



UT3NP06

Power MOSFET

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

DESCRIPTION

The UTC **UT3NP06** 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 **UT3NP06** is universally applied in low voltage applications.

FEATURES

*N-CHANNEL: 3A, 60V

$R_{DS(on)} \leq 56 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=1.5\text{A}$

$R_{DS(on)} \leq 66 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=1.5\text{A}$

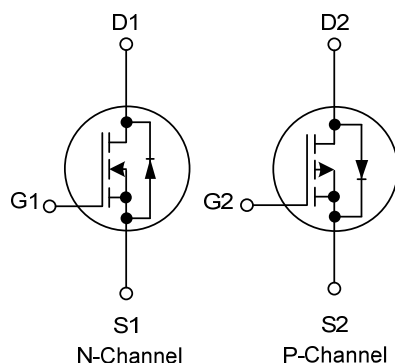
*P-CHANNEL: -3A, -60V

$R_{DS(on)} \leq 95 \text{ m}\Omega @ V_{GS}=-10\text{V}, I_D=-1.5\text{A}$

$R_{DS(on)} \leq 120 \text{ m}\Omega @ V_{GS}=-4.5\text{V}, I_D=-1.5\text{A}$

* High switching speed

SYMBOL

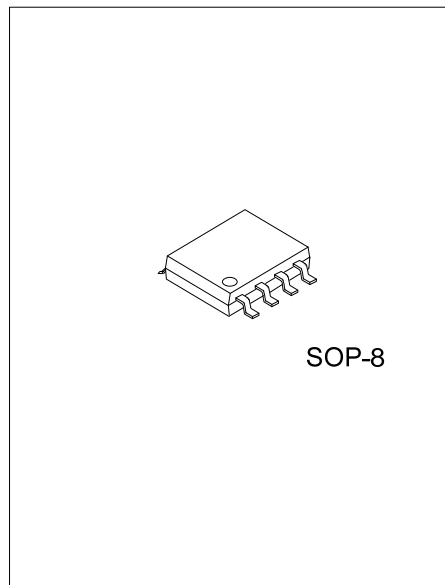


ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT3NP06L-S08-R	UT3NP06G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

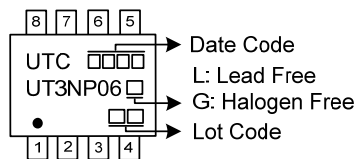
Note: Pin Assignment: G: Gate D: Drain S: Source

UT3NP06G-S08-R		(1)Packing Type	(1) R: Tape Reel
		(2)Package Type	(2) S08: SOP-8
		(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

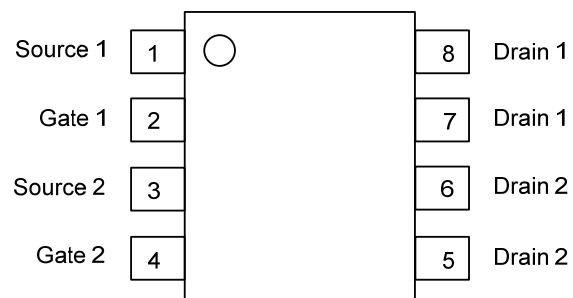


SOP-8

MARKING



PIN CONFIGURATION



■ 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 _A =25°C	I _D	3	-3	A
	Pulsed (Note 1)		I _{DM}	6	-6	A
Power Dissipation	T _A =25°C		P _D	1		W
Junction Temperature			T _J	-55 ~ +150		°C
Storage Temperature Range			T _{STG}	-55 ~ +150		°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 CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	125 (Note)	$^\circ\text{C/W}$

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch 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 =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 2)		R _{DS(ON)}	V _{GS} =10V, I _D =1.5A			56	mΩ
			V _{GS} =4.5V, I _D =1.5A			66	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		540		pF
Output Capacitance		C _{OSS}			50		pF
Reverse Transfer Capacitance		C _{RSS}			40		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q _G	V _{DS} =48V, V _{GS} =10V, I _D =3A		22		nC
Gate to Source Charge		Q _{GS}			3.6		nC
Gate to Drain Charge		Q _{GD}			4		nC
Turn-ON Delay Time (Note 2)		t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =3A, R _G =6Ω		4		ns
Rise Time		t _R			16.5		ns
Turn-OFF Delay Time		t _{D(OFF)}			21		ns
Fall-Time		t _F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V _{SD}	I _S =3A, V _{GS} =0V			1.4	V

■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

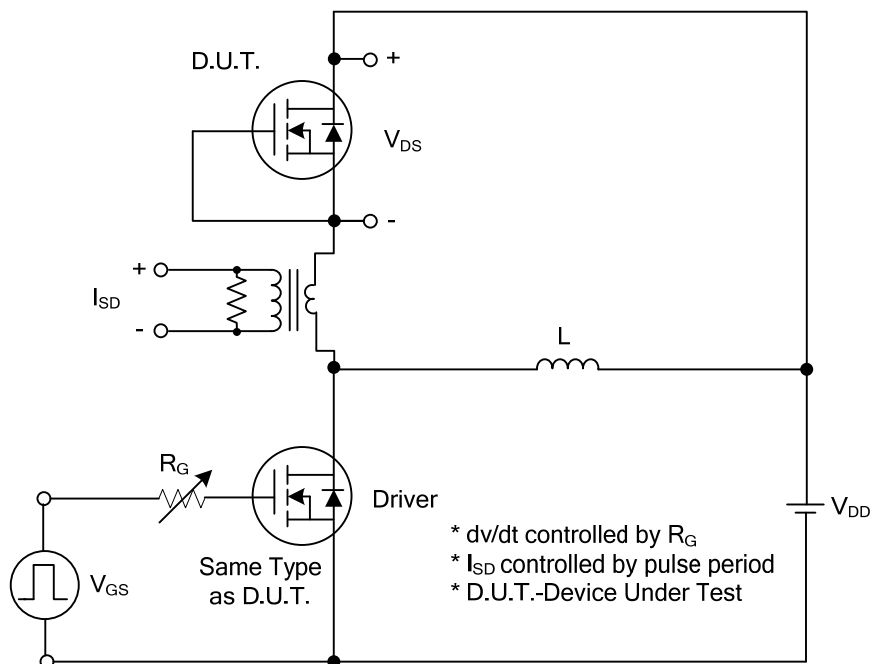
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=-250\mu A$, $V_{GS}=0V$	-60			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=-60V$, $V_{GS}=0V$, $T_J=25^{\circ}C$			-1	μA
			$V_{DS}=-48V$, $V_{GS}=0V$, $T_J=125^{\circ}C$			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20V$			+100	nA
	Reverse		$V_{GS}=-20V$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=-250\mu A$	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note 2)		$R_{DS(ON)}$	$V_{GS}=-10V$, $I_D=-1.5A$			95	m Ω
			$V_{GS}=-4.5V$, $I_D=-1.5A$			120	m Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{GS}=0V$, $V_{DS}=-25V$, $f=1.0MHz$		780		pF
Output Capacitance		C_{OSS}			65		pF
Reverse Transfer Capacitance		C_{RSS}			50		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	$V_{DS}=-48V$, $V_{GS}=-10V$, $I_D=-3A$		23		nC
Gate to Source Charge		Q_{GS}			4.8		nC
Gate to Drain Charge		Q_{GD}			4.6		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	$V_{DS}=-30V$, $V_{GS}=-10V$, $I_D=-3A$, $R_G=6\Omega$		6		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			38		ns
Fall-Time		t_F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V_{SD}	$I_S=-3A$, $V_{GS}=0V$			1.4	V

Notes: 1. Pulse width limited by maximum junction temperature

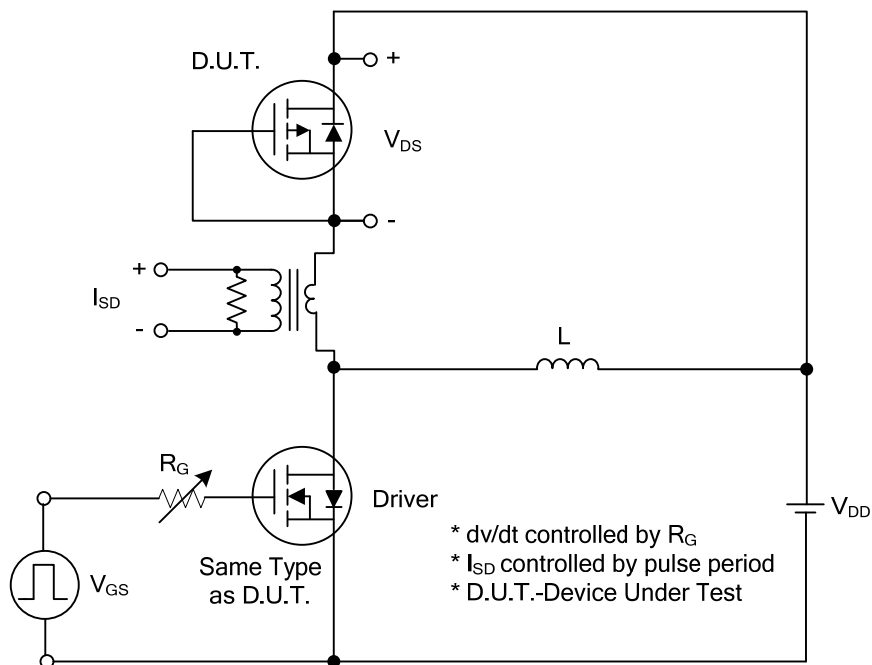
2. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

■ TEST CIRCUITS AND WAVEFORMS

N-CHANNEL

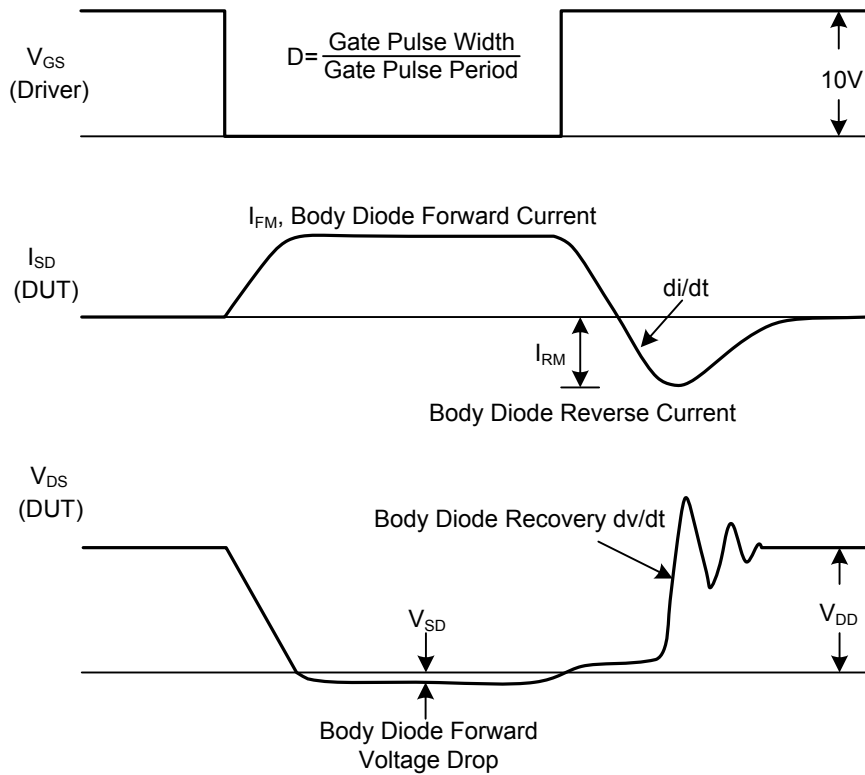


P-CHANNEL



Peak Diode Recovery dv/dt Test Circuit

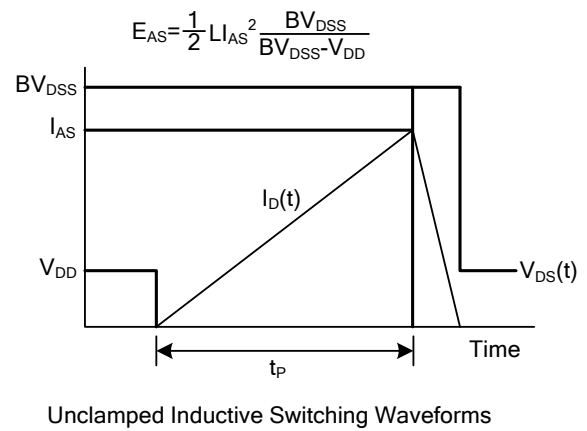
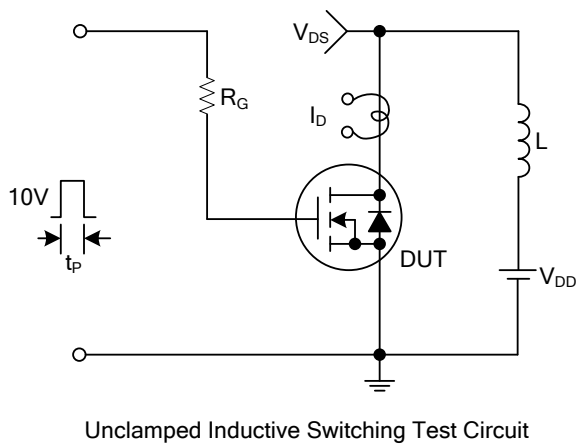
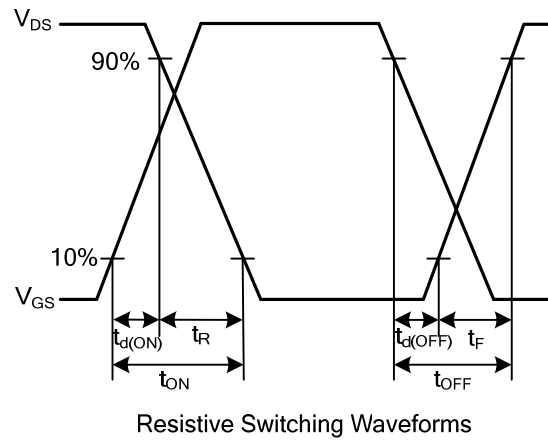
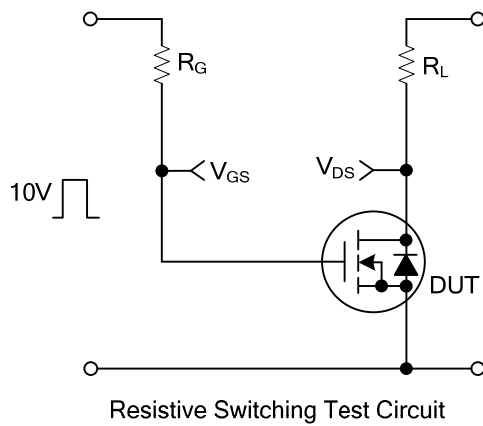
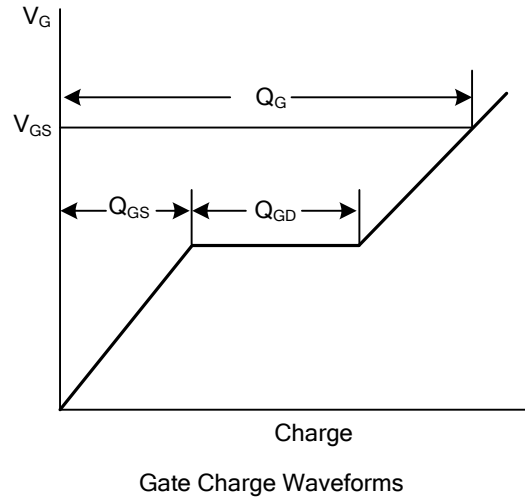
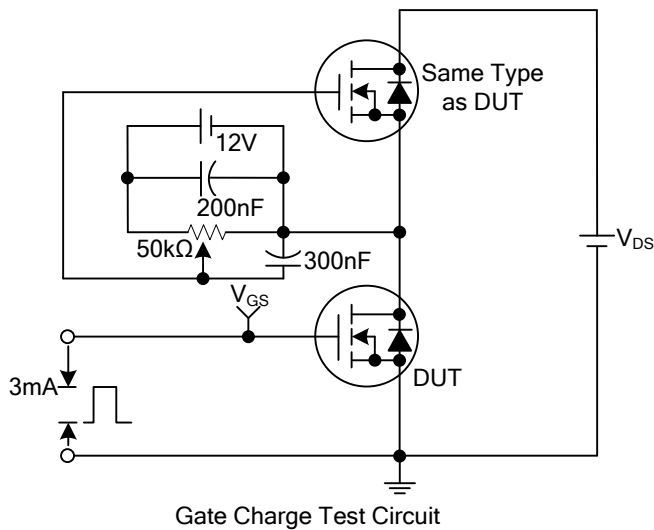
■ TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Waveforms

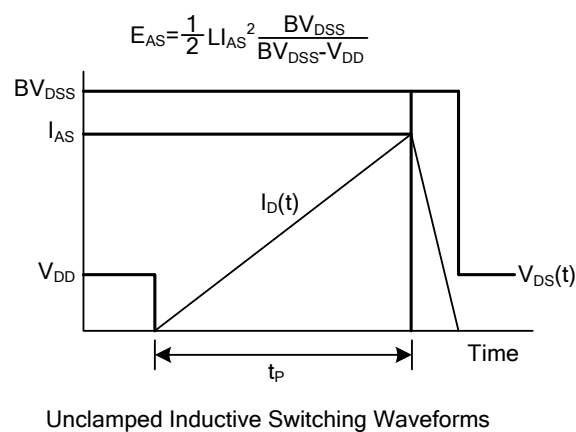
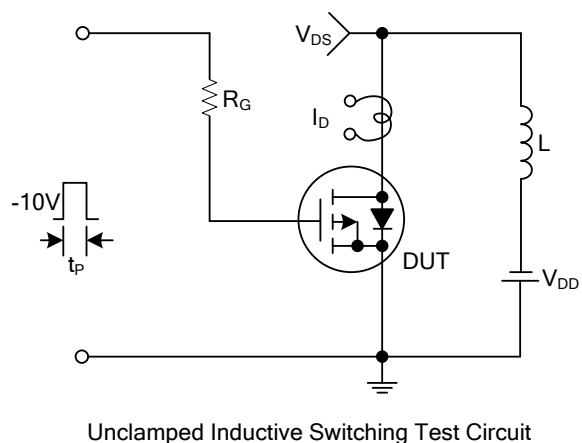
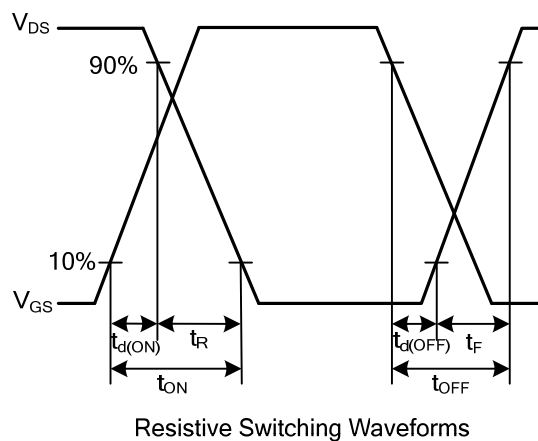
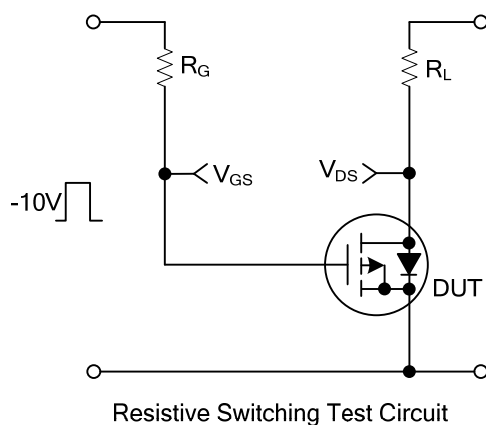
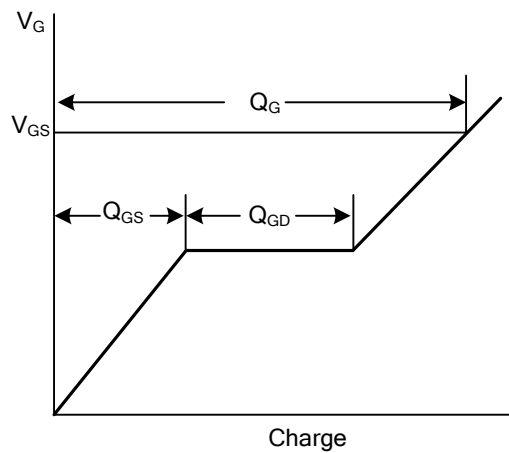
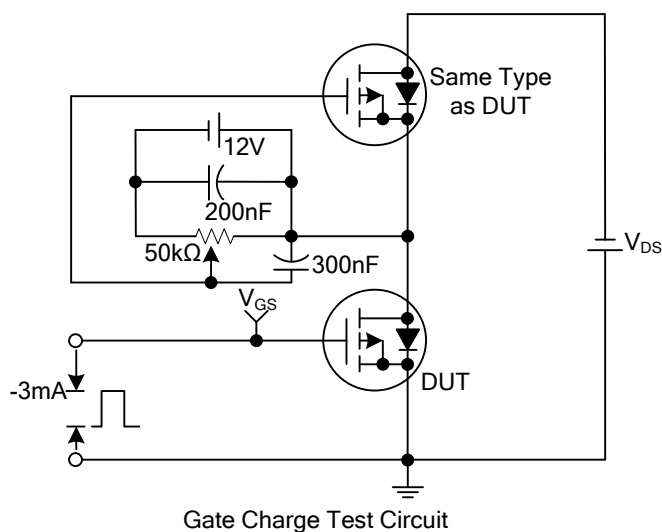
TEST CIRCUITS AND WAVEFORMS

N-CHANNEL



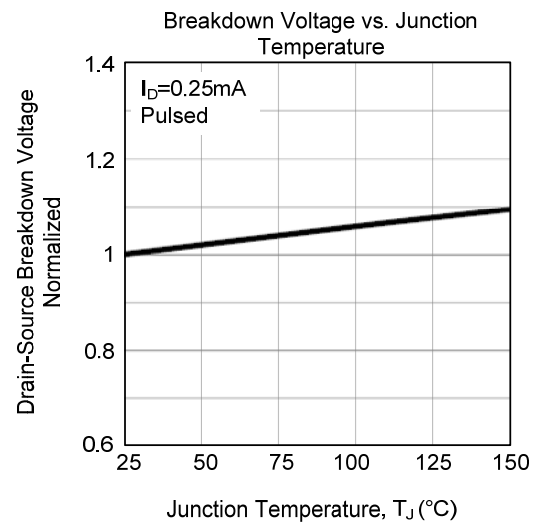
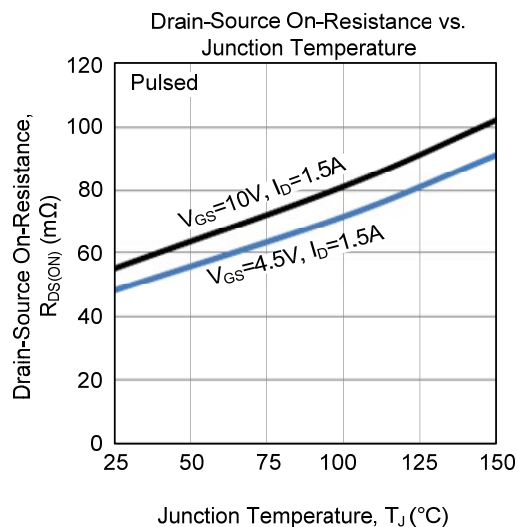
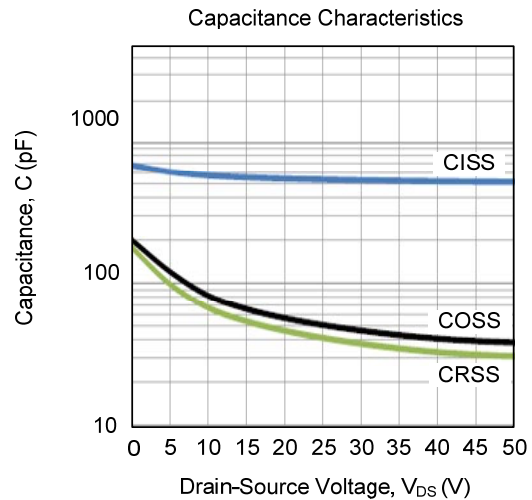
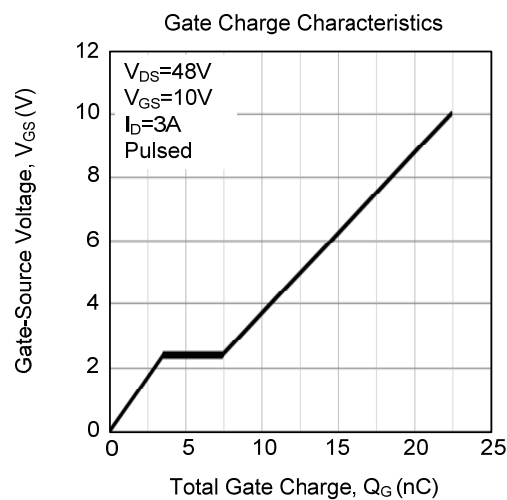
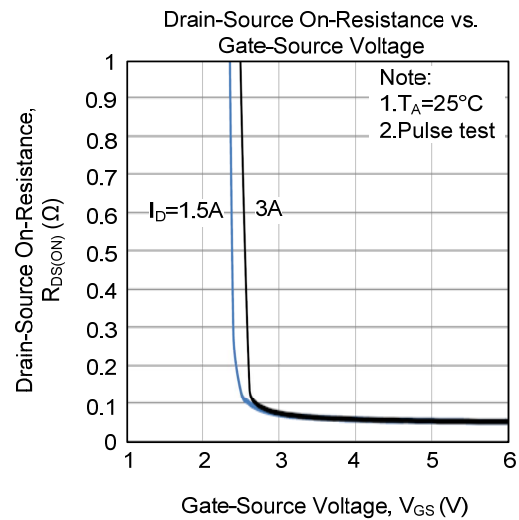
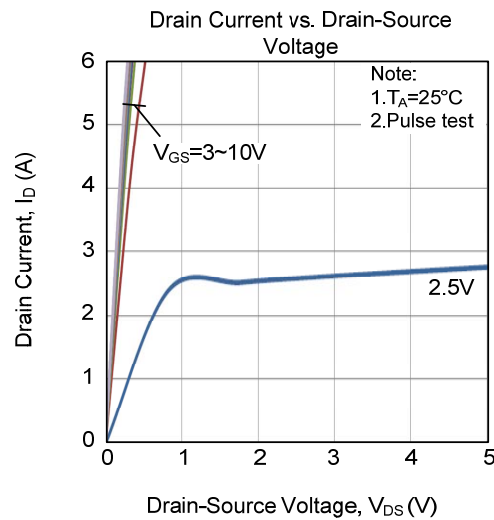
■ TEST CIRCUITS AND WAVEFORMS (Cont.)

P-CHANNEL



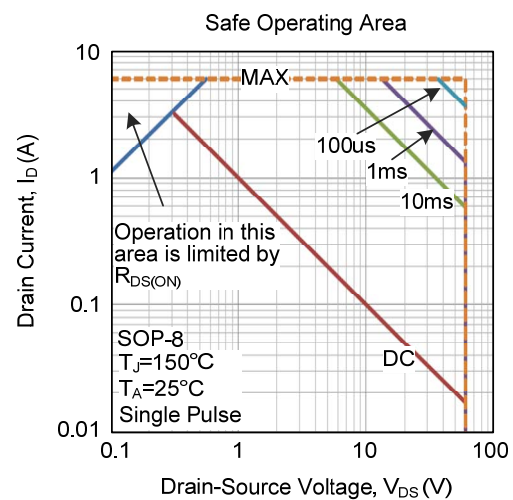
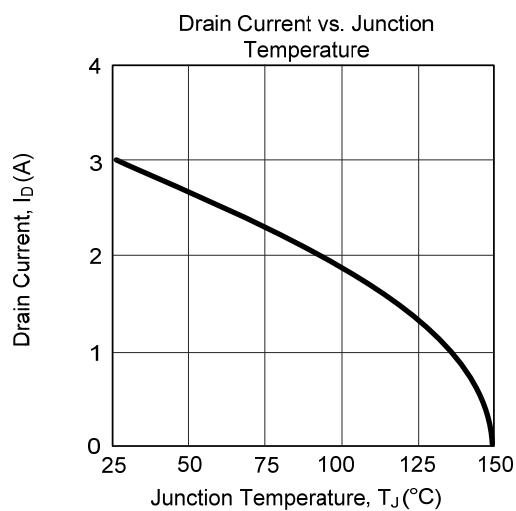
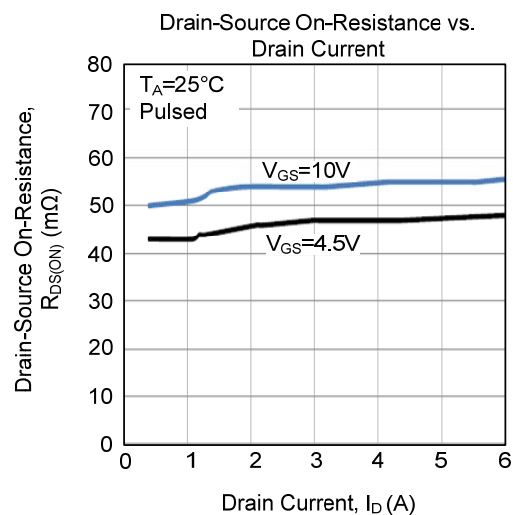
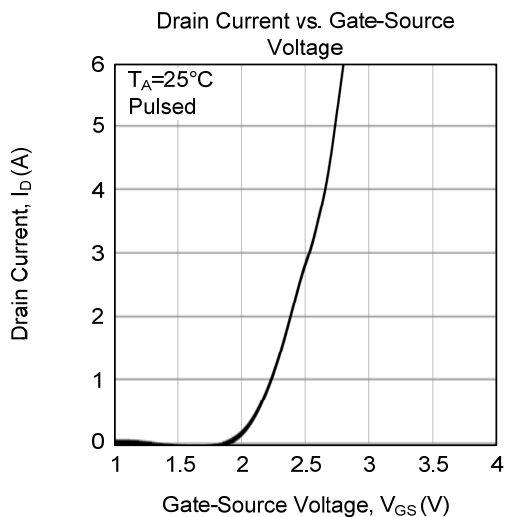
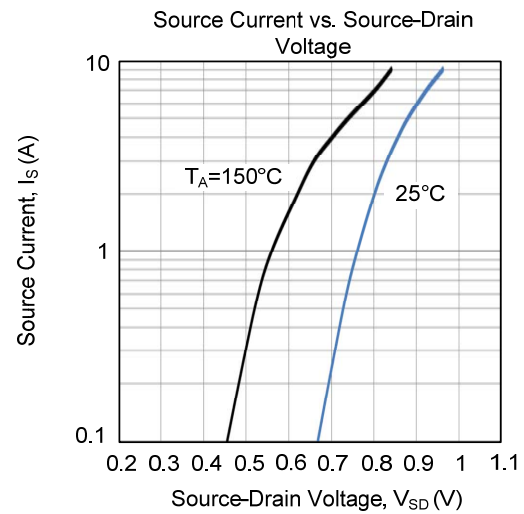
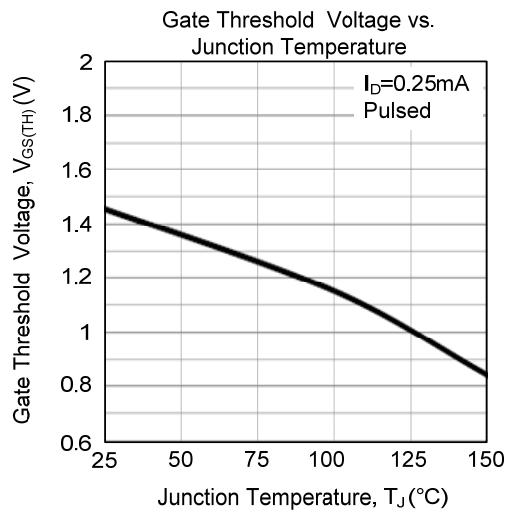
TYPICAL CHARACTERISTICS

N-CHANNEL



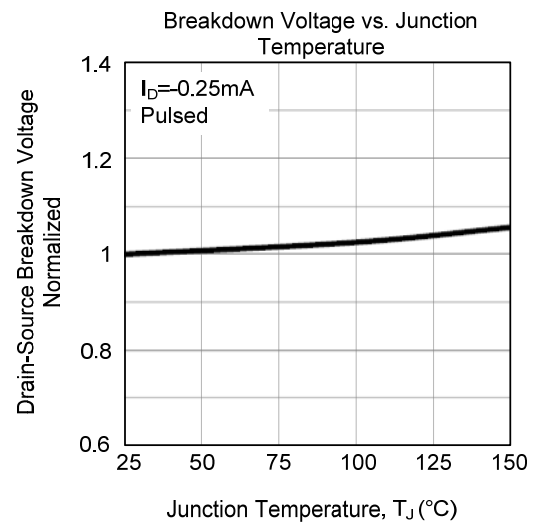
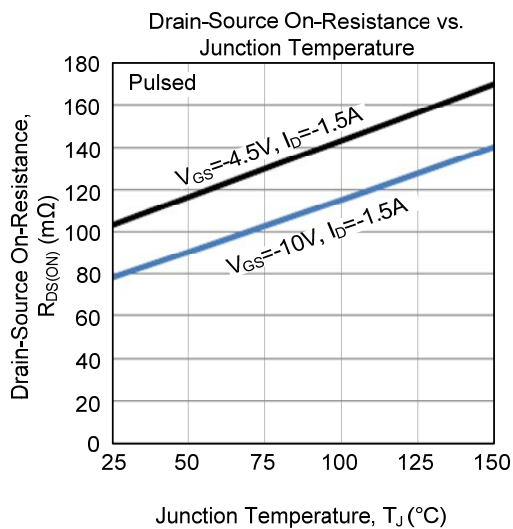
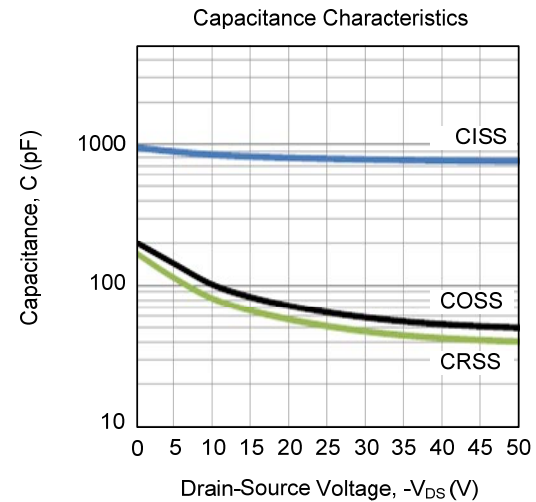
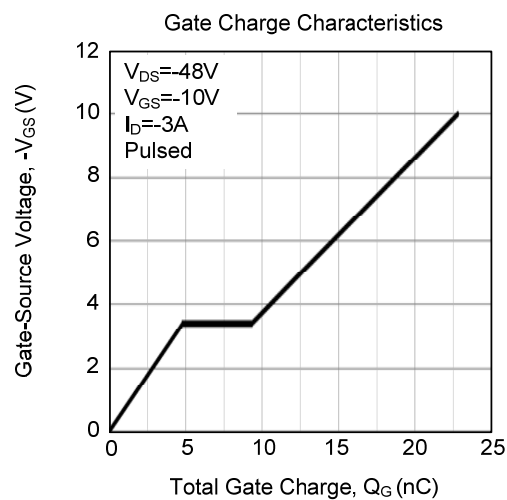
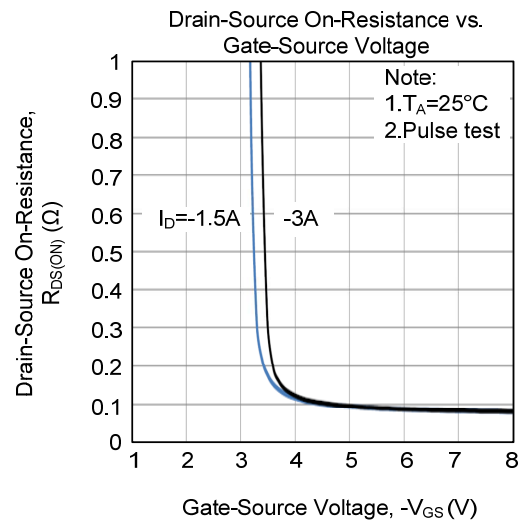
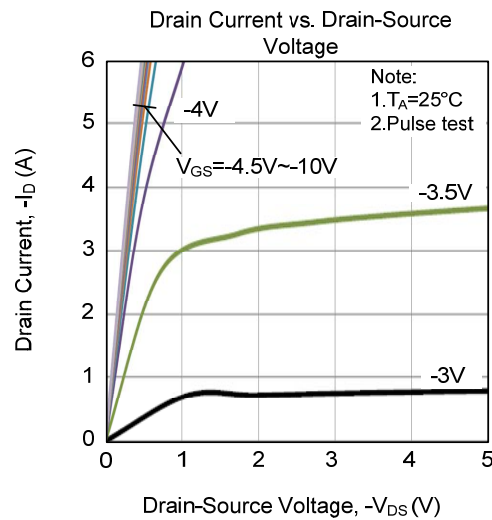
■ TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL



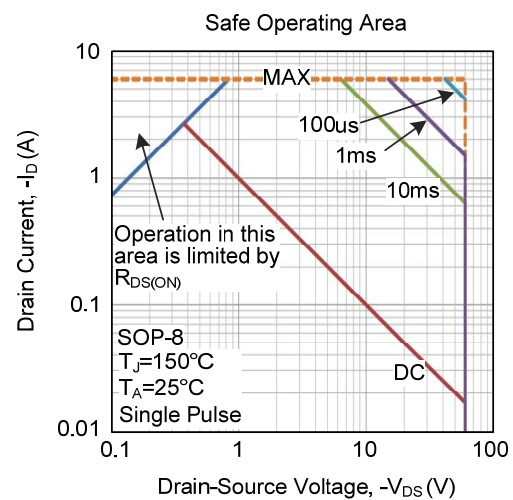
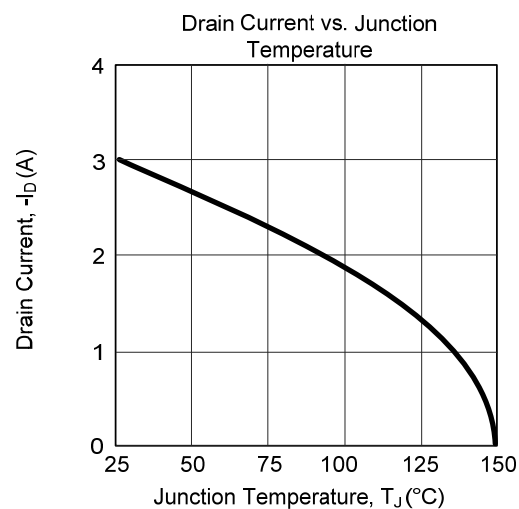
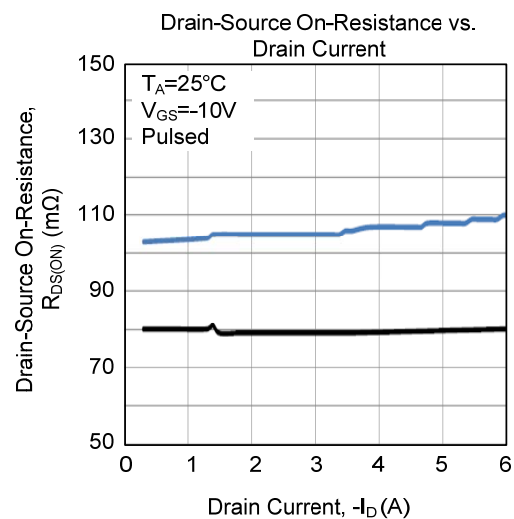
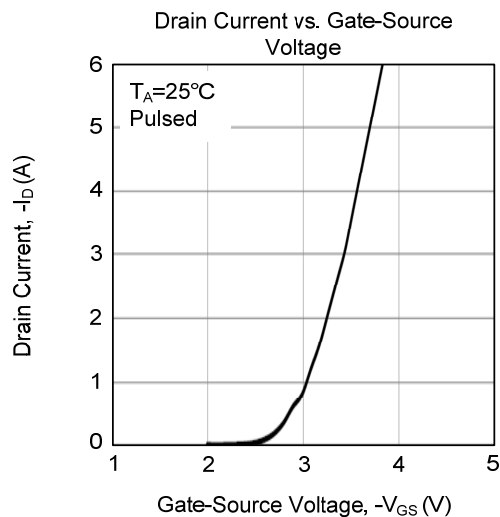
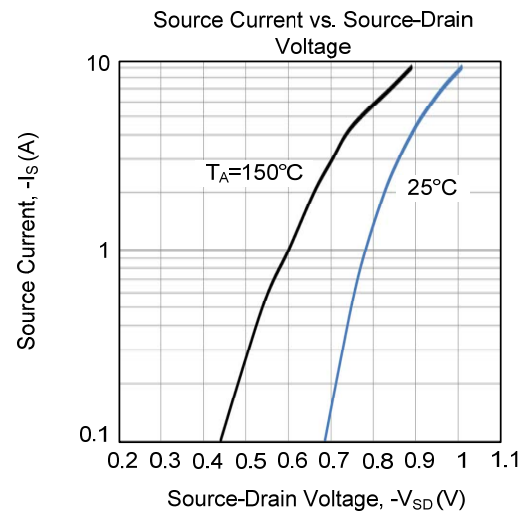
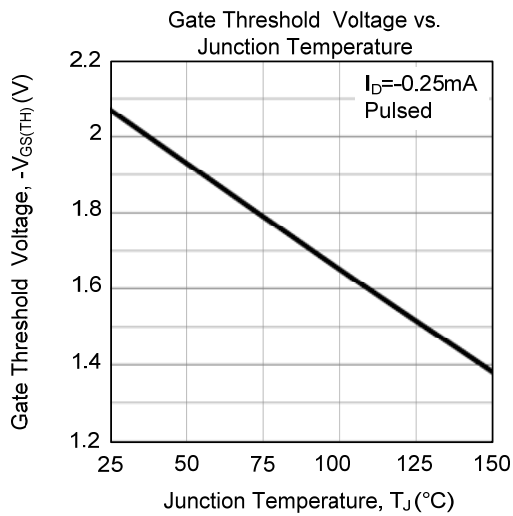
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL

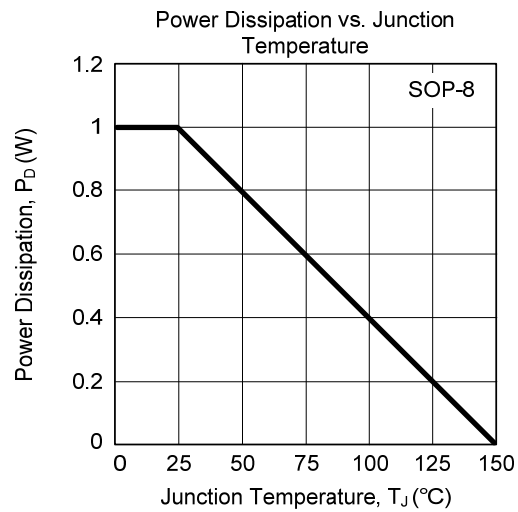


TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)



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