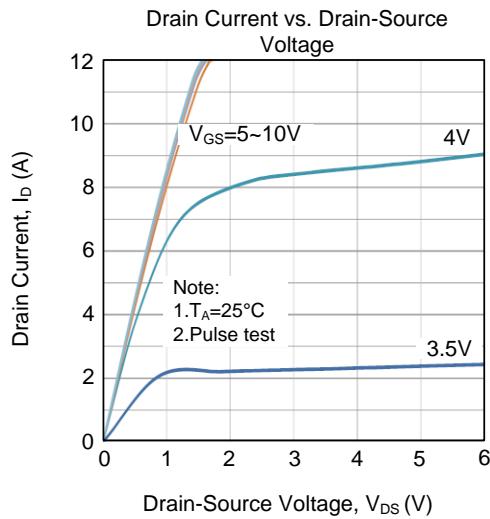
Notes: 1. Pulse Test: Pulse width limited by Max. junction temperature.

2. N-CH, P-CH are same, mounted on 2oz FR4 board $t \leq 10s$.

■ TEST CIRCUITS AND WAVEFORMS

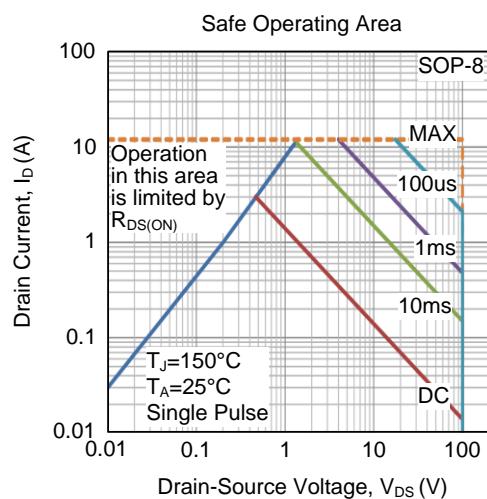
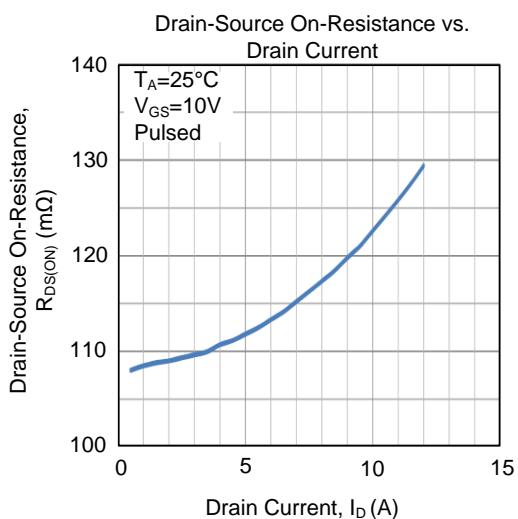
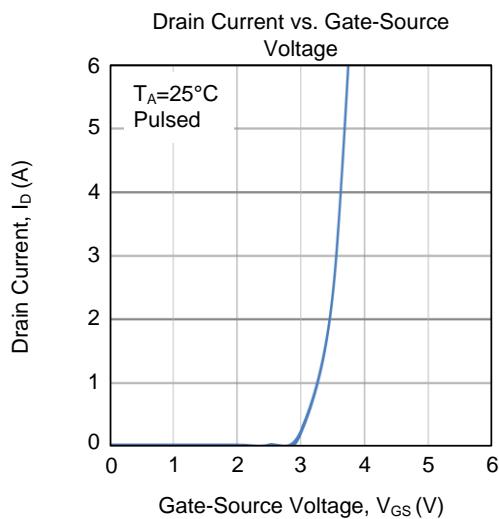
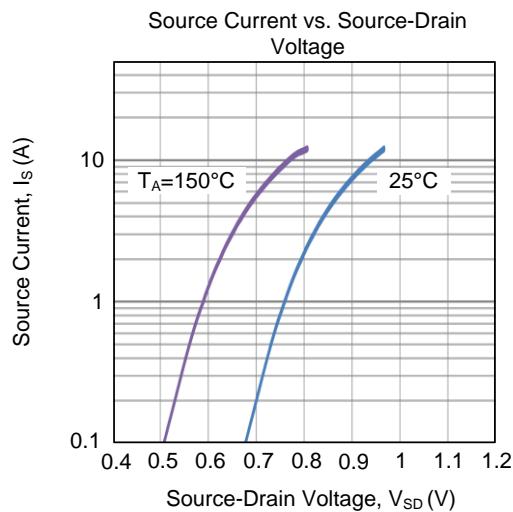
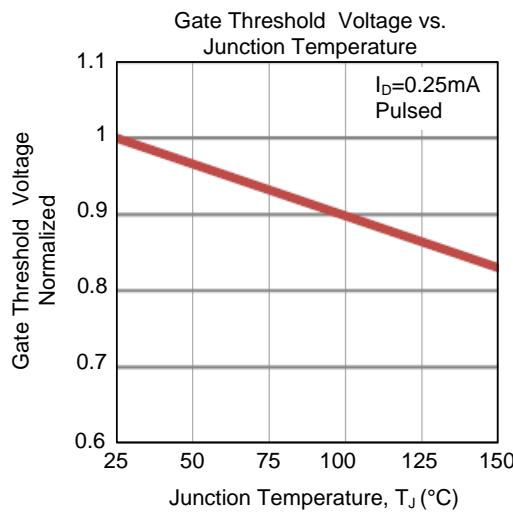
■ TYPICAL CHARACTERISTICS

N-CHANNEL



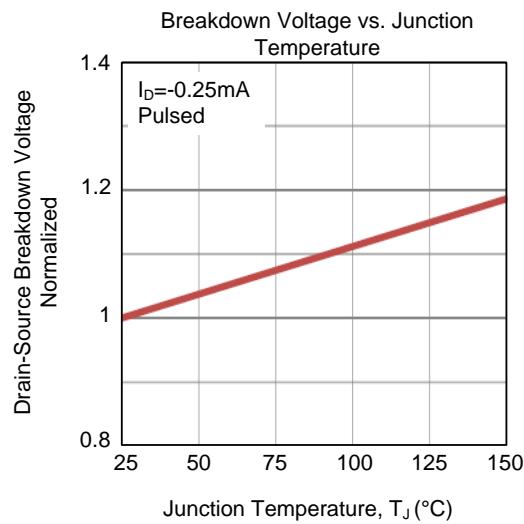
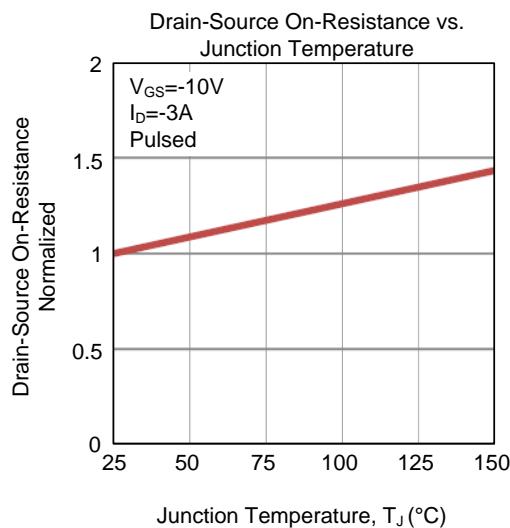
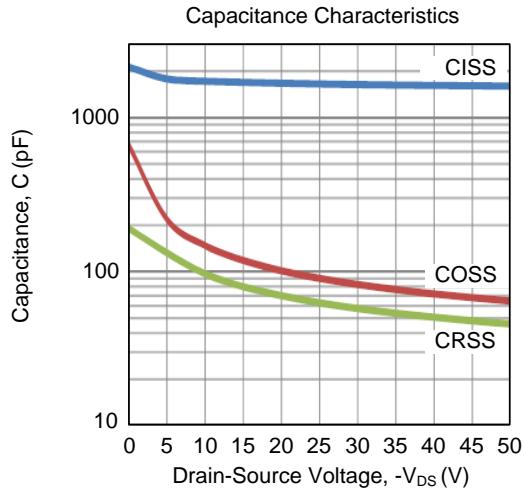
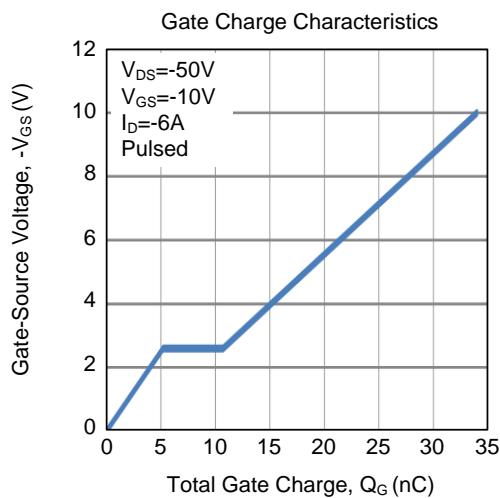
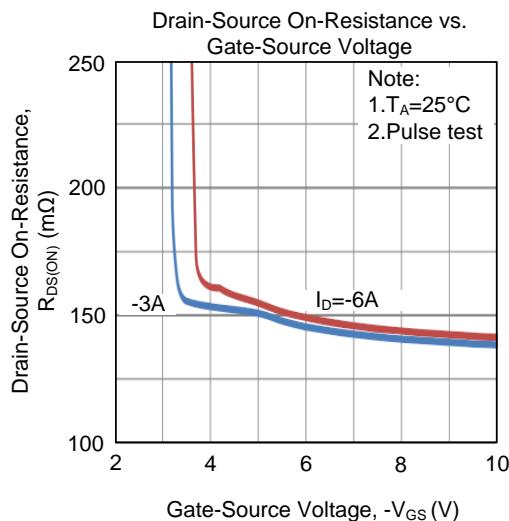
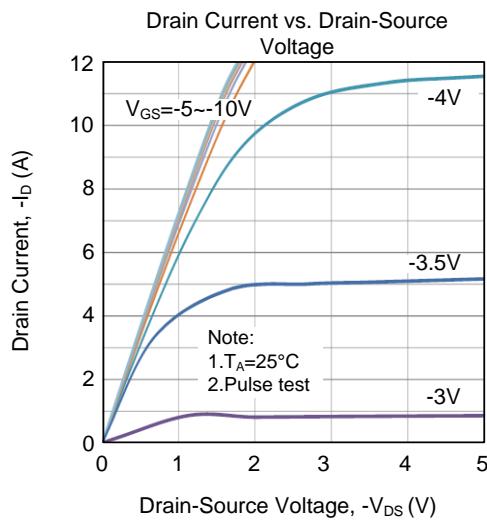
■ TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL



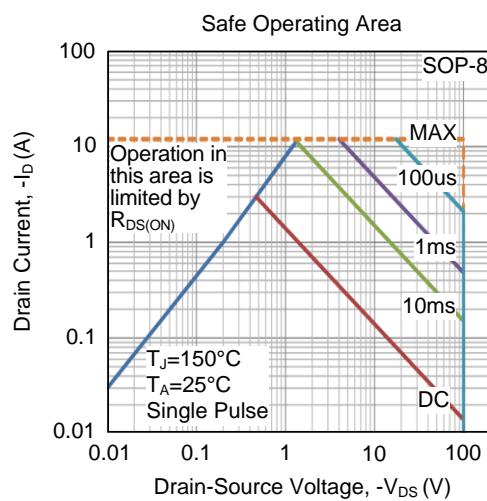
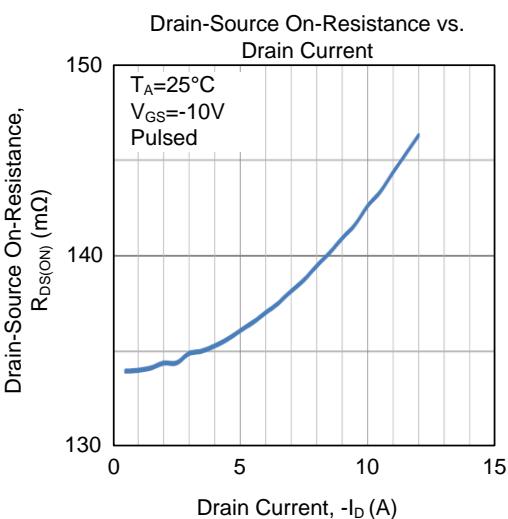
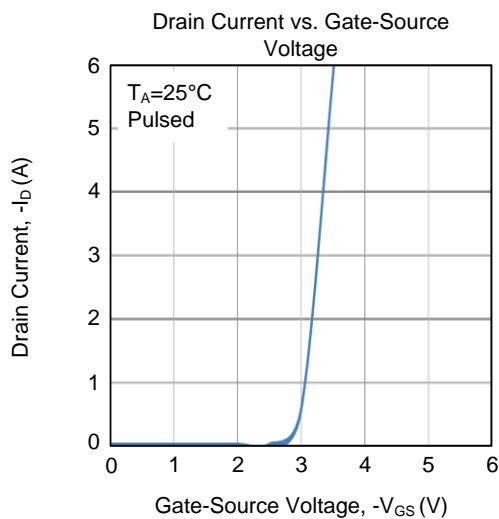
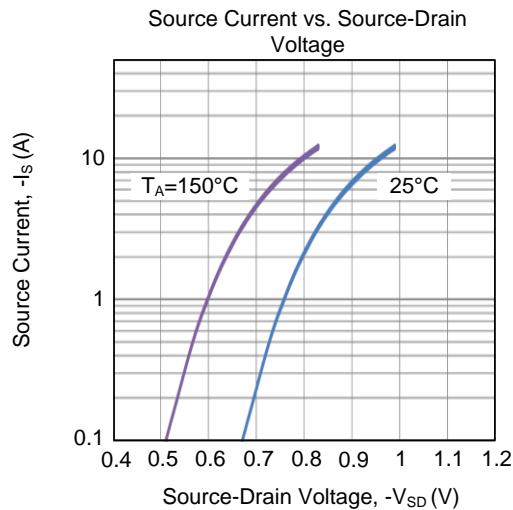
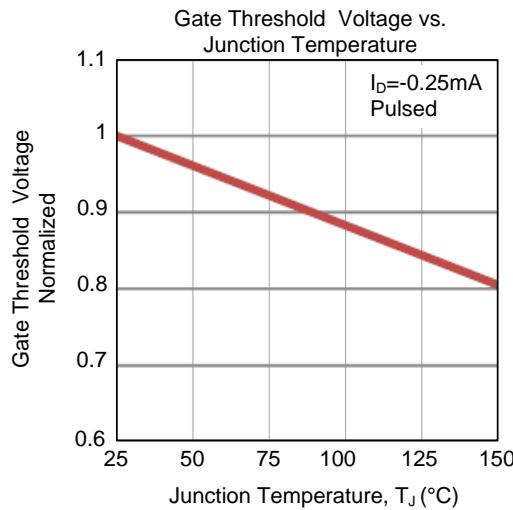
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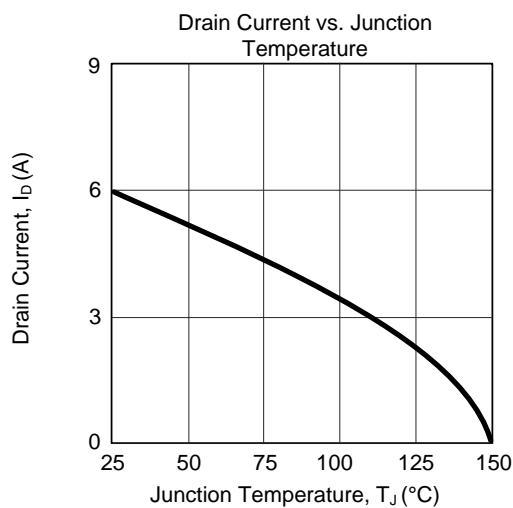
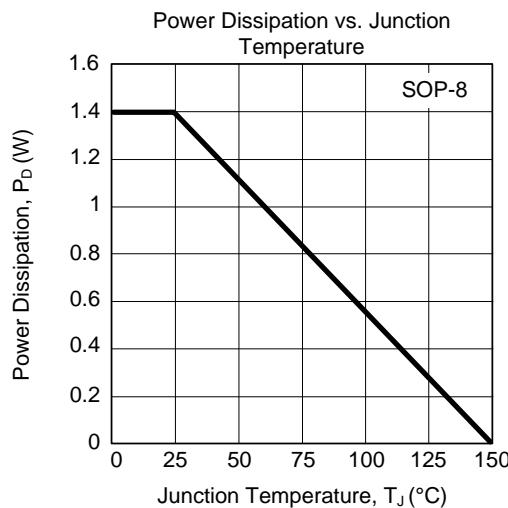
P-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)

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