

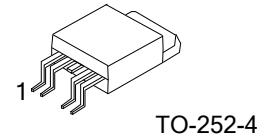
**UT25NP03***Power MOSFET***DUAL ENHANCEMENT MODE
(N-CHANNEL / P-CHANNEL)****DESCRIPTION**

The UTC **UT25NP03** 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.

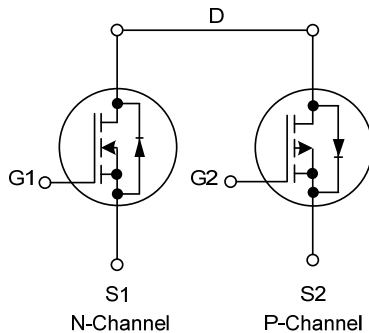
The UTC **UT25NP03** is universally applied in low voltage applications.

FEATURES***N-CHANNEL**
 $R_{DS(ON)} \leq 16 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=12.5\text{A}$
 $R_{DS(ON)} \leq 22 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=12.5\text{A}$
***P-CHANNEL**
 $R_{DS(ON)} \leq 24 \text{ m}\Omega @ V_{GS}=-10\text{V}, I_D=-10\text{A}$
 $R_{DS(ON)} \leq 32 \text{ m}\Omega @ V_{GS}=-4.5\text{V}, I_D=-10\text{A}$

* High switching speed



TO-252-4

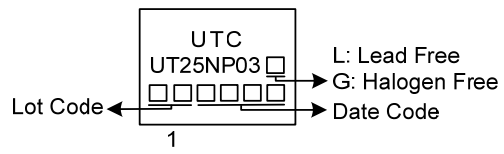
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT25NP03L-TN4-R	UT25NP03G-TN4-R	TO-252-4	G	D	S	Tape Reel

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

UT25NP03G-TN4-R (1) Packing Type (2) Package Type (3) Green Package		(1) R: Tape Reel (2) TN4: TO-252-4 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS		UNIT
			N-CHANNEL	P-CHANNEL	
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	V
Drain Current	Continuous $T_A=25^\circ\text{C}$	I_D	25	-25	A
	Pulsed (Note 1)	I_{DM}	50	-50	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	3.5	48	mJ
Power Dissipation ($T_A=25^\circ\text{C}$)		P_D	43		W
Junction Temperature		T_J	$-55 \sim +150$		$^\circ\text{C}$
Storage Temperature Range		T_{STG}	$-55 \sim +150$		$^\circ\text{C}$

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: $L=0.1\text{mH}$, $I_{AS}=8.0\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

P-Channel: $L=0.1\text{mH}$, $I_{AS}=-31\text{A}$, $V_{DD}=-25\text{V}$, $R_G=25\Omega$, 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}	2.32 (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	30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-20V, 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
Static Drain-Source On-State Resistance (Note 2)		R _{DS(ON)}	V _{GS} =10V, I _D =12.5A			16	mΩ
			V _{GS} =4.5V, I _D =12.5A			22	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =15V, f=1.0MHz		840		pF
Output Capacitance		C _{OSS}			200		pF
Reverse Transfer Capacitance		C _{RSS}			170		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q _G	V _{GS} =10V, V _{DS} =24V, I _D =25A		31		nC
Gate to Source Charge		Q _{GS}			4.4		nC
Gate to Drain Charge		Q _{GD}			8		nC
Turn-ON Delay Time (Note 2)		t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =25A, R _G =6Ω		7		ns
Rise Time		t _R			17		ns
Turn-OFF Delay Time		t _{D(OFF)}			28		ns
Fall-Time		t _F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V _{SD}	I _S =25A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =25A, V _{GS} =0V,		280		nS
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		0.675		nC

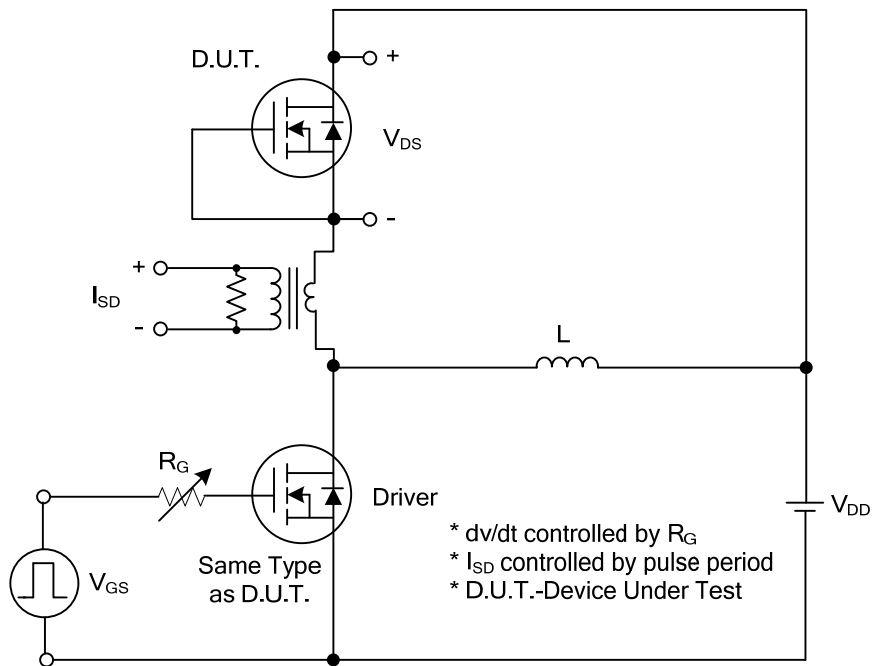
■ ELECTRICAL CHARACTERISTICS (Cont.)

P-Channel

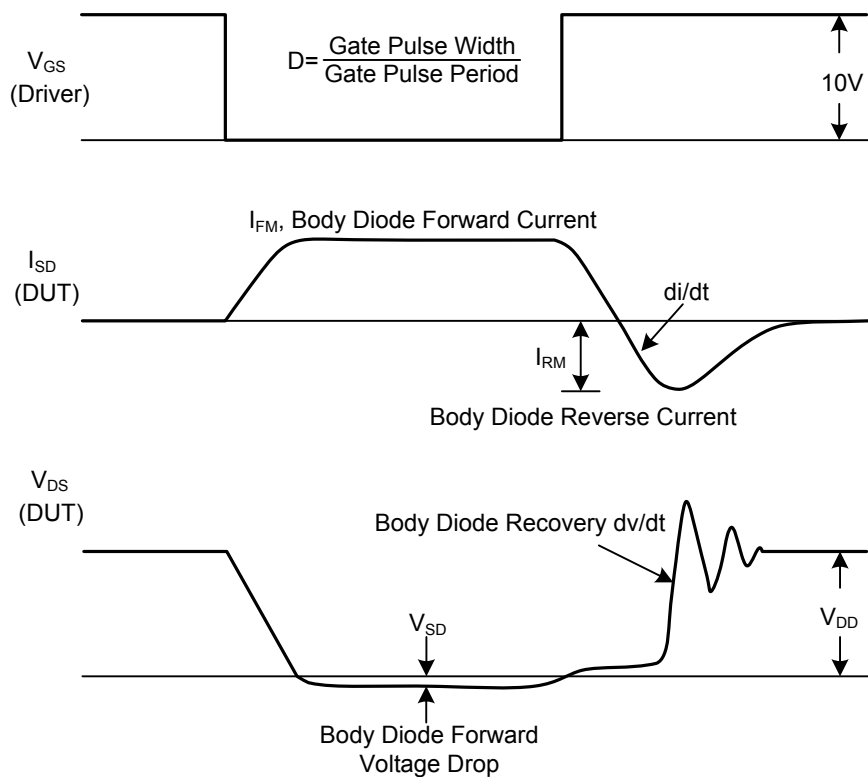
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=-250\mu A, V_{GS}=0V$	-30			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$			-1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=+20V, V_{DS}=0V$			+100	nA
	Reverse		$V_{GS}=-20V, V_{DS}=0V$			-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)		$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-10A$			24	m Ω
			$V_{GS}=-4.5V, I_D=-10A$			32	m Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	$V_{GS}=0V, V_{DS}=-15V,$ $f=1.0MHz$		1600		pF
Output Capacitance		C_{OSS}			300		pF
Reverse Transfer Capacitance		C_{RSS}			260		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 2)		Q_G	$V_{GS}=-10V, V_{DS}=-24V,$ $I_D=-25A$		40		nC
Gate to Source Charge		Q_{GS}			10		nC
Gate to Drain Charge		Q_{GD}			5		nC
Turn-ON Delay Time (Note 2)		$t_{D(ON)}$	$V_{DS}=-15V, V_{GS}=-10V,$ $I_D=-25A, R_G=6\Omega$		8		ns
Rise Time		t_R			17.5		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			68		ns
Fall-Time		t_F			46		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage(Note 2)		V_{SD}	$I_S=-25A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	$I_S=-25A, V_{GS}=0V,$		178		nS
Body Diode Reverse Recovery Charge		Q_{rr}	$dI_F/dt=100A/\mu s$		0.228		nC

Notes: 1. Pulse width limited by maximum junction temperature
 2. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

■ TEST CIRCUITS AND WAVEFORMS



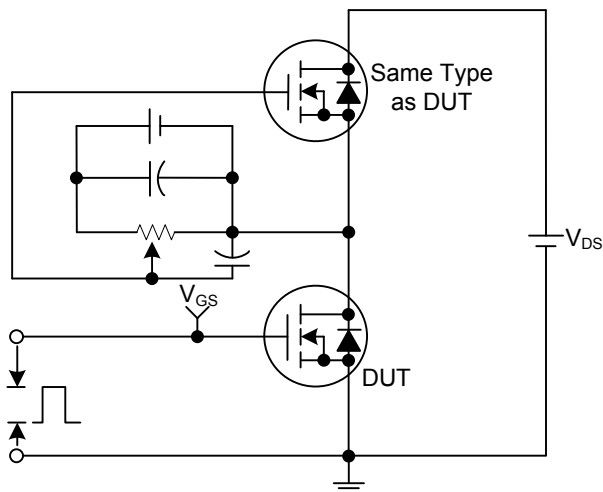
Peak Diode Recovery dv/dt Test Circuit



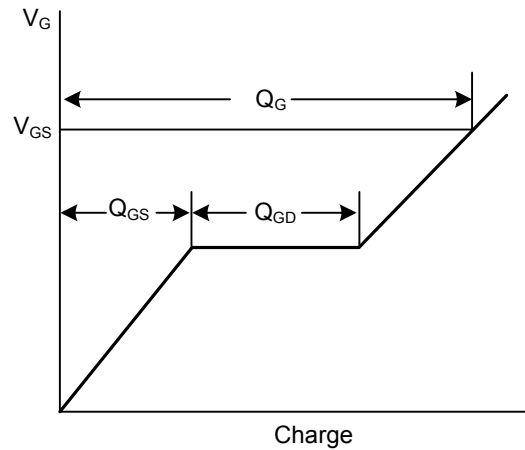
Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

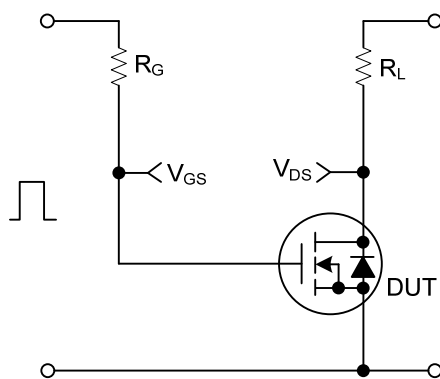
N-CHANNEL



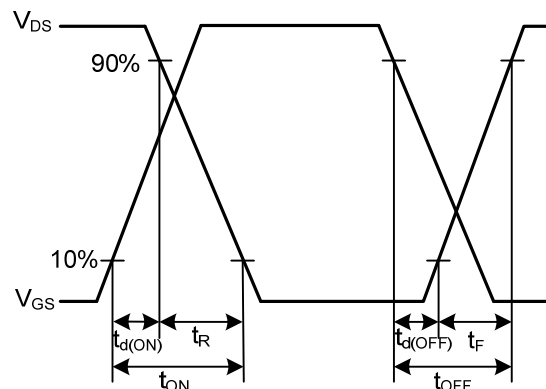
Gate Charge Test Circuit



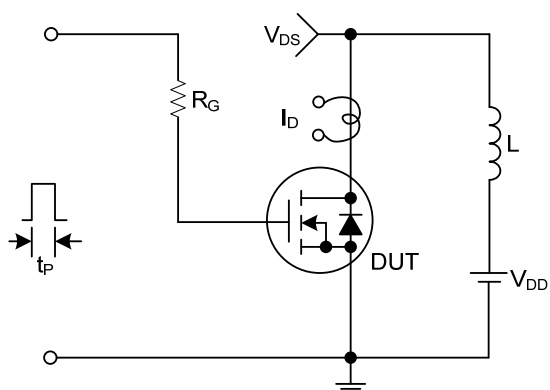
Gate Charge Waveforms



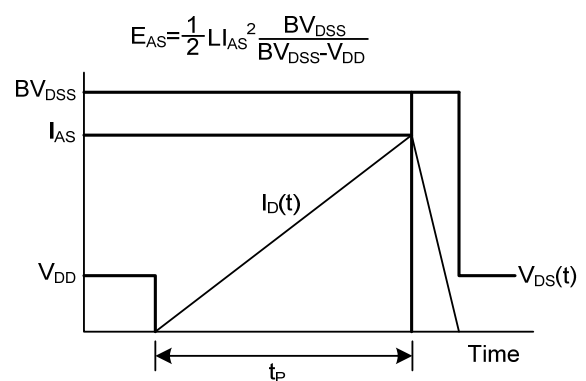
Resistive Switching Test Circuit



Resistive Switching Waveforms



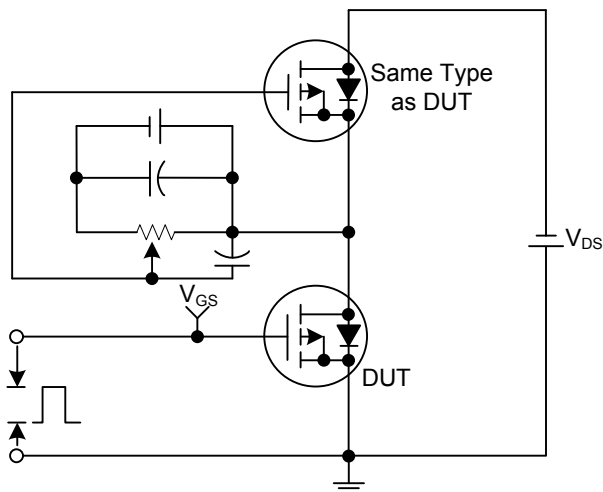
Unclamped Inductive Switching Test Circuit



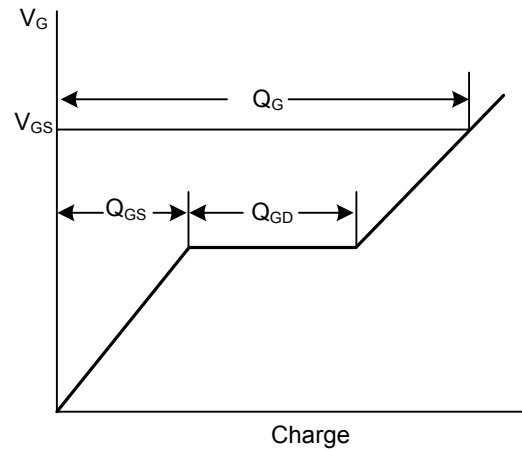
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS

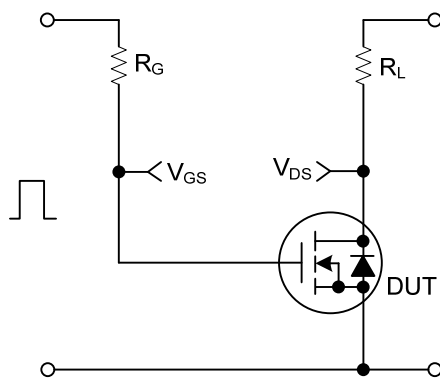
P-CHANNEL



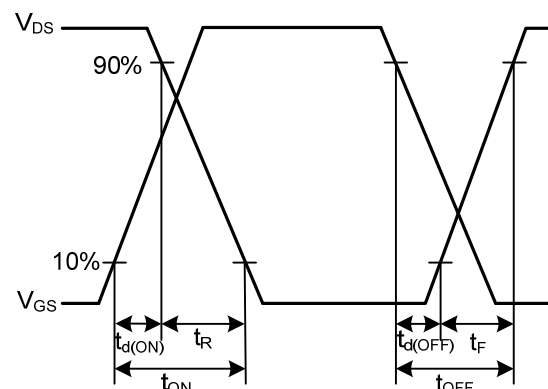
Gate Charge Test Circuit



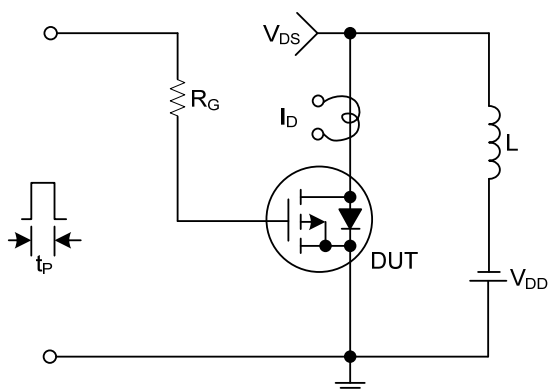
Gate Charge Waveforms



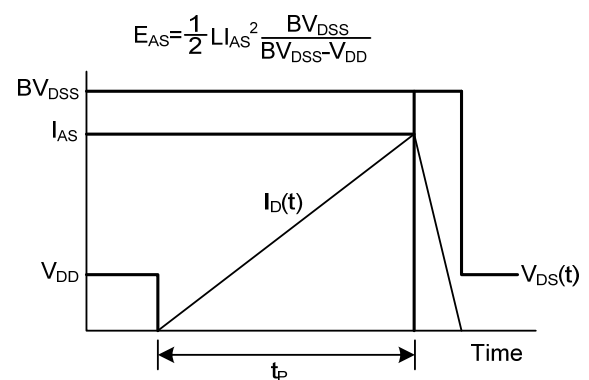
Resistive Switching Test Circuit



Resistive Switching Waveforms



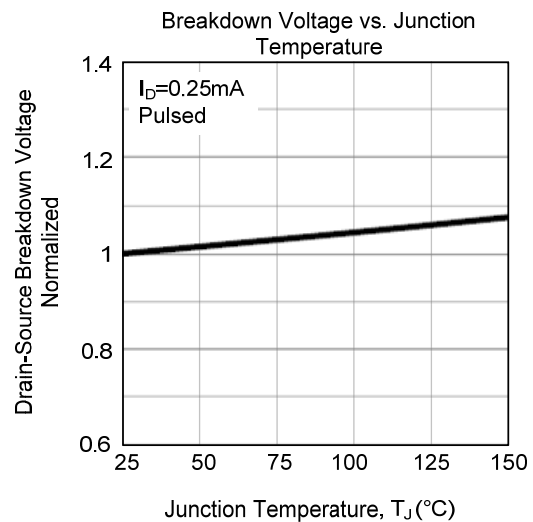
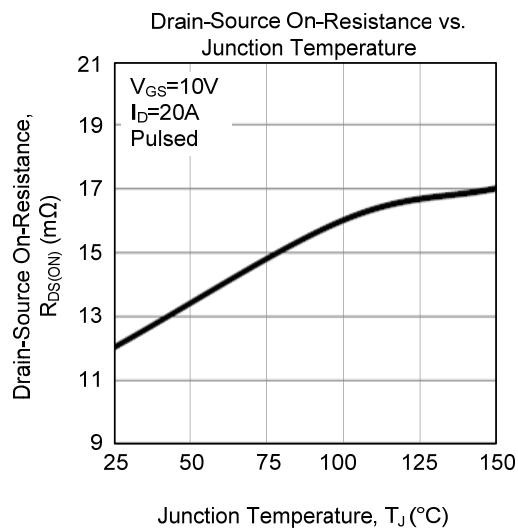
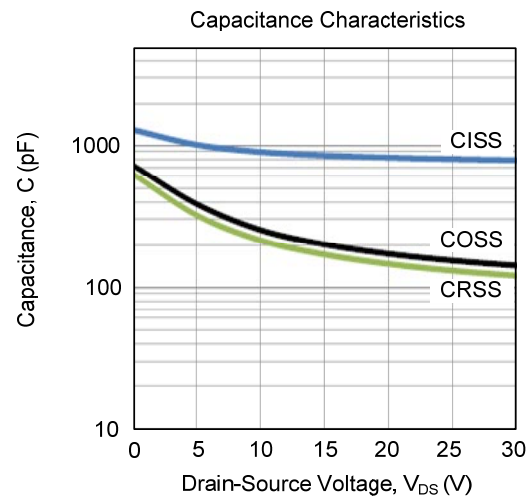
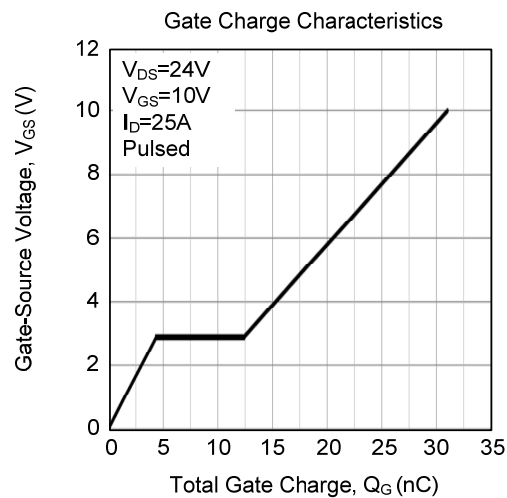
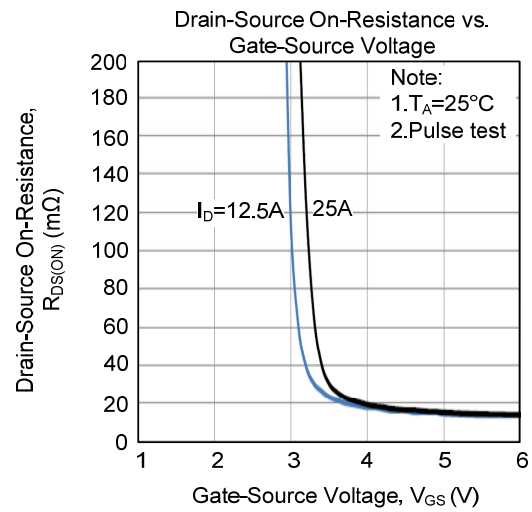
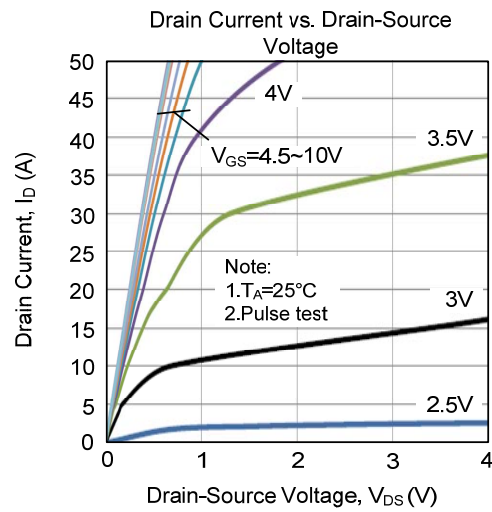
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

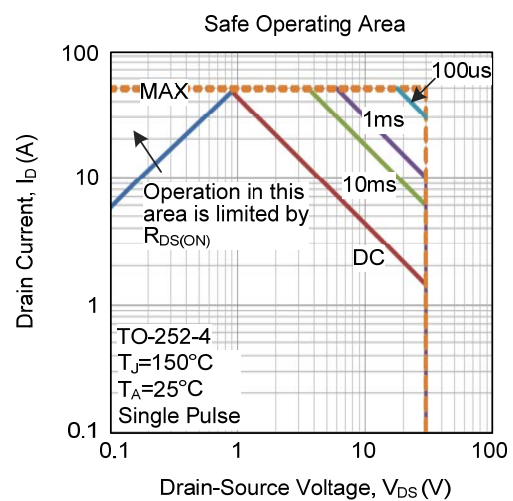
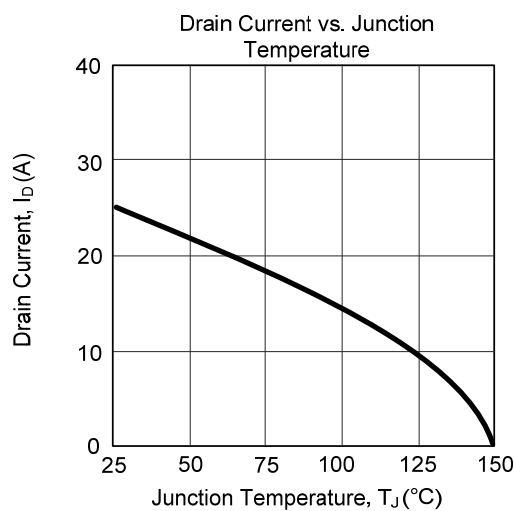
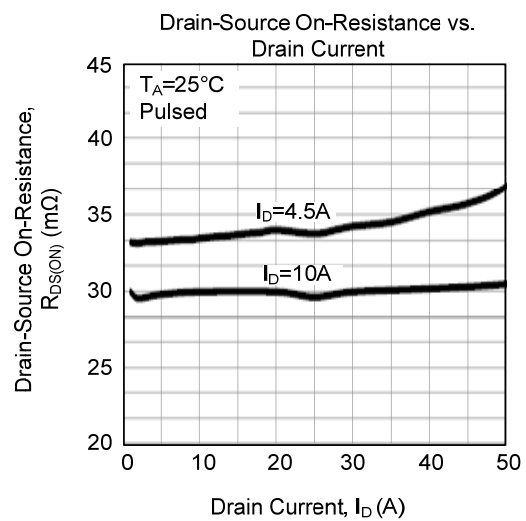
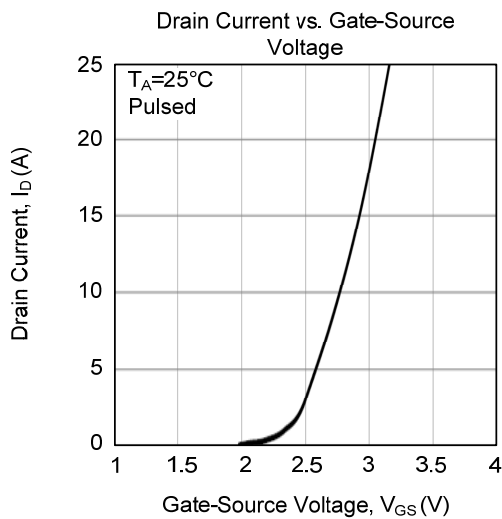
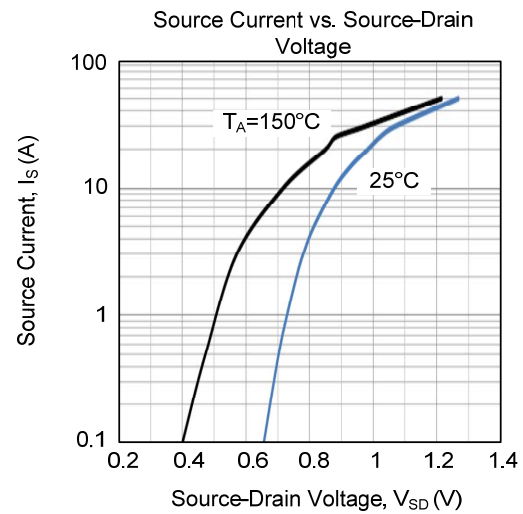
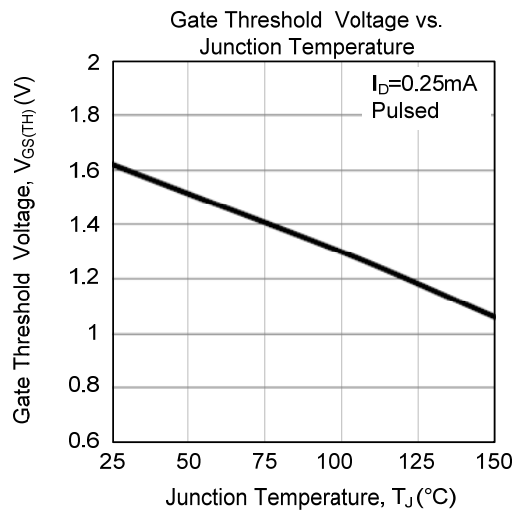
TYPICAL CHARACTERISTICS

N-CHANNEL



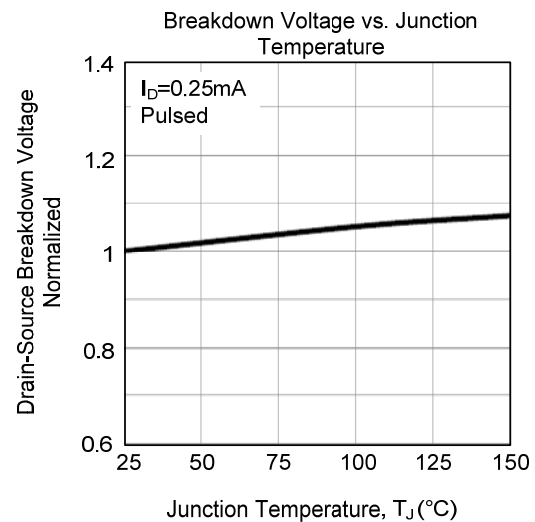
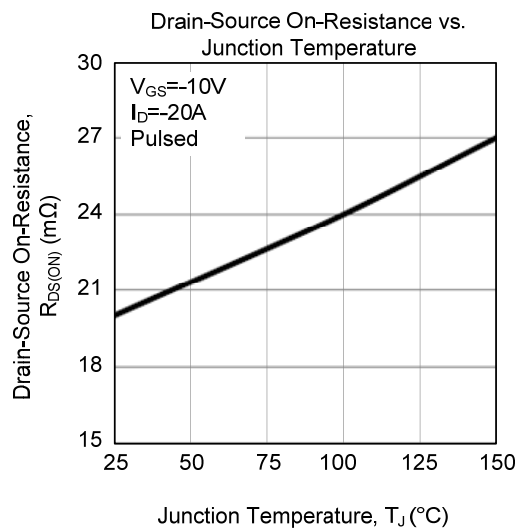
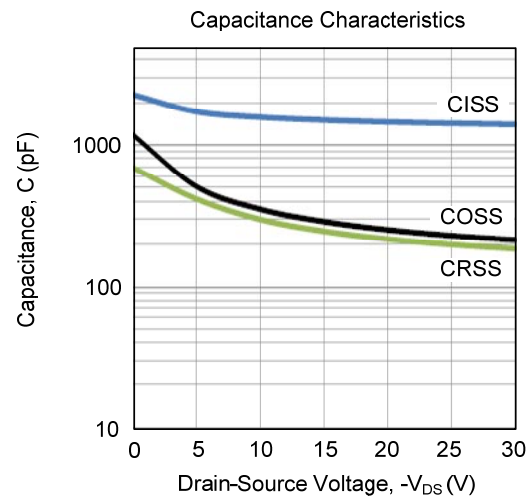
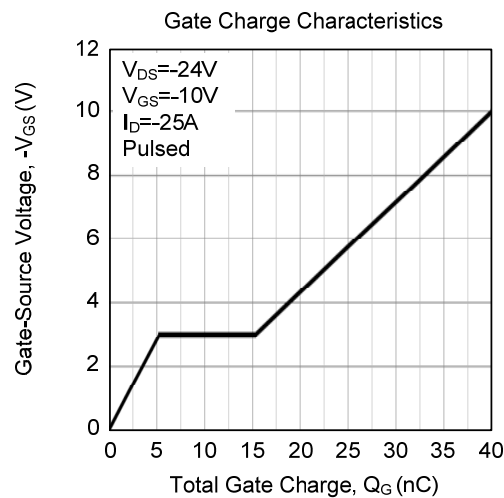
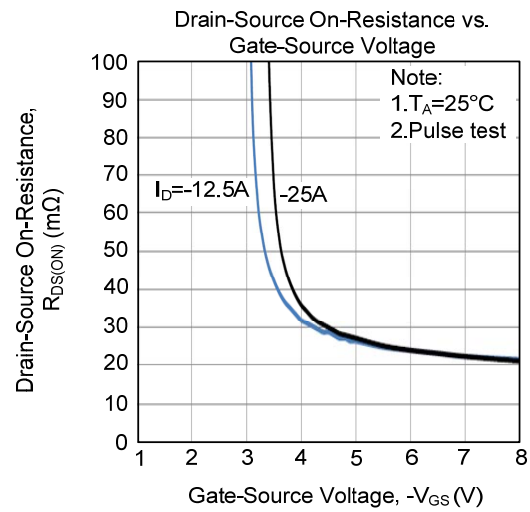
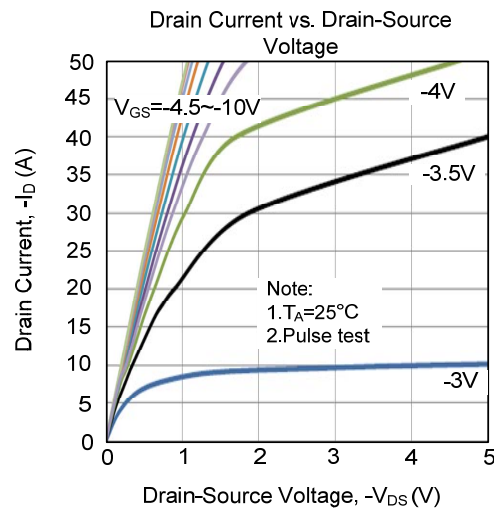
TYPICAL CHARACTERISTICS (Cont.)

N-CHANNEL



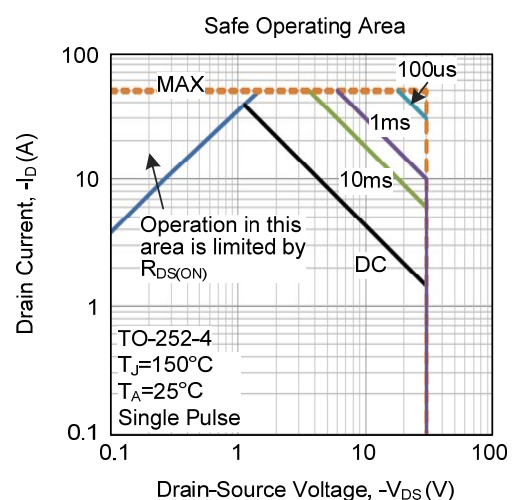
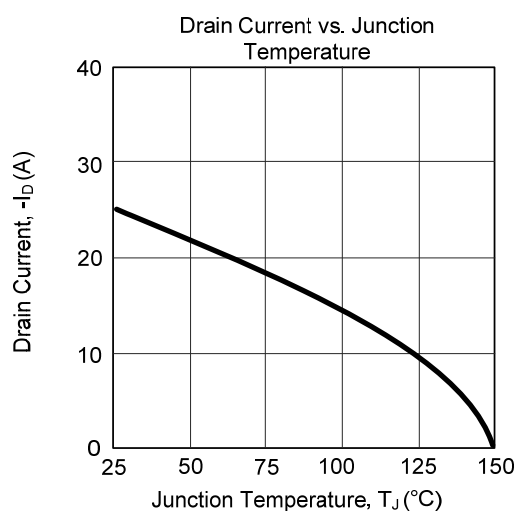
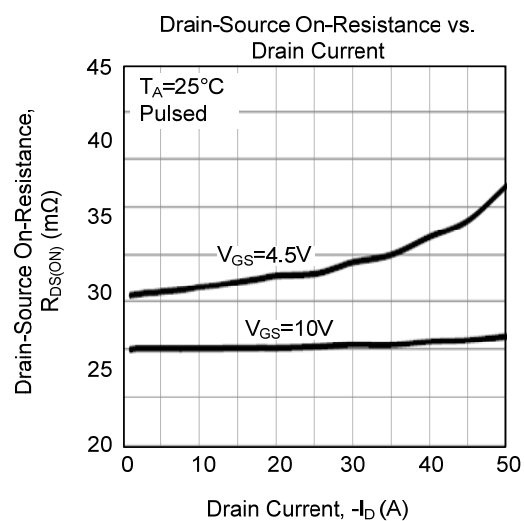
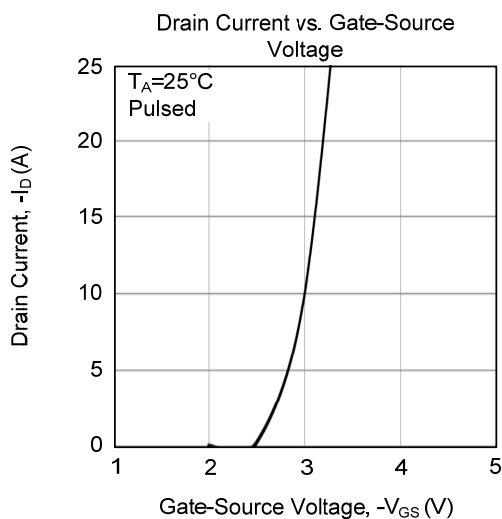
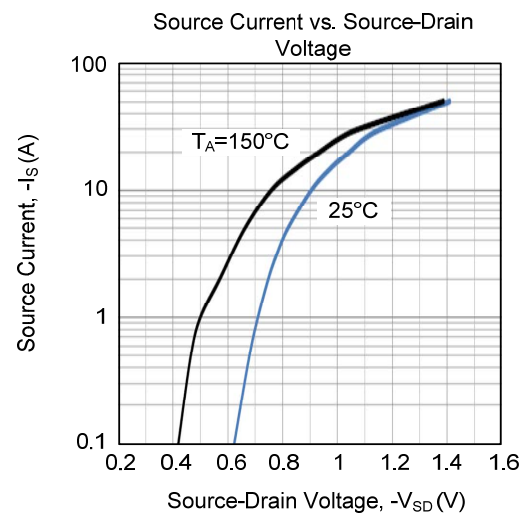
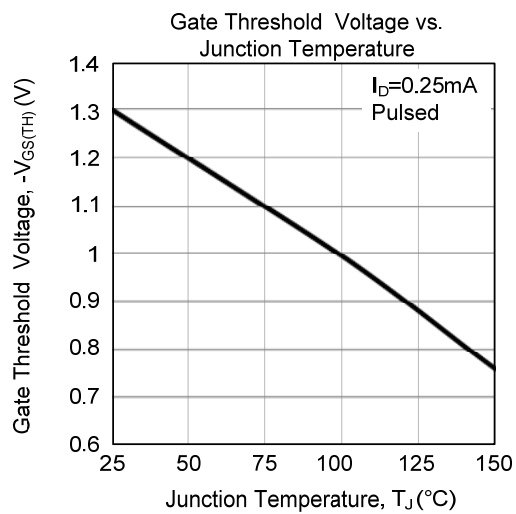
■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL

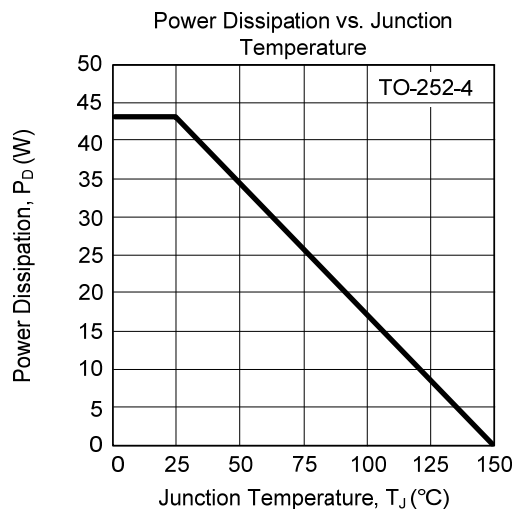


■ TYPICAL CHARACTERISTICS (Cont.)

P-CHANNEL



■ TYPICAL CHARACTERISTICS (Cont.)



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