



## UT130PP04M

Power MOSFET

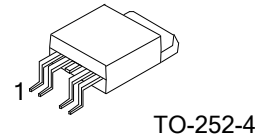
### -30A, -40V P-CHANNEL POWER MOSFET

#### DESCRIPTION

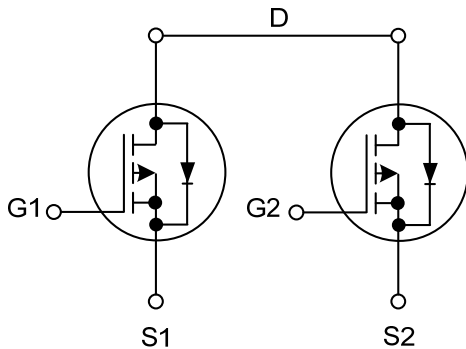
The UTC **UT130PP04M** is a P-channel power MOSFET providing customers with fast switching, ruggedized device design, low on-resistance and cost-effectiveness by UTC's advanced technology.

#### FEATURES

- \*  $R_{DS(ON)} \leq 37\text{ m}\Omega$  @  $V_{GS}=-10\text{V}$ ,  $I_D=-15\text{A}$
- \*  $R_{DS(ON)} \leq 52\text{ m}\Omega$  @  $V_{GS}=-4.5\text{V}$ ,  $I_D=-15\text{A}$
- \* Low on-Resistance
- \* Fast Switching Speed



#### SYMBOL



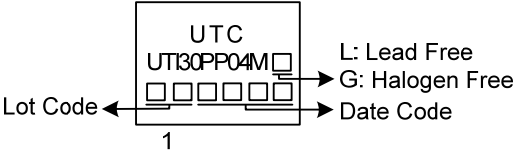
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
UT130PP04ML-TN4-R	UT130PP04MG-TN4-R	TO-252-4	S1	G1	D	S2	G2	Tape Reel

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

UT130PP04MG-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 RATING ( $T_C=25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	-40	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	$I_D$	-30
	Pulsed (Note 2)	$I_{DM}$	-60
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	37.5
Peak Diode Recovery dv/dt (Note 4)	dv/dt	1.1	V/nS
Power Dissipation	$P_D$	50	W
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-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.  $L = 0.1\text{mH}$ ,  $I_{AS} = -27.3\text{A}$ ,  $V_{DD} = -20\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq -30\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	110	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	2.5	$^\circ\text{C}/\text{W}$

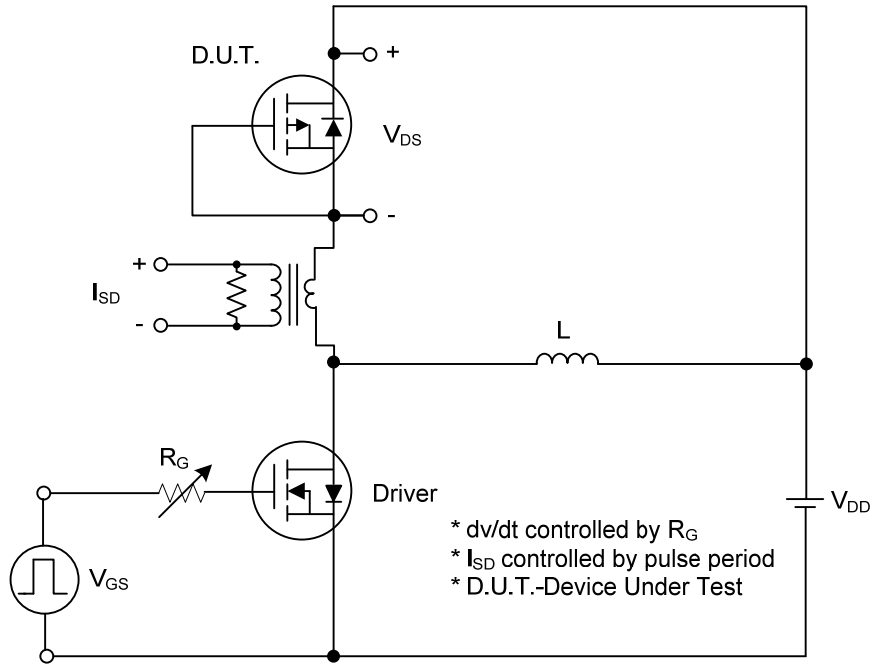
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

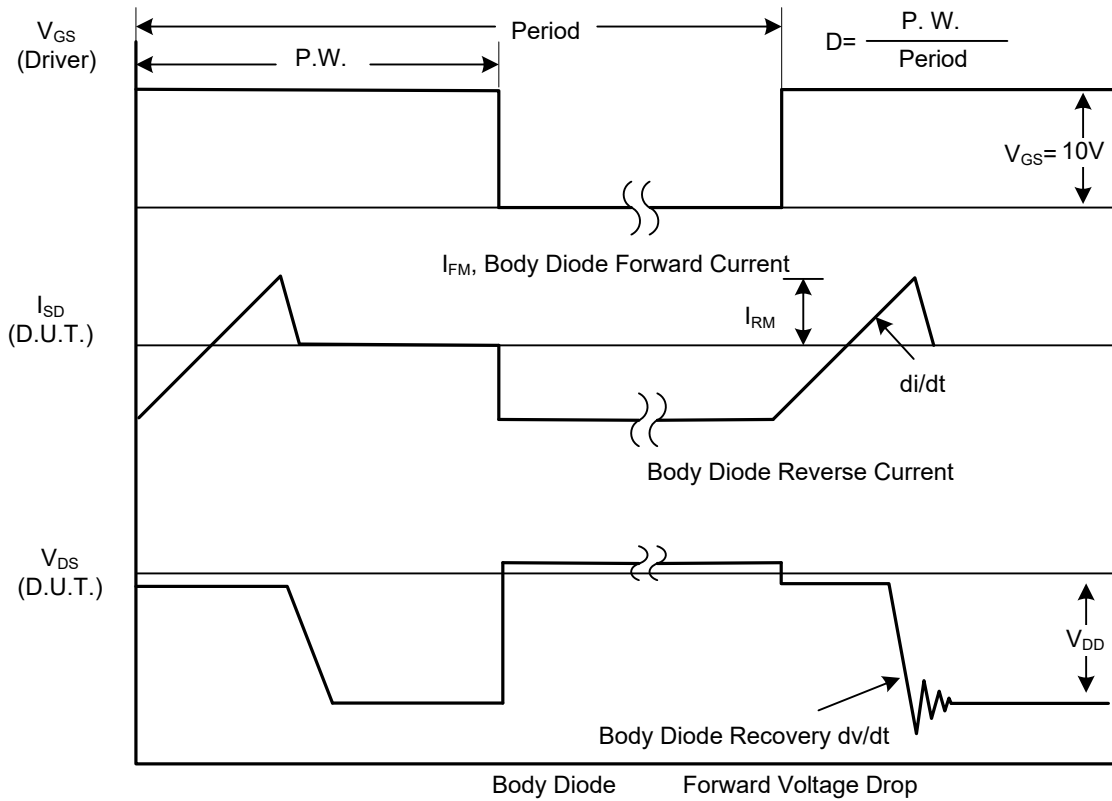
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$	-40			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS} = -40\text{V}$ , $V_{GS} = 0\text{V}$			-1	$\mu\text{A}$
Gate- Source Leakage Current	$I_{GSS}$	$V_{DS} = 0\text{V}$ , $V_{GS} = +20\text{V}$			+100	nA
		$V_{DS} = 0\text{V}$ , $V_{GS} = -20\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
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 (Note 1)	$R_{DS(ON)}$	$V_{GS} = -10\text{V}$ , $I_D = -15\text{A}$			37	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}$ , $I_D = -15\text{A}$			52	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS} = 0\text{V}$ , $V_{DS} = -20\text{V}$ , $f = 1.0\text{MHz}$		1107.3		pF
Output Capacitance	$C_{OSS}$			158		pF
Reverse Transfer Capacitance	$C_{RSS}$			135		pF
<b>SWITCHING PARAMETERS (Note 2)</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS} = -32\text{V}$ , $V_{GS} = -10\text{V}$ , $I_D = -30\text{A}$ (Note 1, 2)		30		nC
Gate to Source Charge	$Q_{GS}$			3.4		nC
Gate to Drain Charge	$Q_{GD}$			10.4		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS} = -15\text{V}$ , $V_{GS} = -10\text{V}$ , $I_D = -30\text{A}$ , $R_{GS} = 6.0\Omega$ (Note 1, 2)		6.9		ns
Rise Time	$t_R$			16.5		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			41.8		ns
Fall-Time	$t_F$			28.3		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				-30	A
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				-60	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_F = -10\text{A}$ , $V_{GS} = 0\text{V}$			-1.2	V
Reverse Recovery Time (Note 1)	$t_{rr}$	$I_F = -30\text{A}$ , $V_{GS} = 0\text{V}$		73		ns
Reverse Recovery Charge	$Q_{rr}$	$di_F/dt = 100\text{A}/\mu\text{s}$		212		nC

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

■ TEST CIRCUITS AND WAVEFORMS

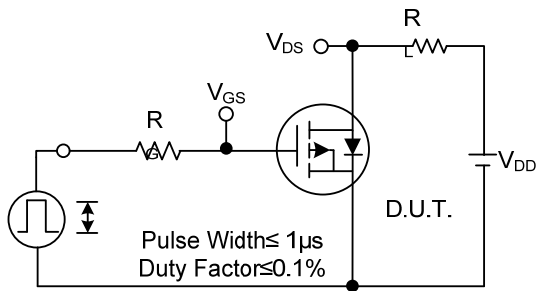


Peak Diode Recovery dv/dt Test Circuit

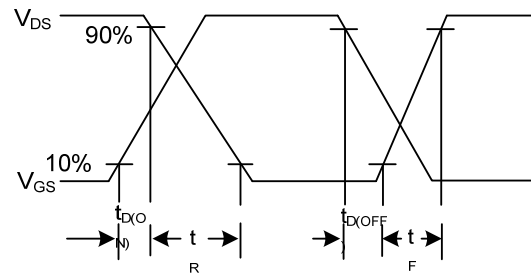


Peak Diode Recovery dv/dt Waveforms

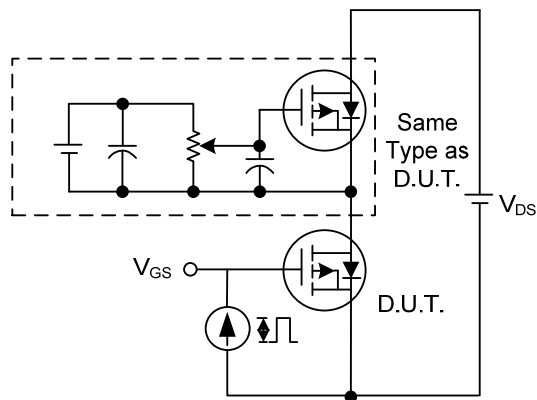
## TEST CIRCUITS AND WAVEFORMS



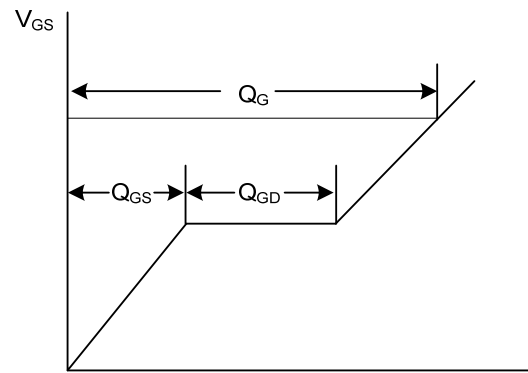
Switching Test Circuit



Switching Waveforms

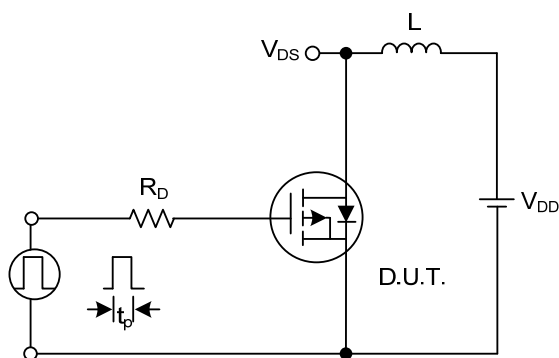


Gate Charge Test Circuit

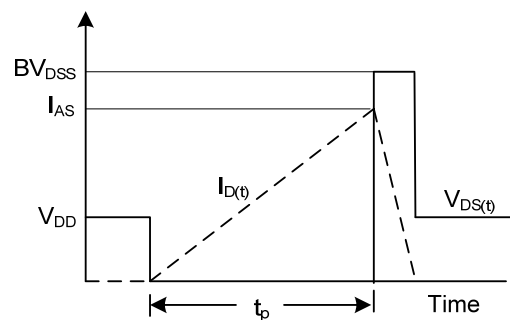


Charge

Gate Charge Waveform

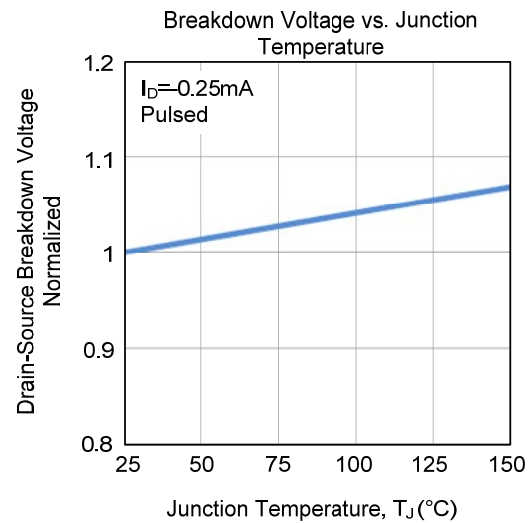
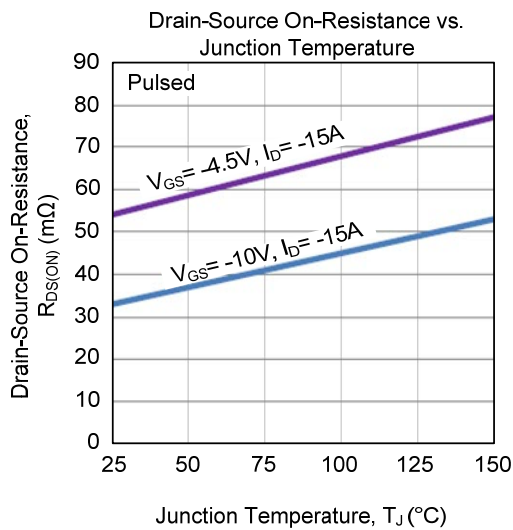
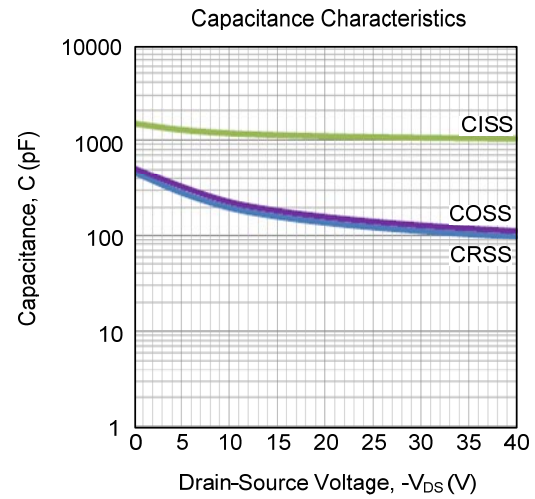
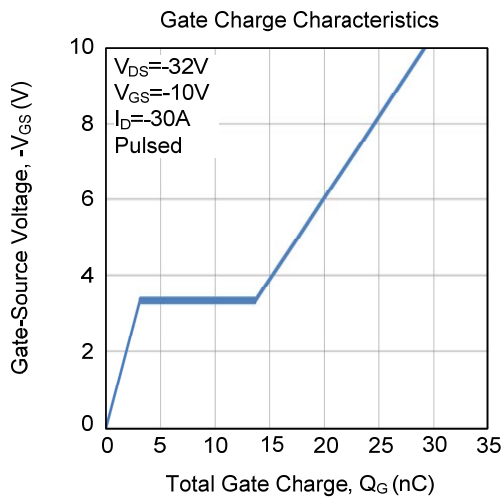
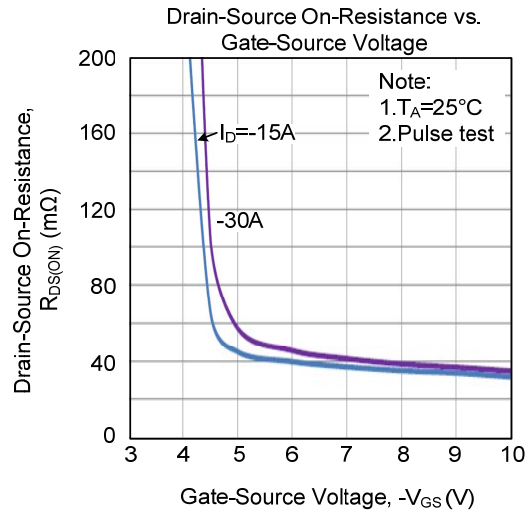
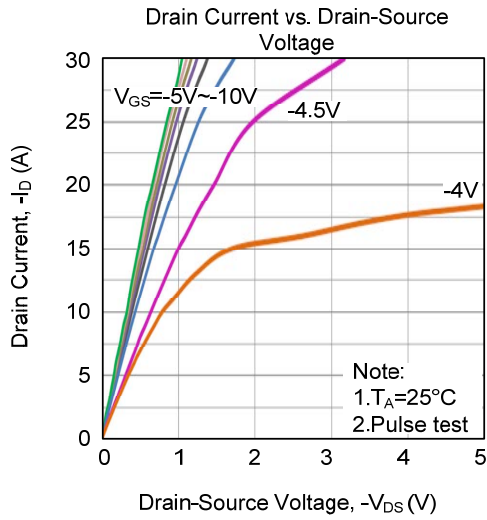


Unclamped Inductive Switching Test Circuit

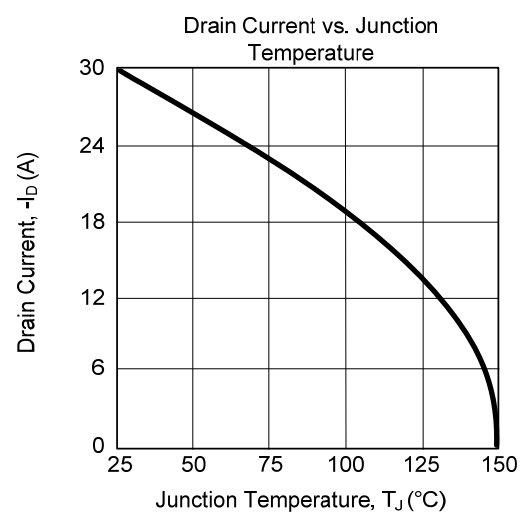
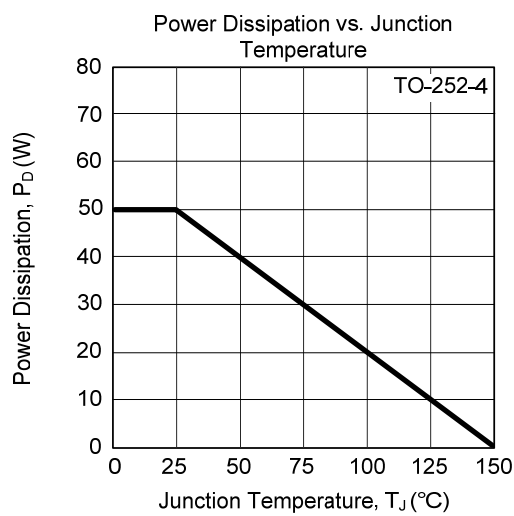
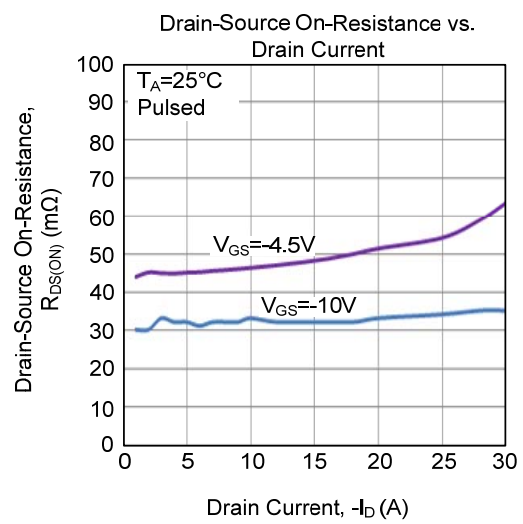
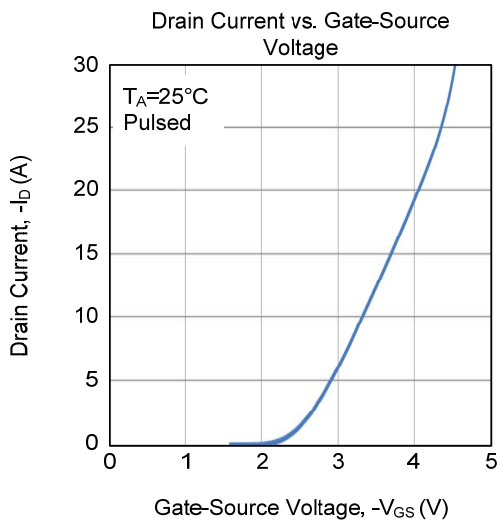
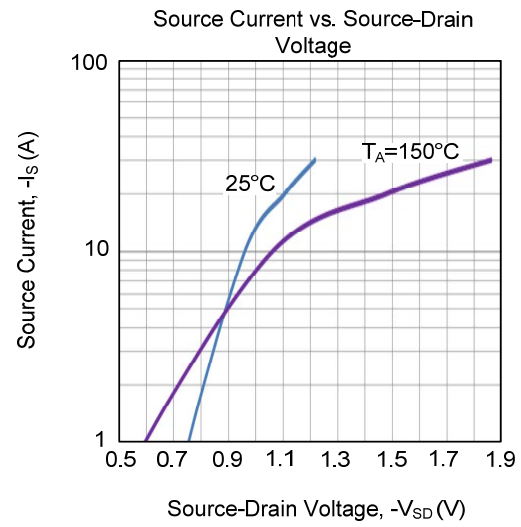
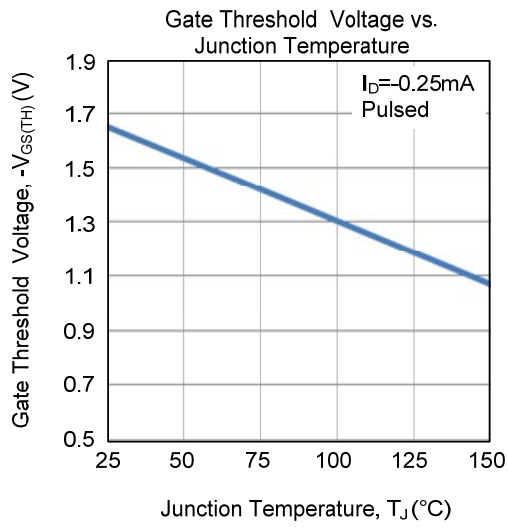


Unclamped Inductive Switching Waveforms

## TYPICAL CHARACTERISTICS

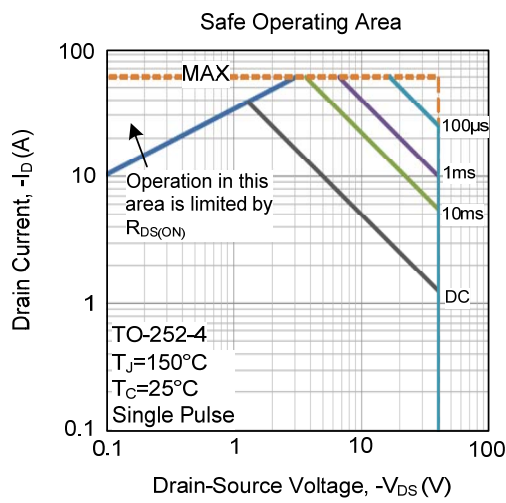


## TYPICAL CHARACTERISTICS (Cont.)





■ TYPICAL CHARACTERISTICS (Cont.)



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