



UT50N06

Power MOSFET

50A, 60V N-CHANNEL POWER MOSFET

DESCRIPTION

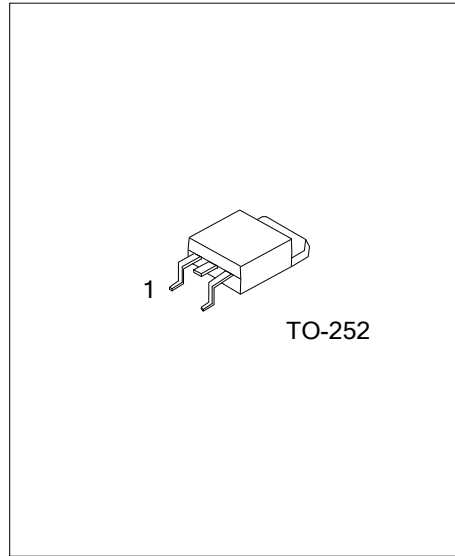
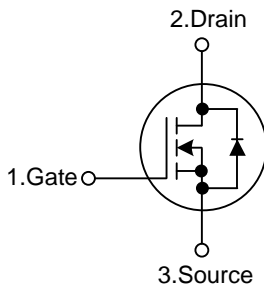
The UTC **UT50N06** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

The UTC **UT50N06** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

FEATURES

- * $R_{DS(ON)} \leq 15 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=30\text{A}$
- * $R_{DS(ON)} \leq 18 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=30\text{A}$
- * High Switching Speed

SYMBOL



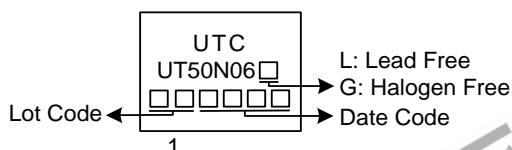
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT50N06L-TN3-R	UT50N06G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UT50N06G-TN3-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) TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free L: Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Drain Current	Continuous (V _{GS} =10V)	I _D	50
	Pulsed (Note 2)	I _{DM}	100
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	63
Peak Diode Recovery dv/dt (Note 4)	dv/dt	1.7	V/ns
Power Dissipation	P _D	50	W
Junction Temperature	T _J	+150	°C
Storage Temperature	T _{STG}	-55 ~ +175	°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. L=0.1mH, I_{AS}=35.5A, V_{DD}=25V, R_G=25Ω, Starting T_J=25°C

4. I_{SD} ≤ 50A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	110	°C/W
Junction to Case	θ _{JC}	2.5 (Note)	°C/W

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

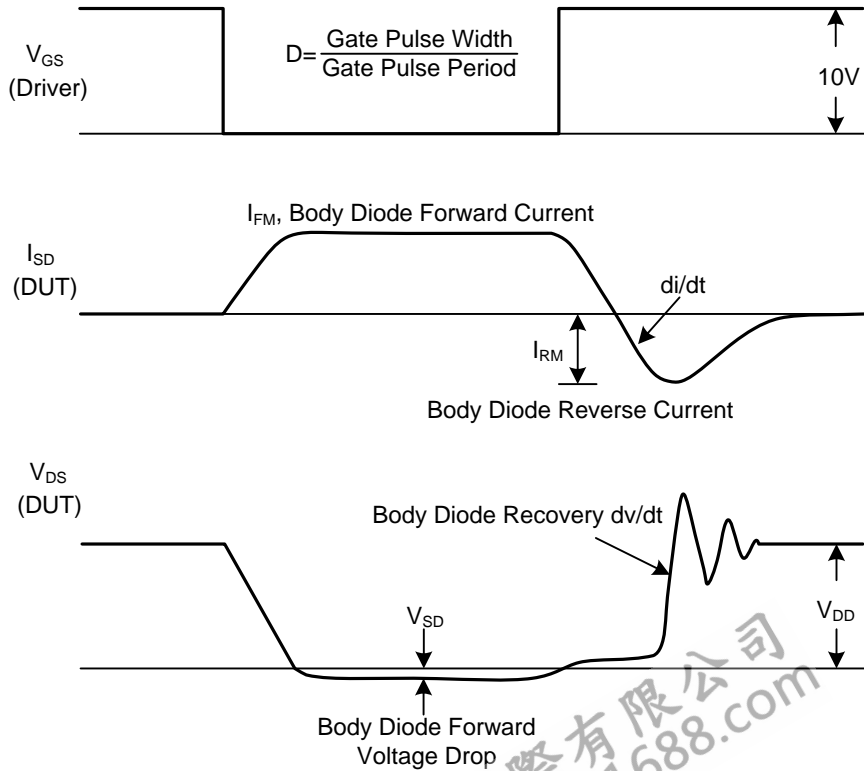
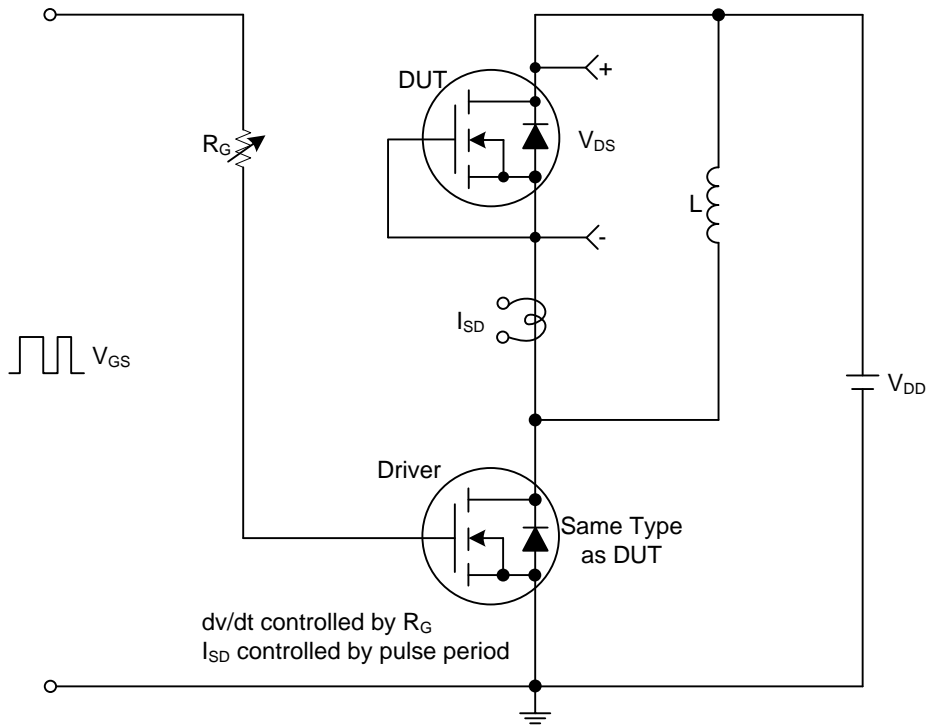
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}			+200	nA
					Reverse	-200
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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$			15	m Ω
		$V_{GS}=4.5V, I_D=30A$			18	m Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		2350		pF
Output Capacitance	C_{OSS}			165		pF
Reverse Transfer Capacitance	C_{RSS}			125		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=48V, V_{GS}=10V, I_D=50A$ $I_G=1mA$ (Note 2)		48		nC
Gate to Source Charge	Q_{GS}			5.5		nC
Gate to Drain Charge	Q_{GD}			8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=30V, V_{GS}=10V, I_D=50A$ $R_G=3\Omega$ (Note 2)		8		ns
Rise Time	t_R			16		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			36		ns
Fall-Time	t_F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				50	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				100	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=50A, V_{GS}=0V$			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	$I_S=30A, V_{GS}=0V, di/dt=100A/\mu s$		55		ns
Reverse Recovery Charge	Q_{rr}			74		nC

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

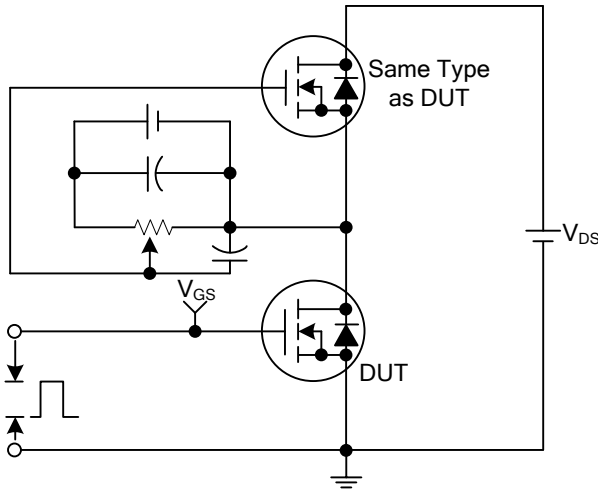
2. Essentially independent of operating ambient temperature.

TEST CIRCUITS AND WAVEFORMS

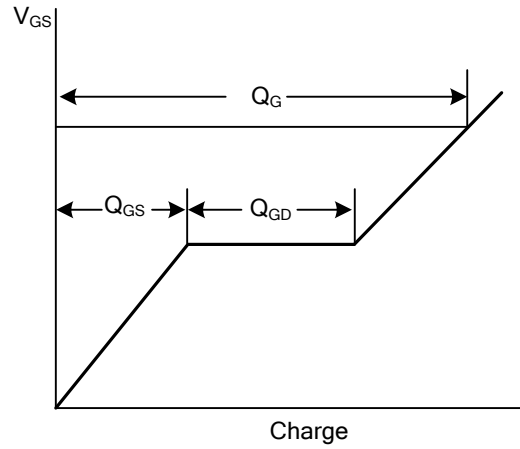


Peak Diode Recovery dV/dt Test Circuit and Waveforms

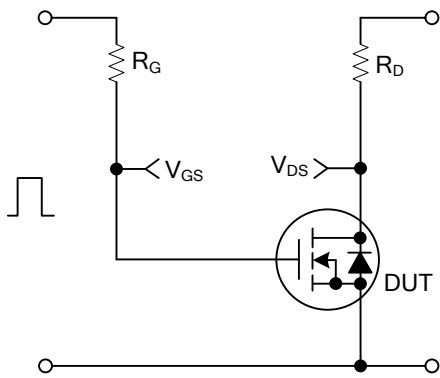
TEST CIRCUITS AND WAVEFORMS



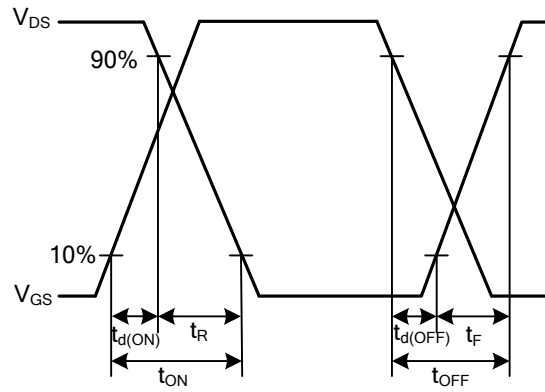
Gate Charge Test Circuit



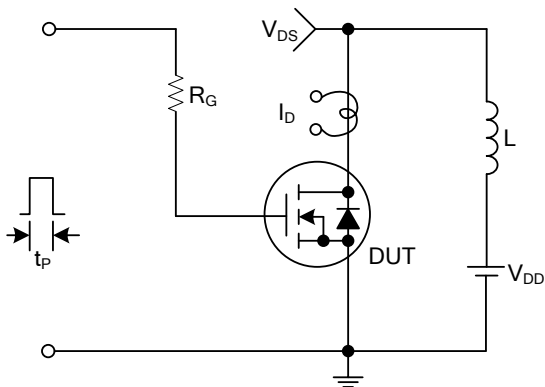
Gate Charge Waveforms



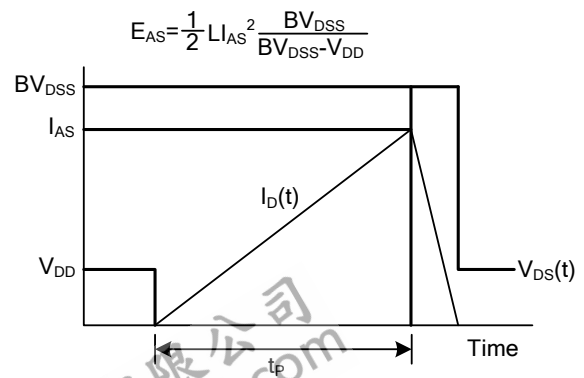
Resistive Switching Test Circuit



Resistive Switching Waveforms

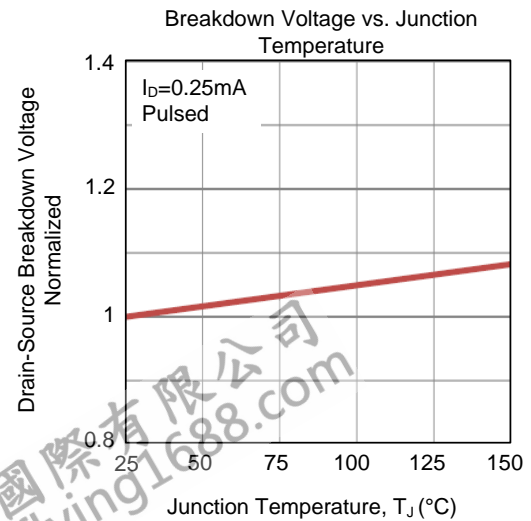
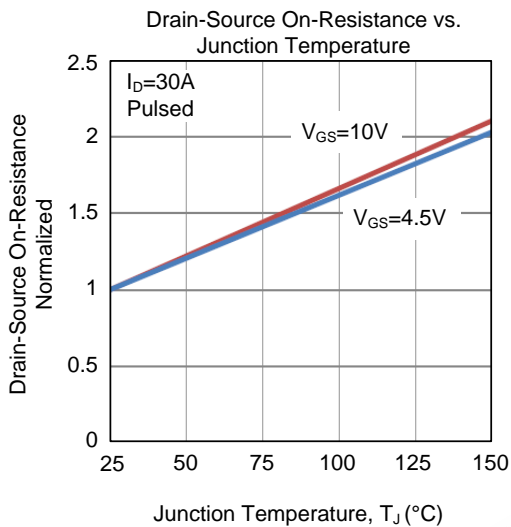
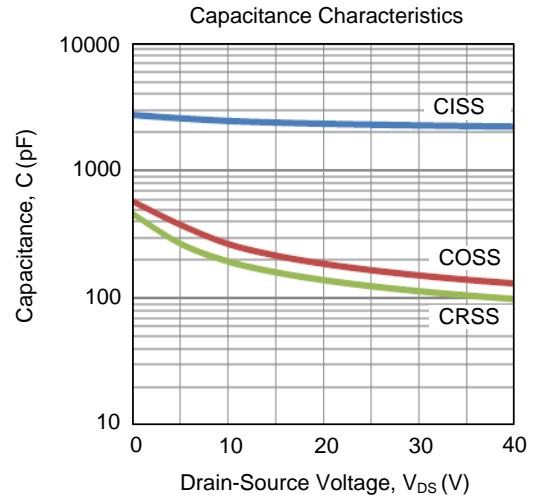
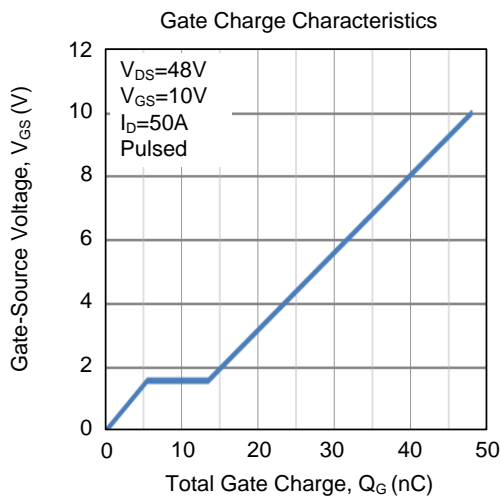
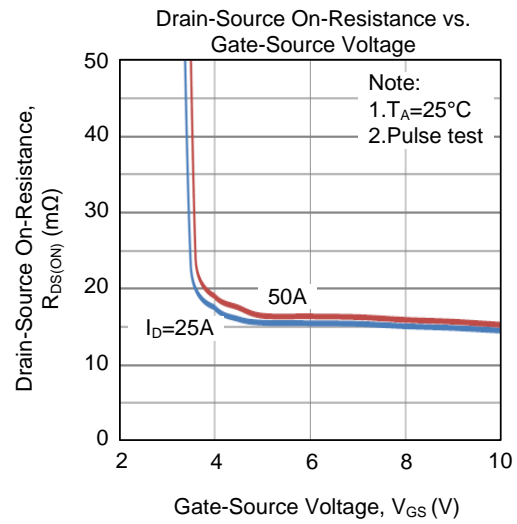
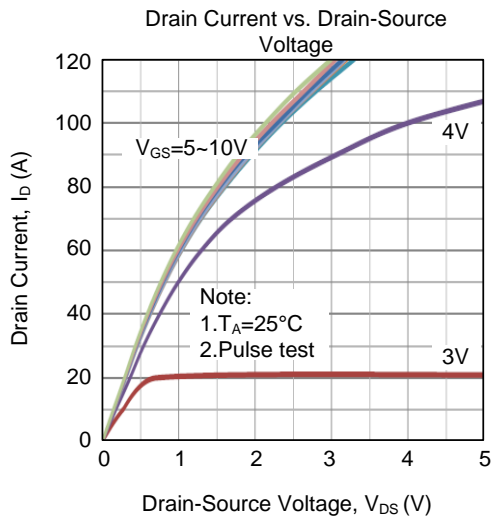


Unclamped Inductive Switching Test Circuit

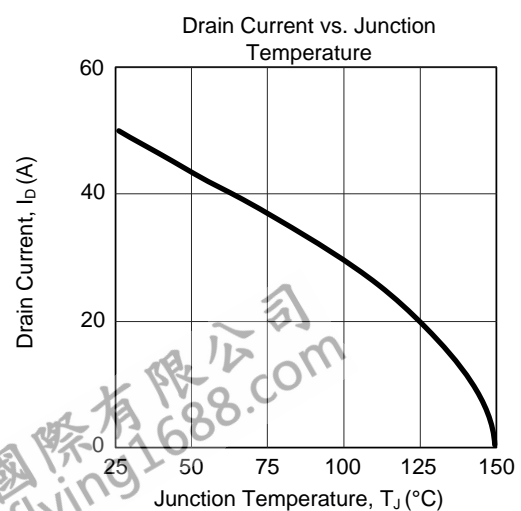
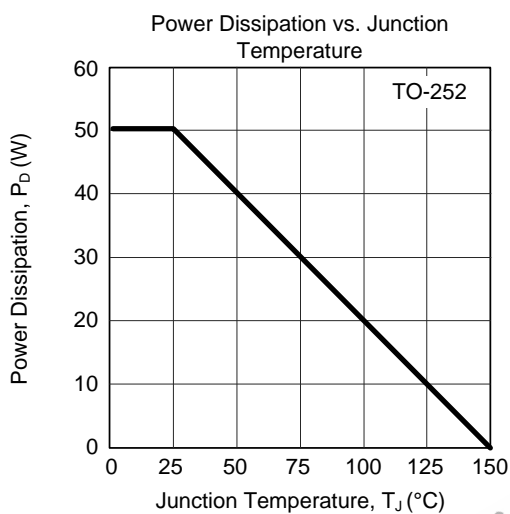
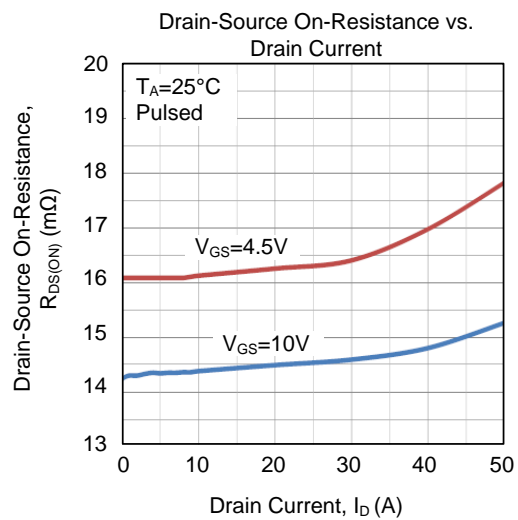
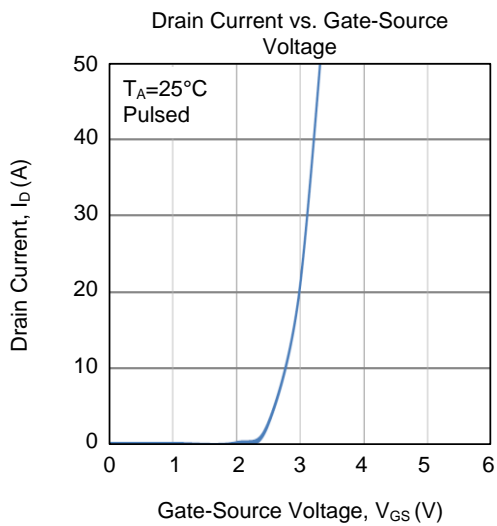
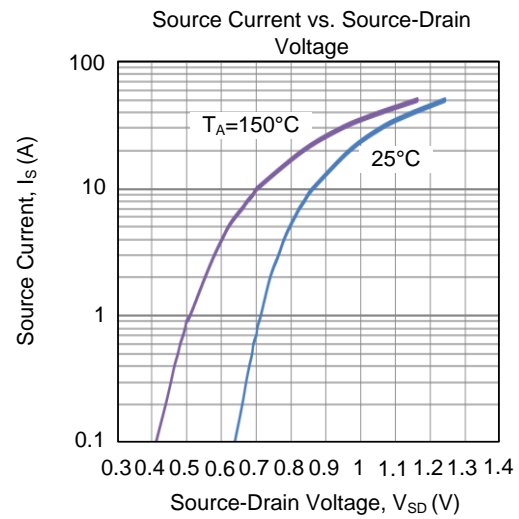
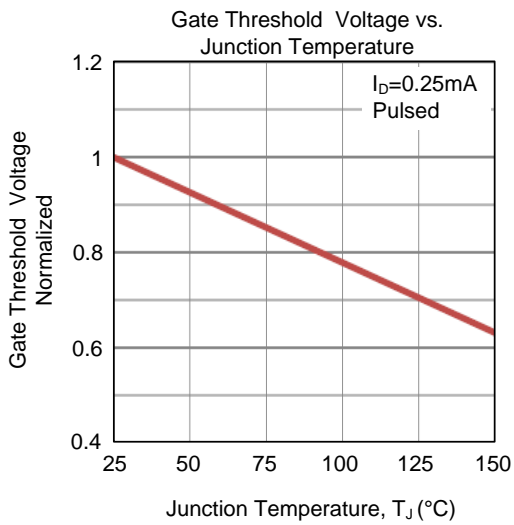


Unclamped Inductive Switching Waveforms

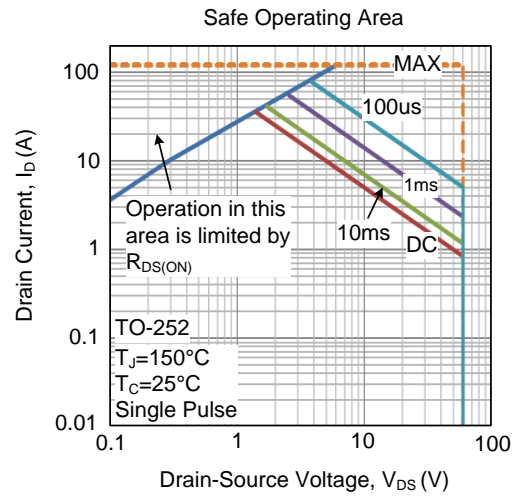
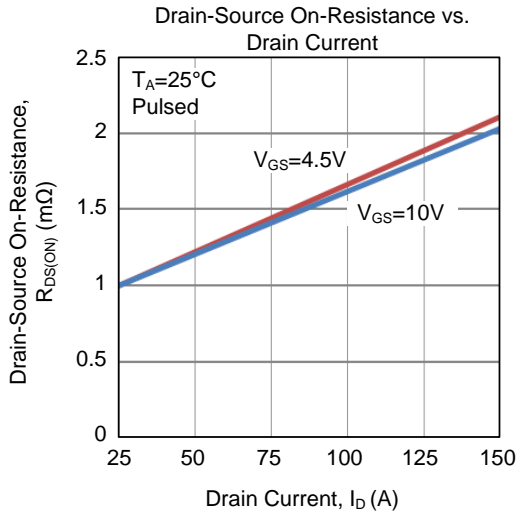
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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