



UT14NP08

Power MOSFET

80V DUAL MIDDLE POWER MOSFET (N-CHANNEL/P-CHANNEL)

DESCRIPTION

The UTC **UT14NP08** 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 **UT14NP08** is universally applied in high-speed switching, motor driver.

FEATURES

* N-Channel

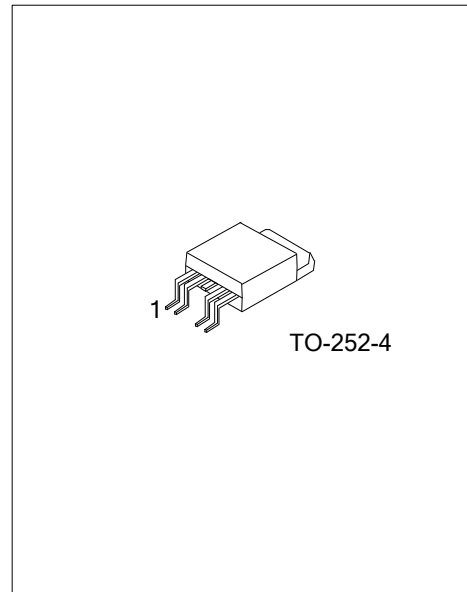
$R_{DS(on)} \leq 70m\Omega @V_{GS} = 10V, I_D=7.0A$

$R_{DS(on)} \leq 75m\Omega @V_{GS} =4.5V, I_D=7.0A$

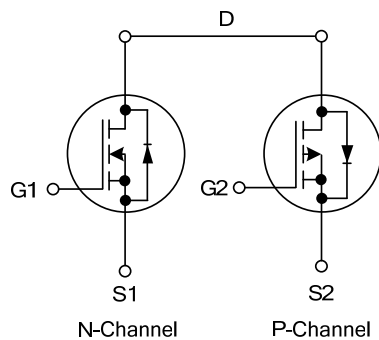
* P-Channel

$R_{DS(on)} \leq 190m\Omega @V_{GS} =-10V, I_D=-7.0A$

* High switching speed



SYMBOL



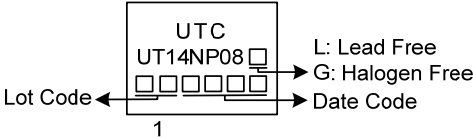
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
UT14NP08L-TN4-R	UT14NP08G-TN4-R	TO-252-4	S1	G1	D	S2	G2	Tape Reel

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

<p>UT14NP08G-TN4-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) TN4: TO-252-4</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER	SYMBOL	RATINGS		UNIT	
		N-CH	P-CH		
Drain-Source Voltage	V_{DSS}	80	80	V	
Gate-Source Voltage	V_{GSS}	± 20	± 20	V	
Drain Current	Continuous $T_C=25^{\circ}\text{C}$	I_D	14	-14	A
	Pulsed	I_{DM}	20	-20	A
Avalanche Current	I_{AS}	7.6	-28.9	A	
Avalanche Energy, Single Pulse	E_{AS}	2.91	41.7	mJ	
Power Dissipation	P_D	32		W	
Junction Temperature	T_J	+150		$^{\circ}\text{C}$	
Range of Storage Temperature	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. Repetitive Rating : Pulse width limited by maximum junction temperature.

3. N-Channel: $L=0.1\text{mH}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

P-Channel: $L=0.1\text{mH}$, $V_{DD}=-50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	$^{\circ}\text{C/W}$
Junction to Case	θ_{JC}	3.9	$^{\circ}\text{C/W}$

Note: The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.

■ 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}	$I_D=1\text{mA}$, $V_{GS}=0\text{V}$	80			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=80\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 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
Static Drain-Source On-State Resistance (Pulsed)	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=7.0\text{A}$			70	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=7.0\text{A}$			75	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		1050		pF
Output Capacitance	C_{OSS}			85		pF
Reverse Transfer Capacitance	C_{RSS}			61		pF
SWITCHING PARAMETERS						
Total Gate Charge (Pulsed)	Q_G	$V_{DD}=40\text{V}$, $V_{GS}=10\text{V}$, $I_D=14\text{A}$ $I_G=1\text{mA}$ (Note 1, 2)		27		nC
Gate to Source Charge (Pulsed)	Q_{GS}			3.6		nC
Gate to Drain Charge (Pulsed)	Q_{GD}			5.4		nC
Turn-ON Delay Time (Pulsed)	$t_{D(ON)}$	$V_{DD}=40\text{V}$, $V_{GS}=10\text{V}$, $I_D=14\text{A}$, $R_G=6\Omega$ (Note 1, 2)		9.6		ns
Rise Time (Pulsed)	t_R			16		ns
Turn-OFF Delay Time (Pulsed)	$t_{D(OFF)}$			44		ns
Fall-Time (Pulsed)	t_F			18		ns
SOURCE TO DRAIN DIODE SPECIFICATIONS						
Maximum Body-Diode Continuous Current	I_S				14	A
Maximum Body-Diode Pulsed Current	I_{SM}				28	A
Diode Forward Voltage	V_{SD}	$I_S=1.0\text{A}$, $V_{GS}=0\text{V}$			1	V

Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ ELECTRICAL CHARACTERISTICS (Cont.)

P-CHANNEL

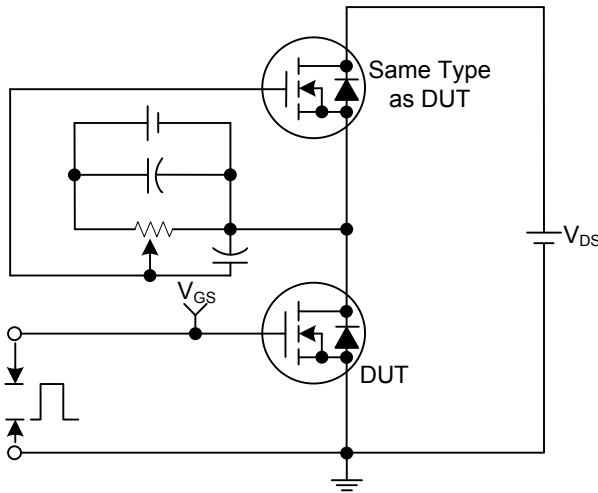
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = -1mA, V_{GS} = 0V$	-80			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -80V, V_{GS} = 0V$			-1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-2.0		-4.0	V
Static Drain-Source On-State Resistance (Pulsed)	$R_{DS(ON)}$	$V_{GS} = -10V, I_D = -7.0A$			190	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS} = 0V, V_{DS} = -25V, f = 1.0MHz$		1759		pF
Output Capacitance	C_{OSS}			85		pF
Reverse Transfer Capacitance	C_{RSS}			68		pF
SWITCHING PARAMETERS						
Total Gate Charge (Pulsed)	Q_G	$V_{DD} = -40V, V_{GS} = -10V, I_D = -14A$ $I_G = -1mA$ (Note 1, 2)		34		nC
Gate to Source Charge (Pulsed)	Q_{GS}			7		nC
Gate to Drain Charge (Pulsed)	Q_{GD}			6.6		nC
Turn-ON Delay Time (Pulsed)	$t_{D(ON)}$	$V_{DD} = -40V, V_{GS} = -10V, I_D = -14A,$ $R_G = 25\Omega$ (Note 1, 2)		24		ns
Rise Time (Pulsed)	t_R			21.3		ns
Turn-OFF Delay Time (Pulsed)	$t_{D(OFF)}$			105		ns
Fall-Time (Pulsed)	t_F			51		ns
SOURCE TO DRAIN DIODE SPECIFICATIONS						
Maximum Body-Diode Continuous Current	I_S				-14	A
Maximum Body-Diode Pulsed Current	I_{SM}				-28	A
Diode Forward Voltage	V_{SD}	$I_S = -1.0A, V_{GS} = 0V$			-1	V

Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

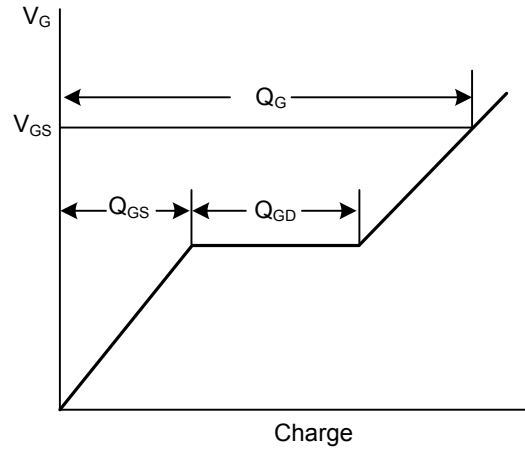
2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

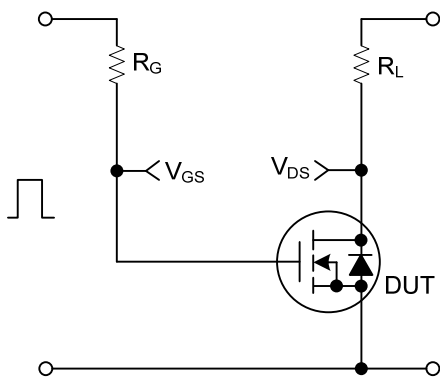
N-CHANNEL



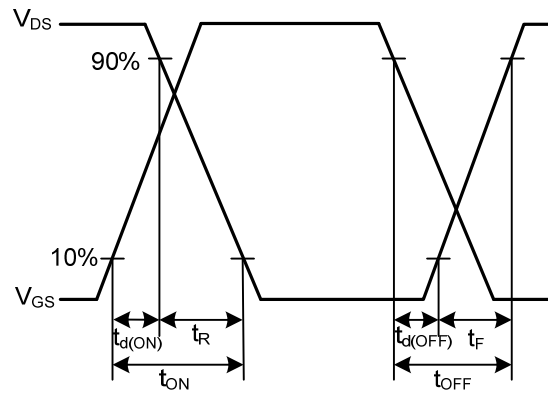
Gate Charge Test Circuit



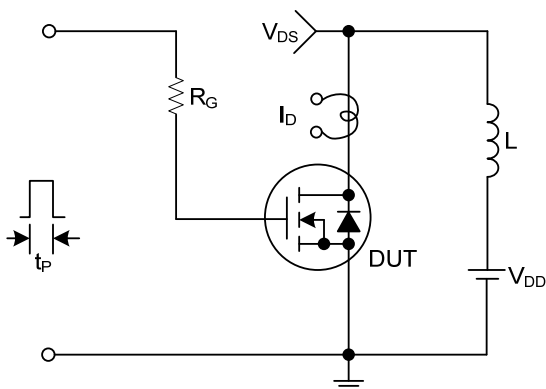
Gate Charge Waveforms



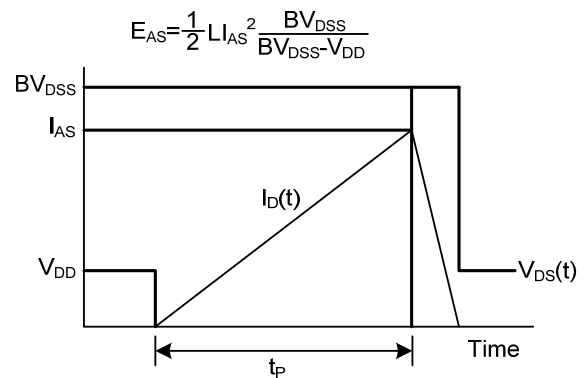
Resistive Switching Test Circuit



Resistive Switching Waveforms



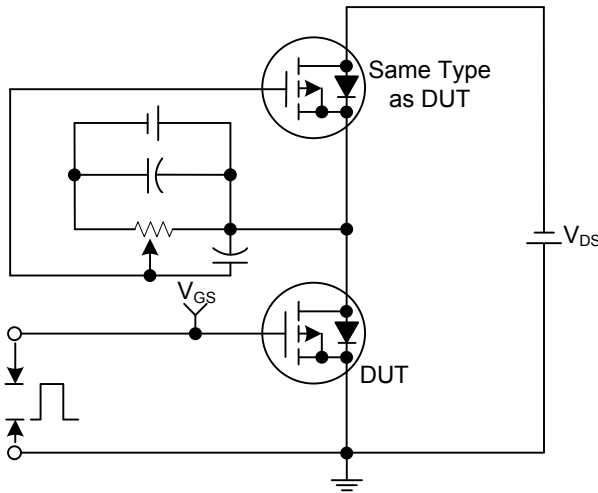
Unclamped Inductive Switching Test Circuit



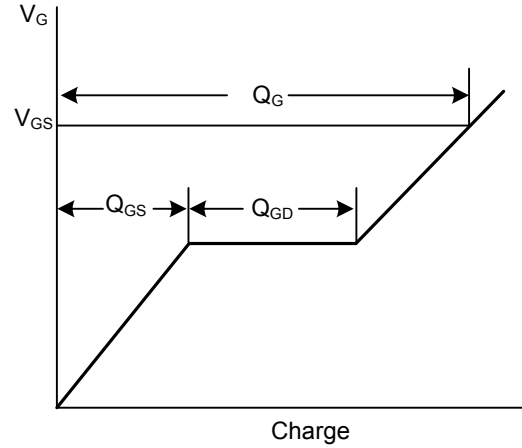
Unclamped Inductive Switching Waveforms

TEST CIRCUITS AND WAVEFORMS

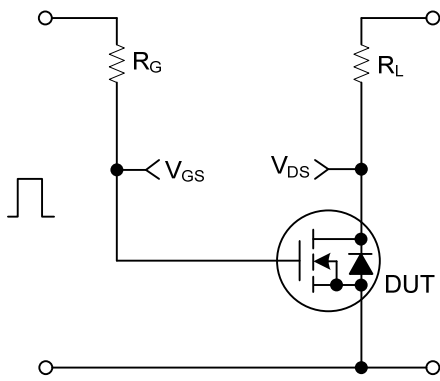
P-CHANNEL



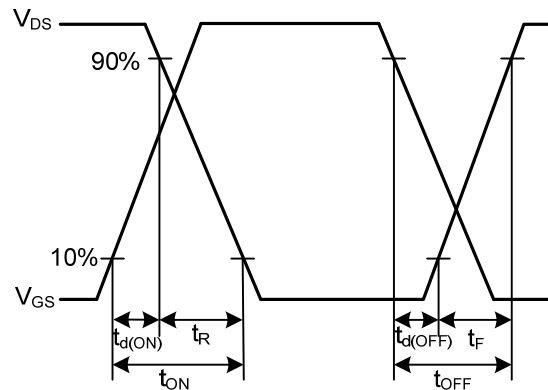
Gate Charge Test Circuit



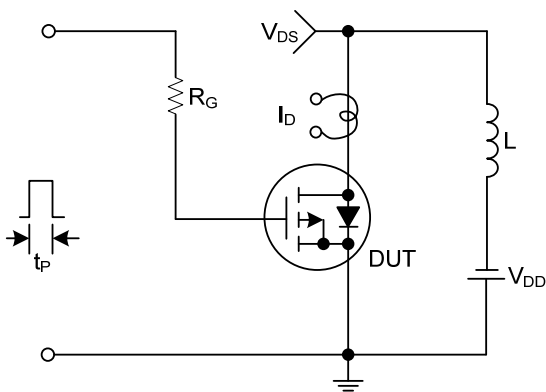
Gate Charge Waveforms



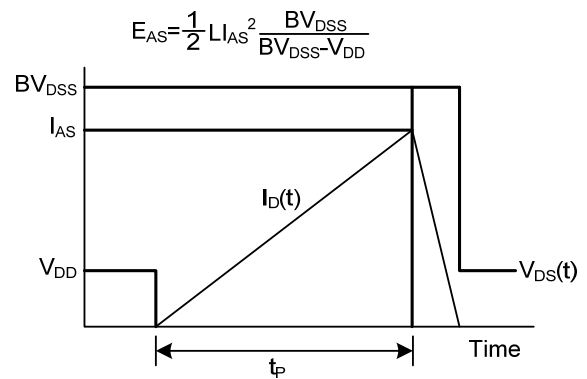
Resistive Switching Test Circuit



Resistive Switching Waveforms



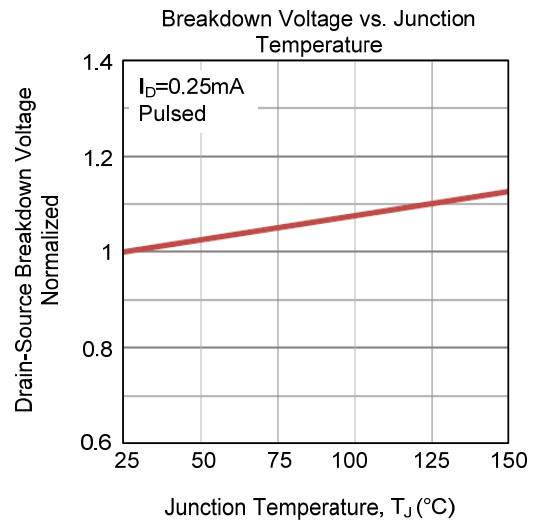
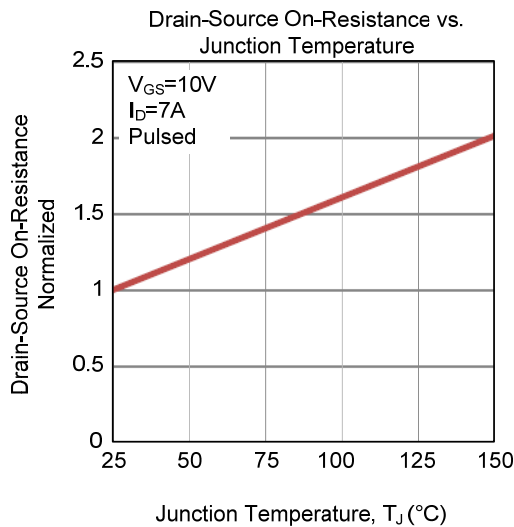
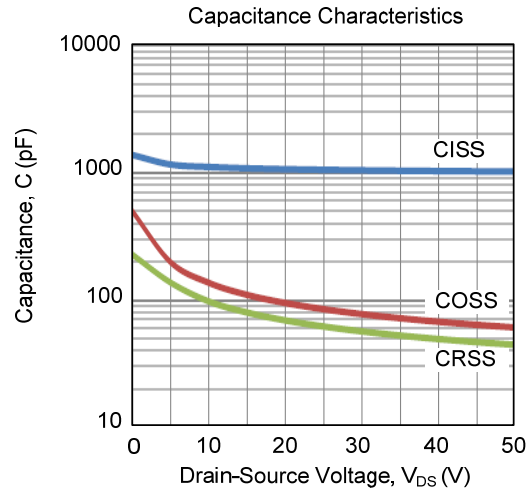
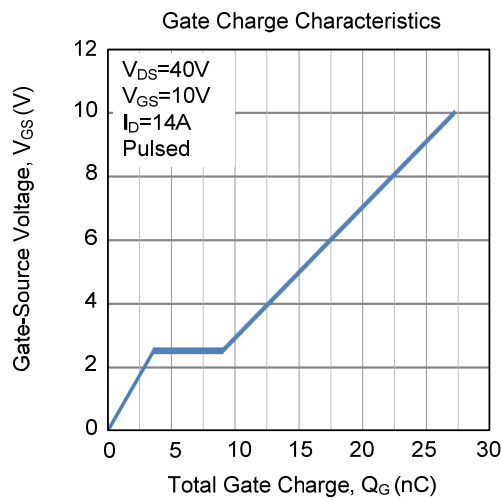
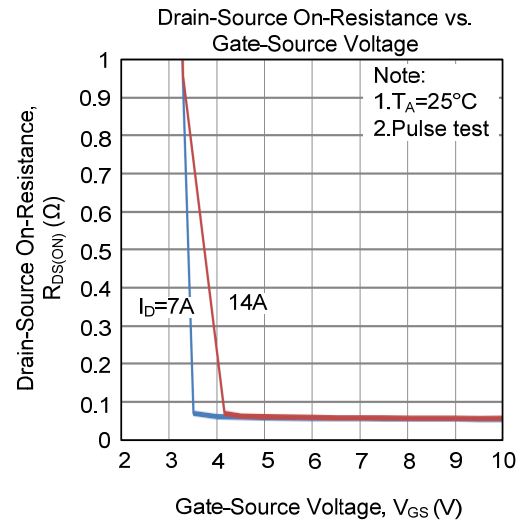
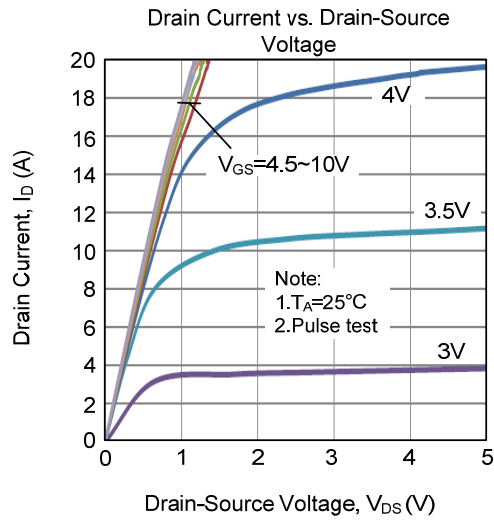
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

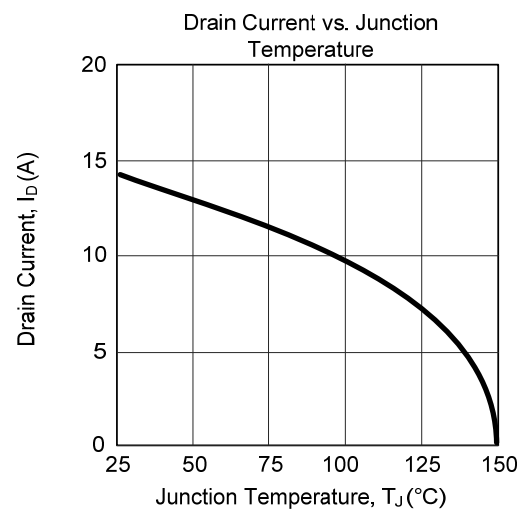
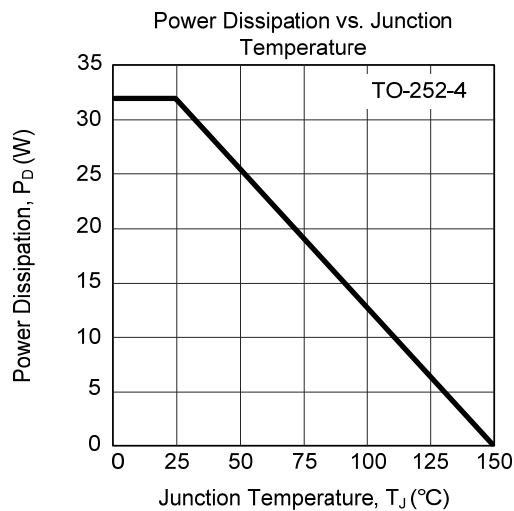
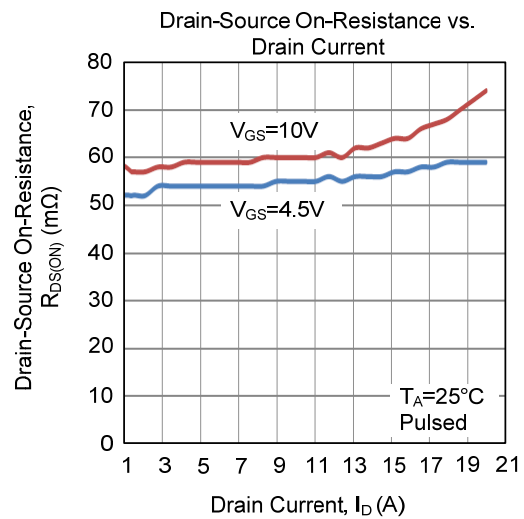
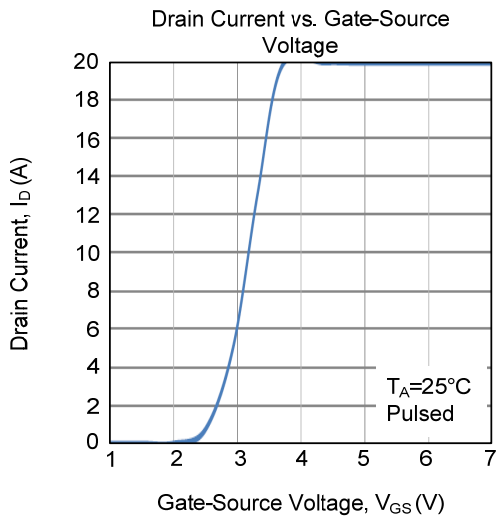
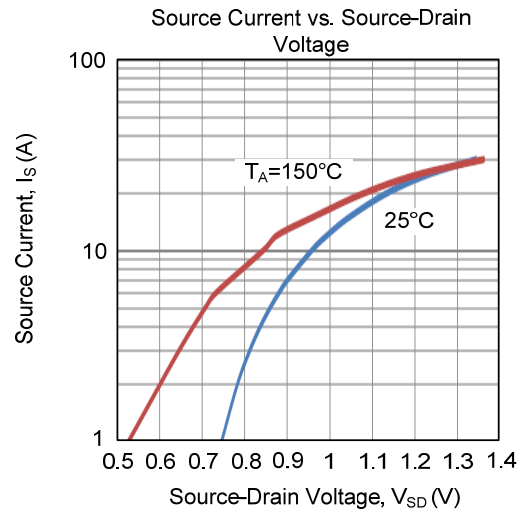
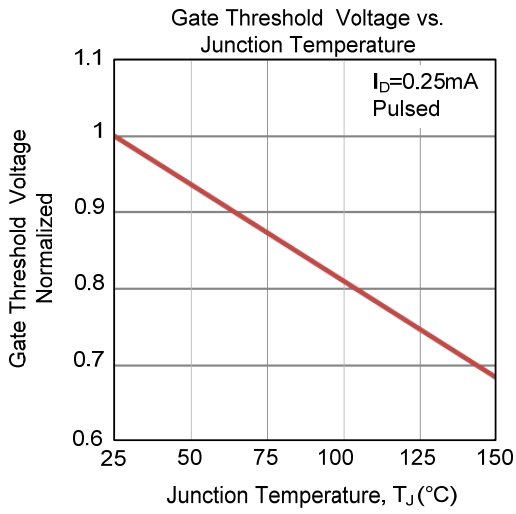
TYPICAL CHARACTERISTICS

N-CHANNEL



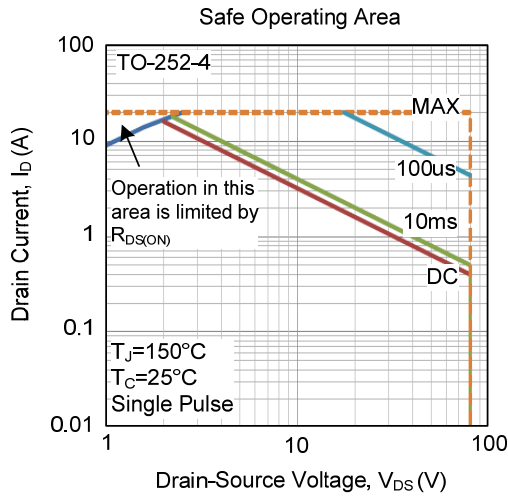
TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL

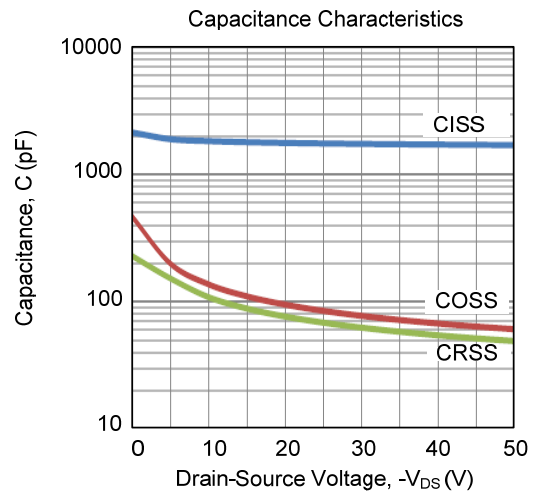
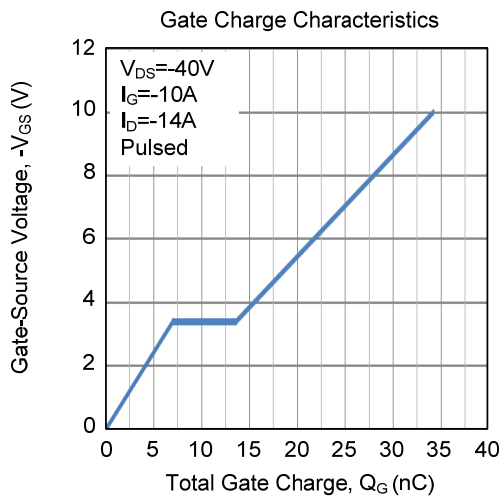
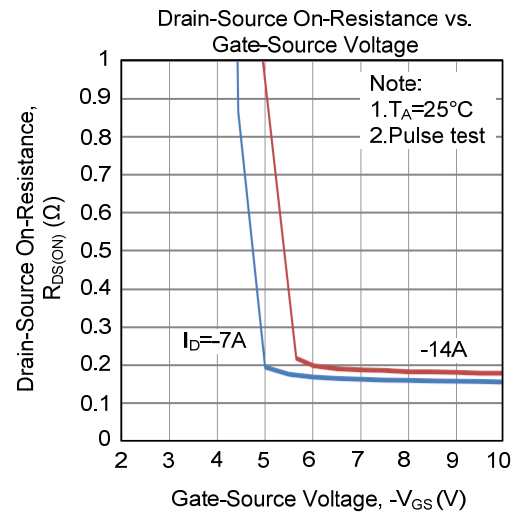
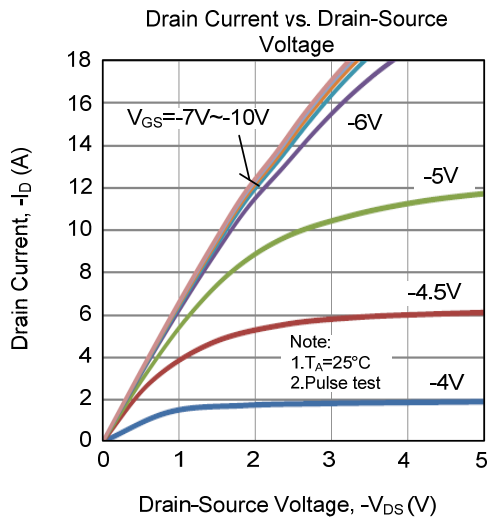


TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL

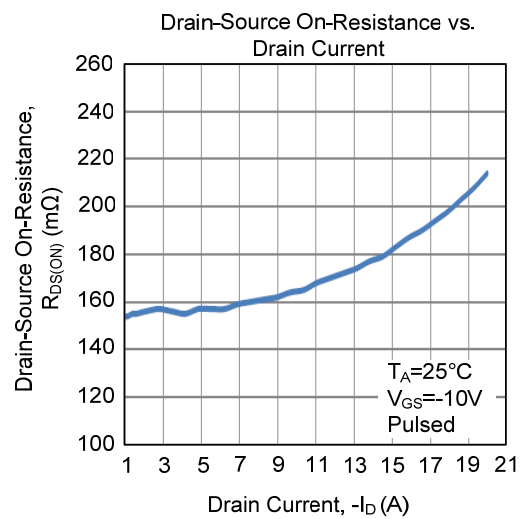
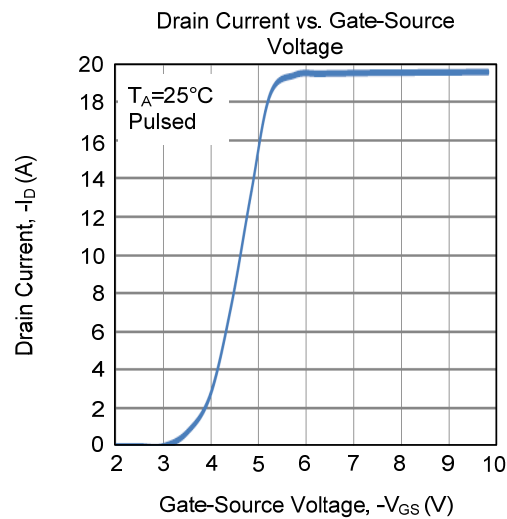
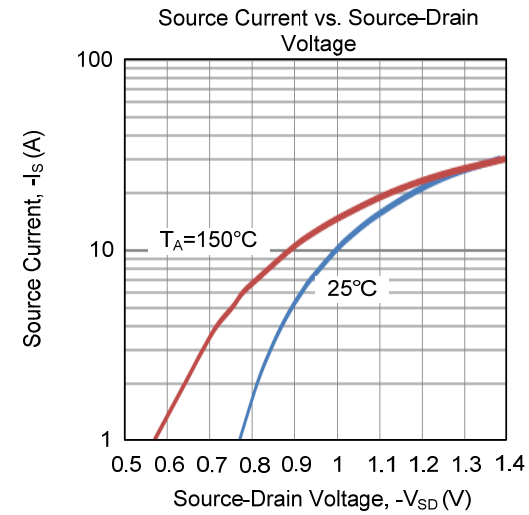
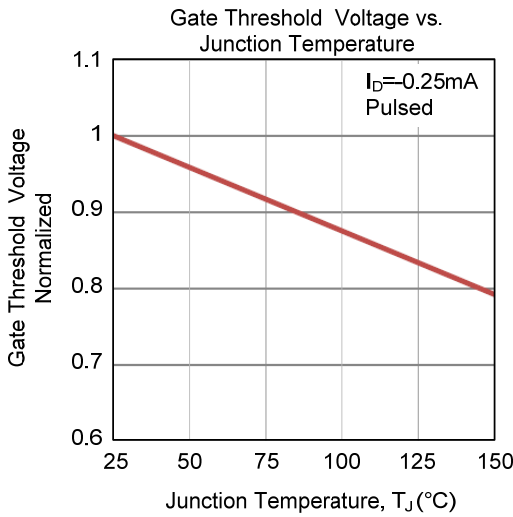
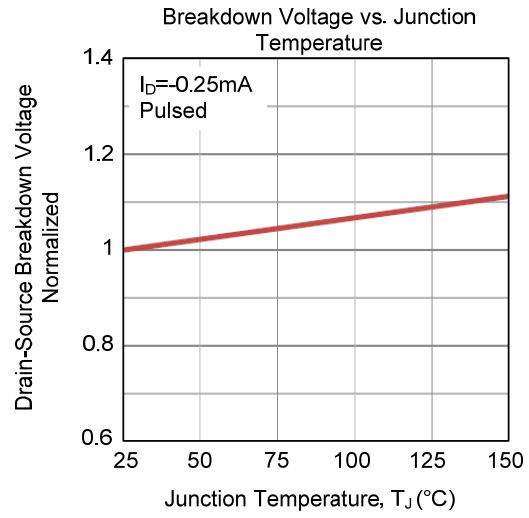
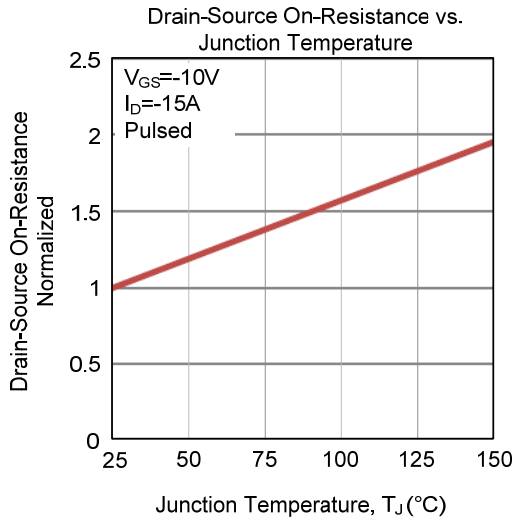


P-CHANNEL



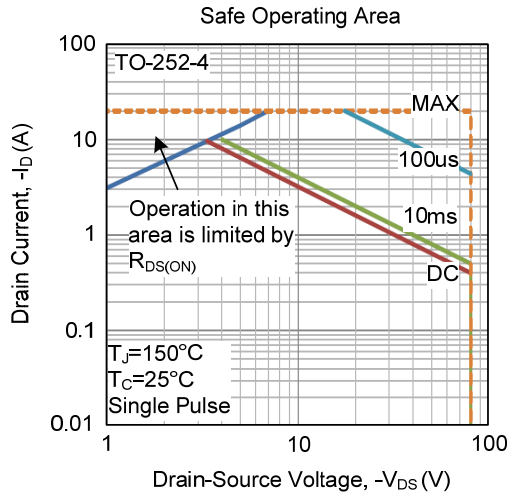
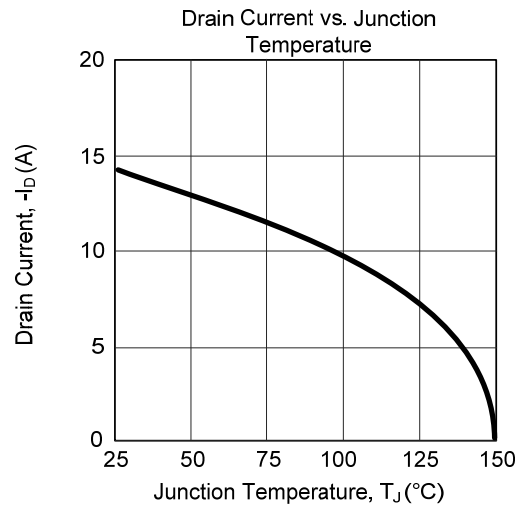
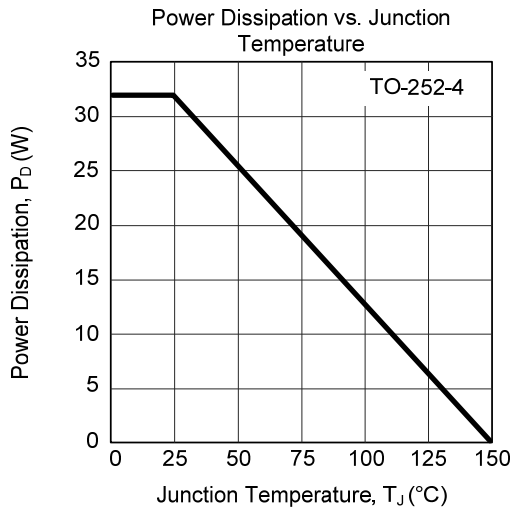
TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



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