



UD9930

Power MOSFET

DUAL N & P-CHANNEL POWER MOSFET

DESCRIPTION

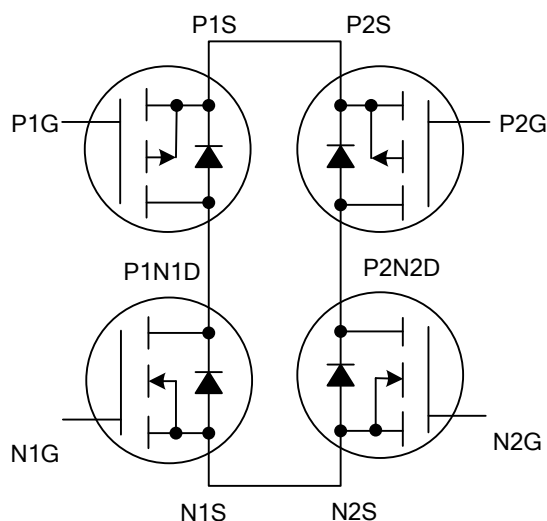
The UTC **UD9930** is a dual N & P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on-state resistance, high switching speed, low gate charge.

The UTC **UD9930** is suitable for DC/DC converters and LCD monitor inverter.

FEATURES

- * N-channel: $R_{DS(on)} \leq 40 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=5.0\text{A}$
- * P-channel: $R_{DS(on)} \leq 60 \text{ m}\Omega$ @ $V_{GS}=-10\text{V}$, $I_D=-4.0\text{A}$
- * High switching speed
- * Low gate charge

SYMBOL

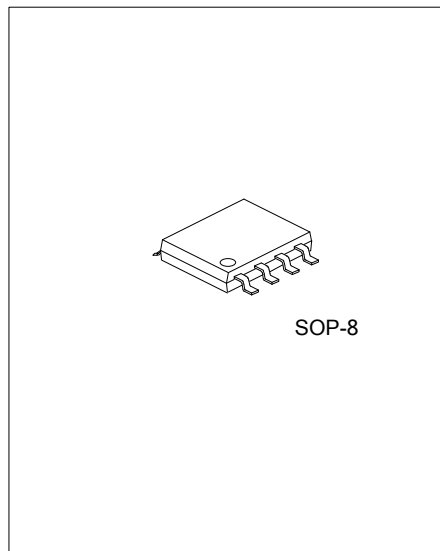


ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UD9930L-S08-R	UD9930G-S08-R	SOP-8	N1G	N1D/ P1D	N1S/ N2S	N2G	P2G	N2D/ P2D	P1S/ P2S	P1G	Tape Reel

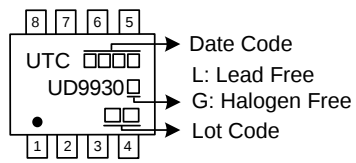
Note: Pin Assignment: G: Gate D: Drain S: Source

UD9930G-S08-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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SOP-8

■ MARKING



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

PARAMETER			SYMBOL	RATINGS		UNIT
				N-CHANNEL	P-CHANNEL	
Drain to Source Voltage			V_{DSS}	30	-30	V
Gate to Source Voltage			V_{GSS}	± 25	± 25	
Drain Current (Note 3)	Continuous	$T_A=25^{\circ}\text{C}$	I_D	5.5	-4.1	A
		$T_A=70^{\circ}\text{C}$		4.4	-3.3	
Drain Current (Note 1)	Pulsed		I_{DM}	20	-20	
Total Power Dissipation @ $T_A=25^{\circ}\text{C}$			P_D	1.38		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 (Note 3)	θ_{JA}	90	$^{\circ}\text{C/W}$

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

■ N-CHANNEL ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0 V, I _D =250μA	30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, V _{GS} =0 V, T _J =25°C			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =25V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-25V, 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
Drain-Source On-state Resistance (Note 2)		R _{DS(ON)}	V _{GS} =10V, I _D =5.0A			40	mΩ
			V _{GS} =4.5V, I _D =3.0A			60	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0 V, f=1.0MHZ		207		pF
Output Capacitance		C _{OSS}			105		pF
Reverse Transfer Capacitance		C _{RSS}			40		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q _G	V _{DS} =15V, V _{GS} =4.5V, I _D =5A		4.2		nC
Gate to Source Charge		Q _{GS}			1.5		nC
Gate to Drain Charge		Q _{GD}			1.5		nC
Turn-ON Delay Time (Note 2)		t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =5A, R _G =6Ω		1.8		ns
Rise Time		t _R			15		ns
Turn-OFF Delay Time		t _{D(OFF)}			10		ns
Fall-Time		t _F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage (Note 2)		V _{SD}	I _S =1.2A, V _{GS} =0V			1.2	V

■ P-CHANNEL ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise noted)

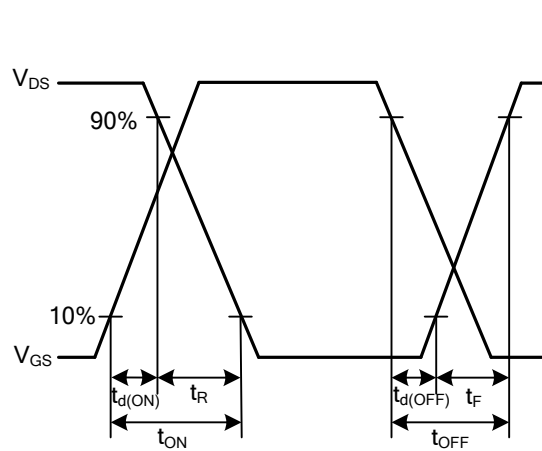
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS}=0\text{ V}, I_D=-250\mu\text{A}$	-30			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=-30\text{V}, V_{GS}=0\text{ V}, T_J=25^\circ\text{C}$			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=25\text{V}, V_{DS}=0\text{V}$			+100	nA
	Reverse		$V_{GS}=-25\text{V}, V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=-250\mu\text{A}$	-1.0		-3.0	V
Drain-Source On-state Resistance (Note 2)		$R_{DS(ON)}$	$V_{GS}=-10\text{V}, I_D=-4.0\text{A}$			60	m Ω
			$V_{GS}=-4.5\text{V}, I_D=-2.0\text{A}$			100	m Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{DS}=-25\text{V}, V_{GS}=0\text{ V}, f=1.0\text{MHz}$		590		pF
Output Capacitance		C_{OSS}			145		pF
Reverse Transfer Capacitance		C_{RSS}			100		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	$V_{DS}=-15\text{V}, V_{GS}=-4.5\text{V}, I_D=-5\text{A}$		9.5		nC
Gate to Source Charge		Q_{GS}			2		nC
Gate to Drain Charge		Q_{GD}			4.2		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	$V_{DS}=-15\text{V}, V_{GS}=-10\text{V}, I_D=-5\text{A}, R_G=6\Omega$		4		ns
Rise Time		t_R			18		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			28		ns
Fall-Time		t_F			21		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage (Note 2)		V_{SD}	$I_S=-1.2\text{A}, V_{GS}=0\text{V}$			-1.2	V

Notes: 1. Pulse width limited by Max. Junction temperature

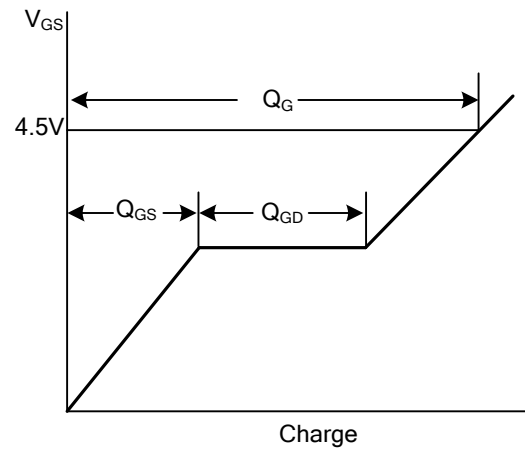
2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$ 3. Surface mounted on 1 in² copper pad of FR4 board, $t \leq 10\text{sec}$; 186°C/W when mounted on Min. copper pad

■ TEST CIRCUITS AND WAVEFORMS

N-Channel

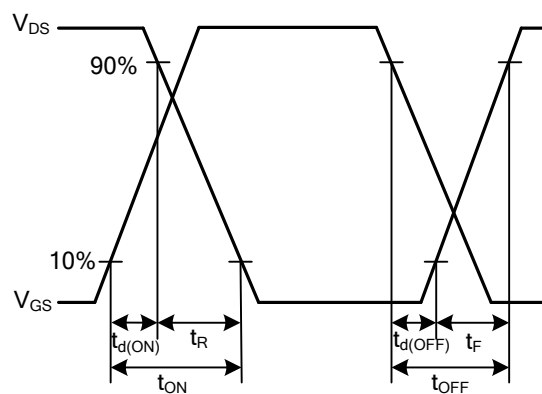


Resistive Switching Waveforms

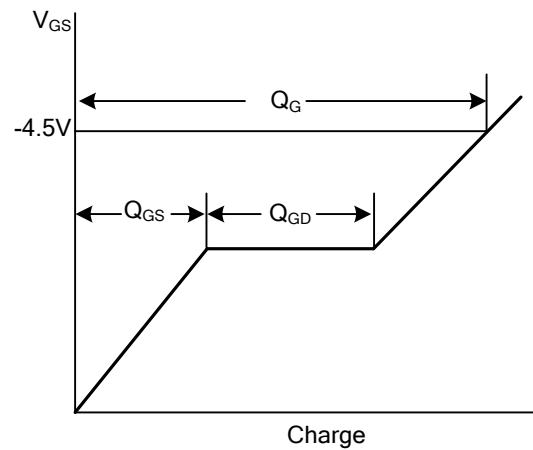


Gate Charge Waveforms

P-Channel



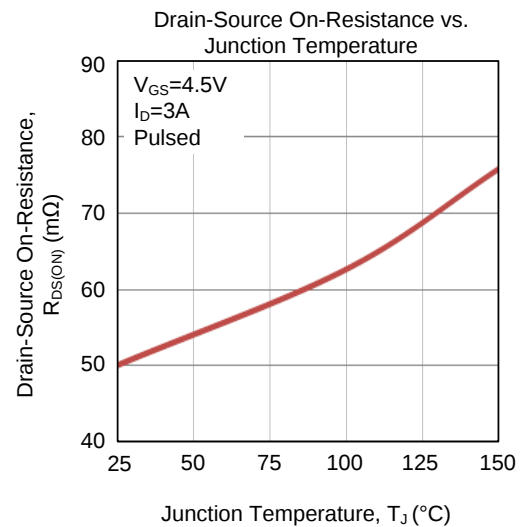
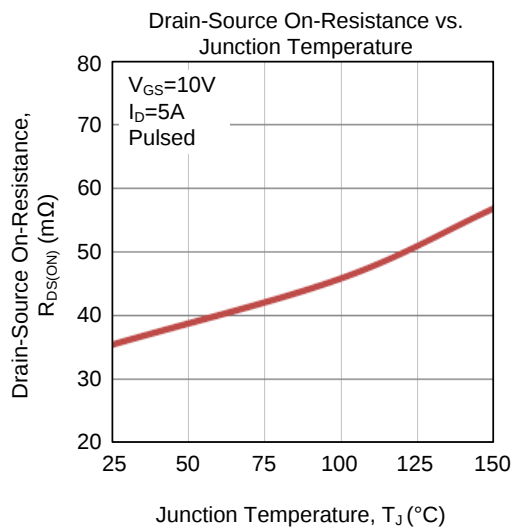
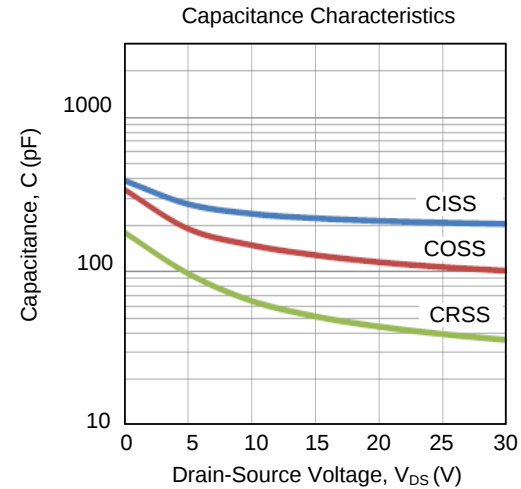
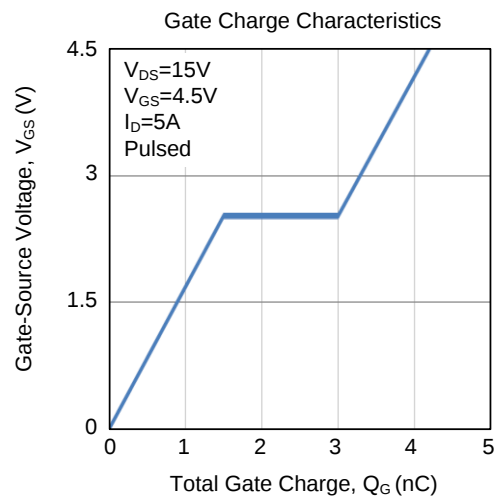
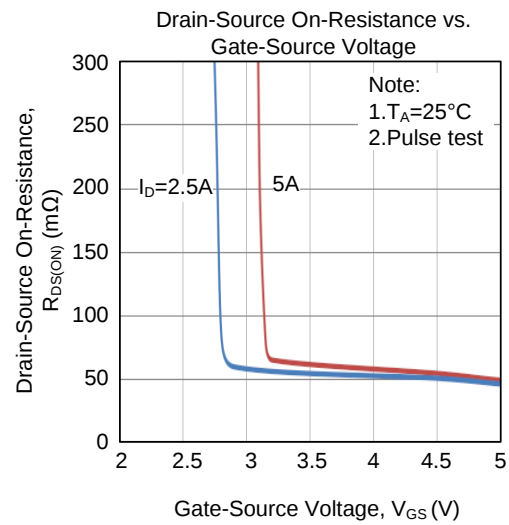
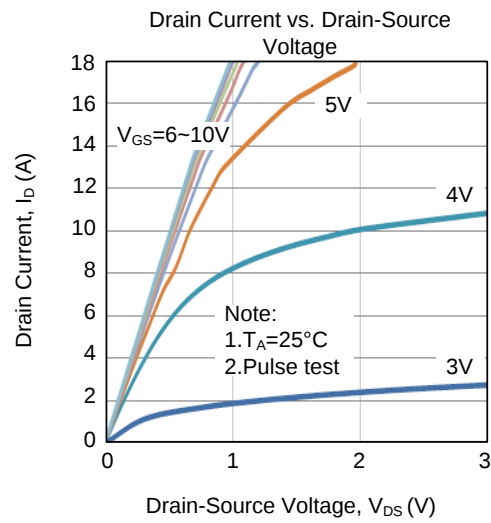
Resistive Switching Waveforms



Gate Charge Waveforms

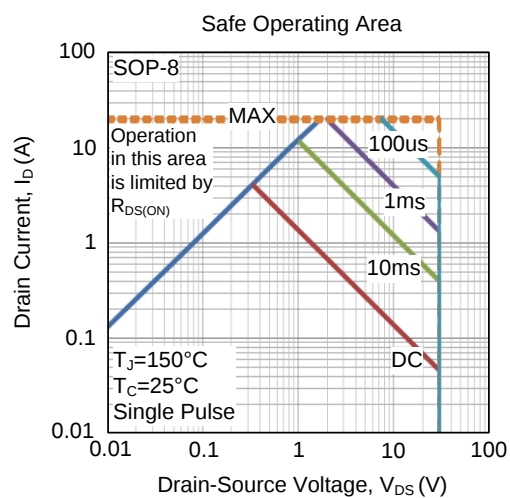
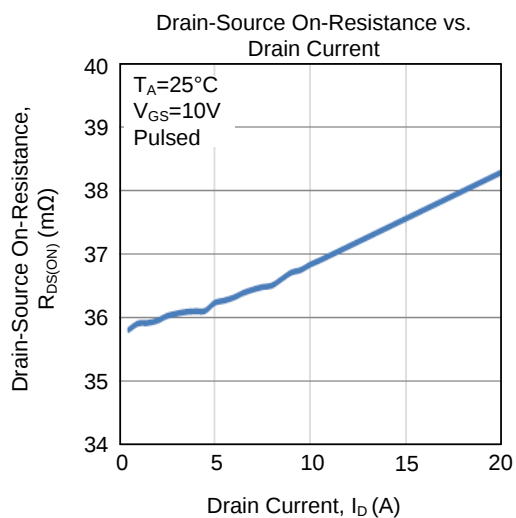
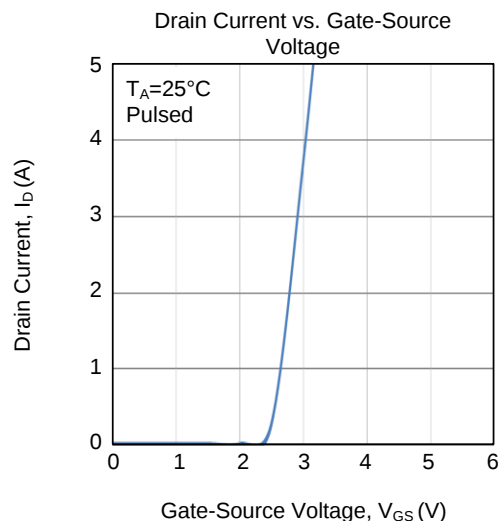
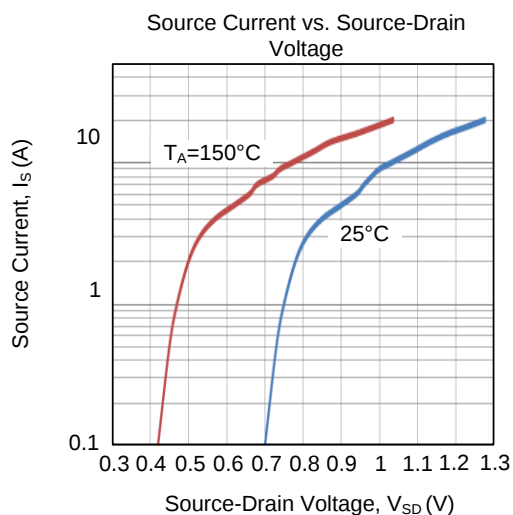
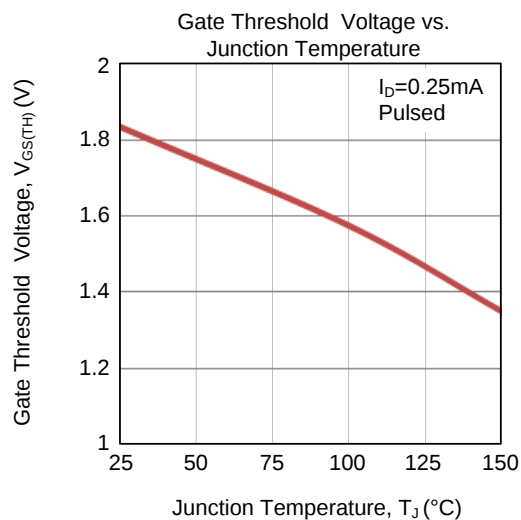
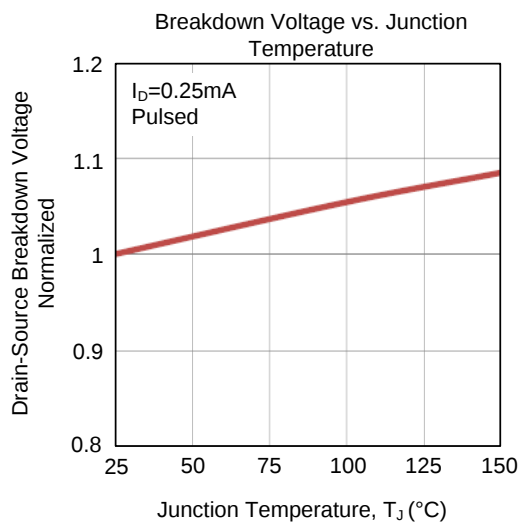
■ TYPICAL CHARACTERISTICS

N-CHANNEL



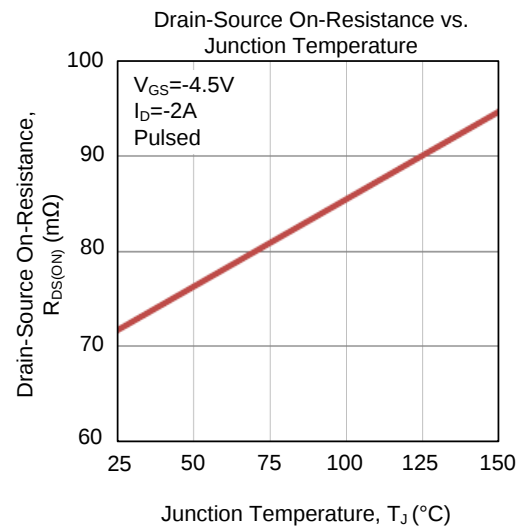
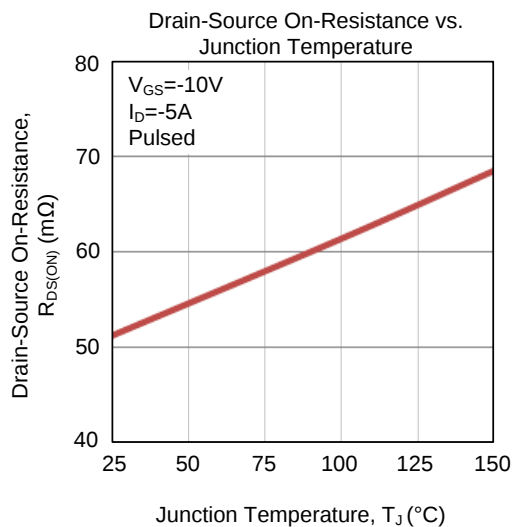
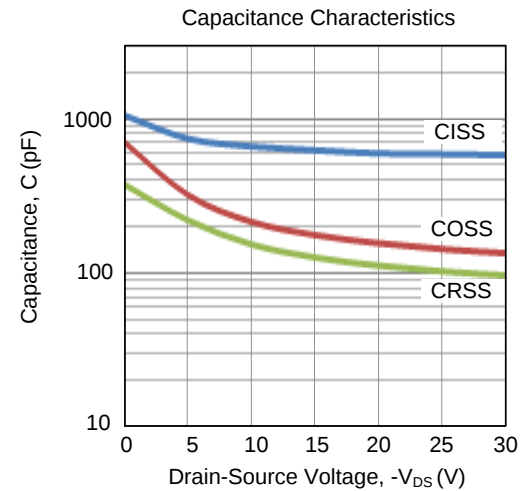
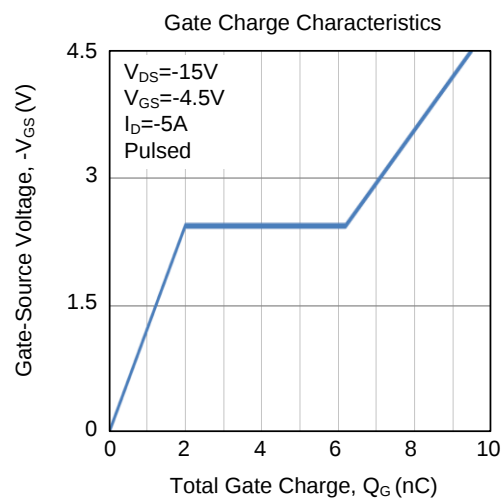
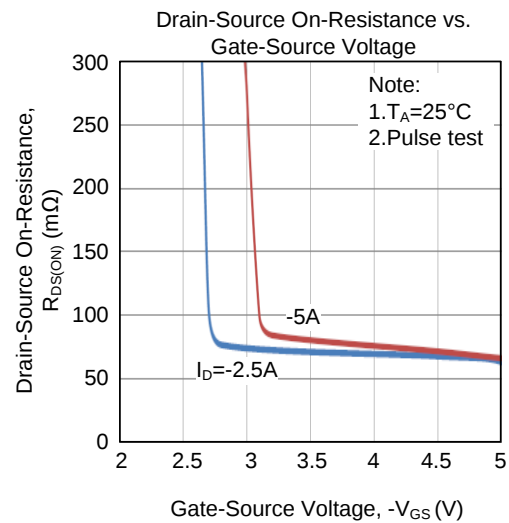
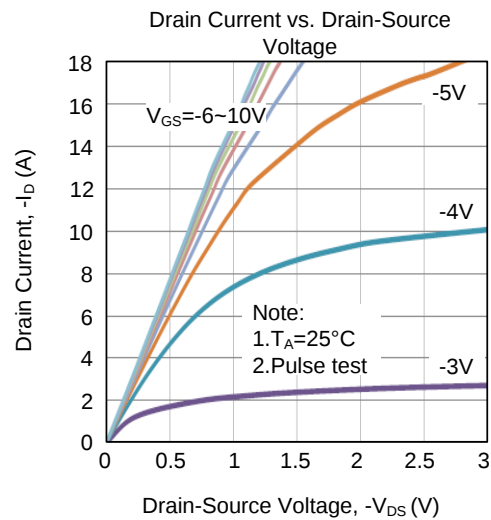
■ TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL



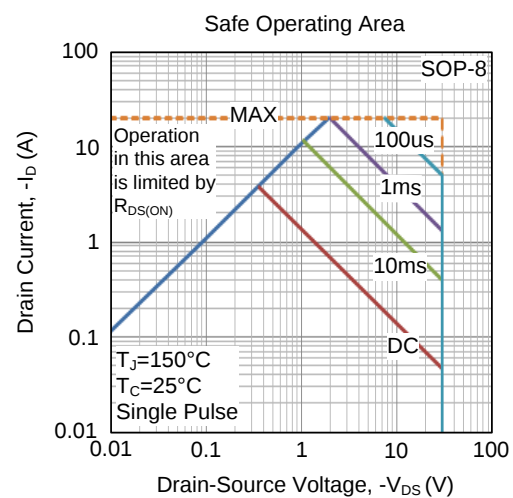
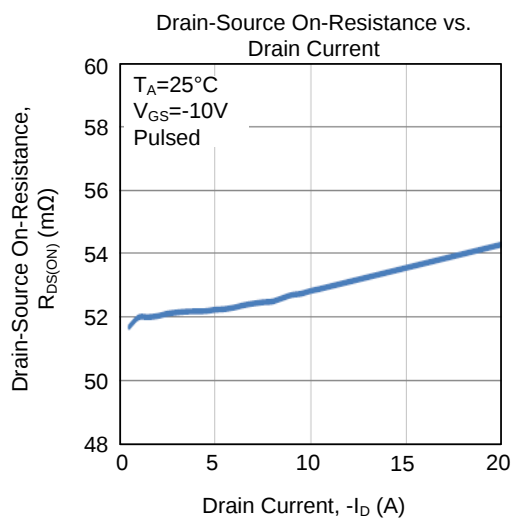
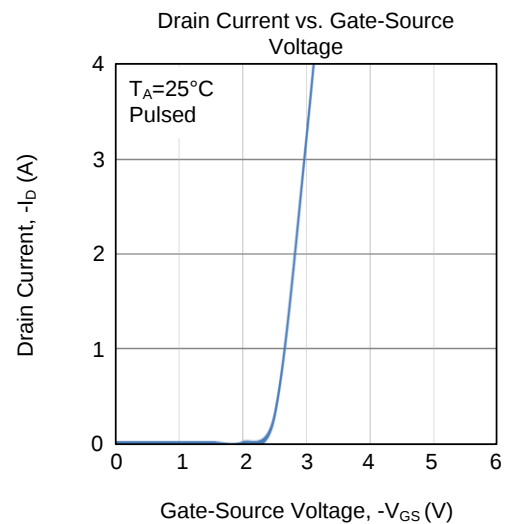
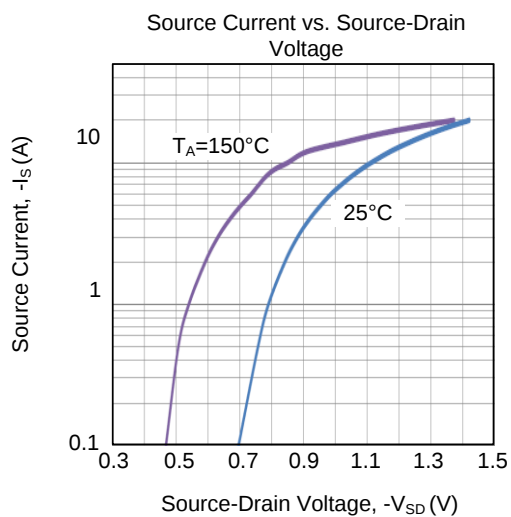
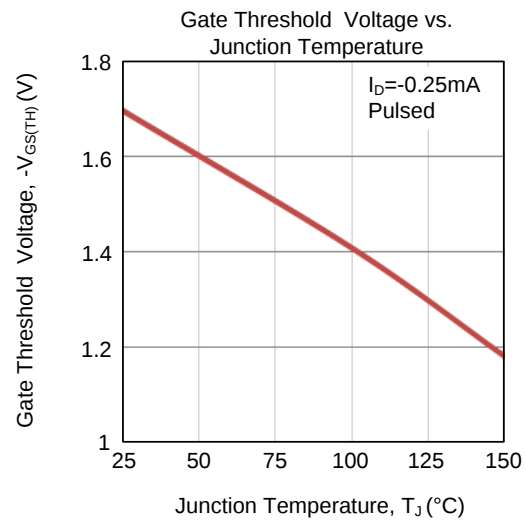
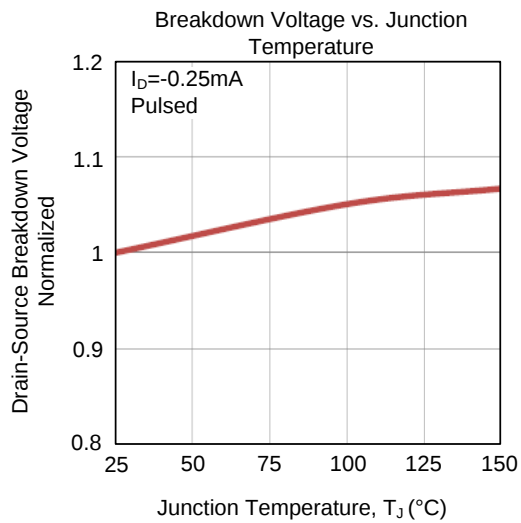
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL

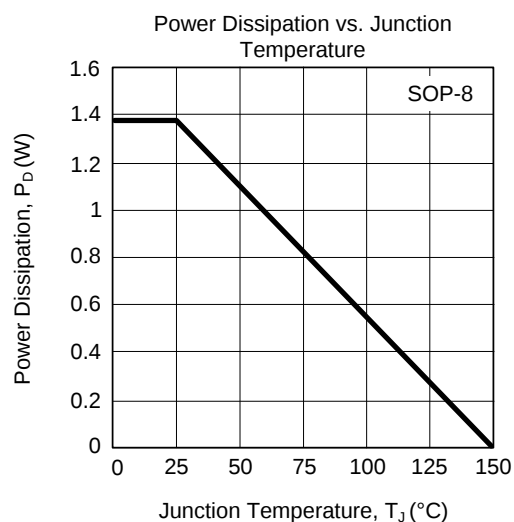
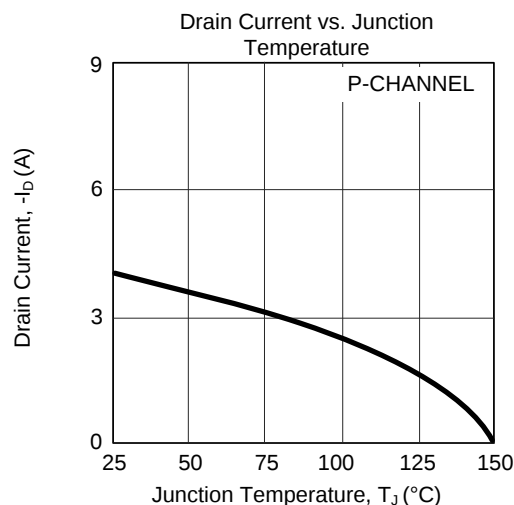
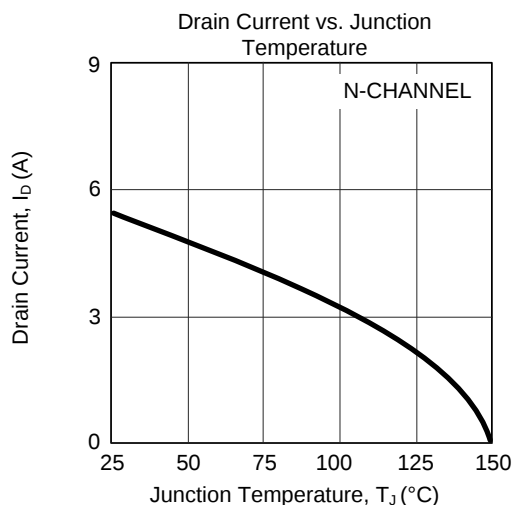


■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



TYPICAL CHARACTERISTICS (Cont.)



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