



UT30N06H

Power MOSFET

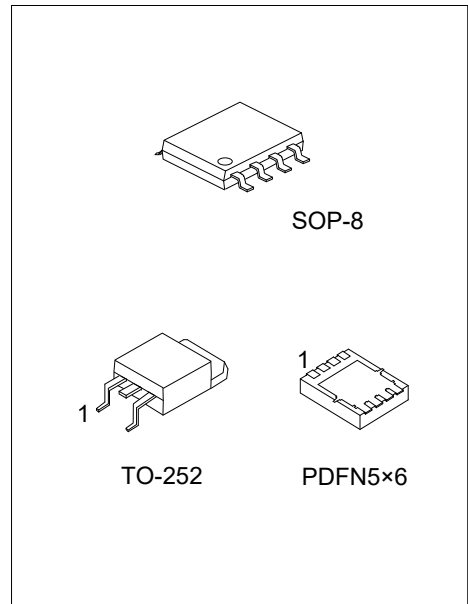
30A, 60V N-CHANNEL ENHANCEMENT MODE

DESCRIPTION

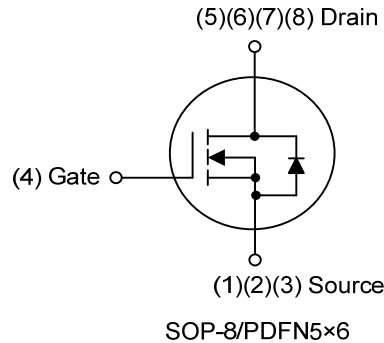
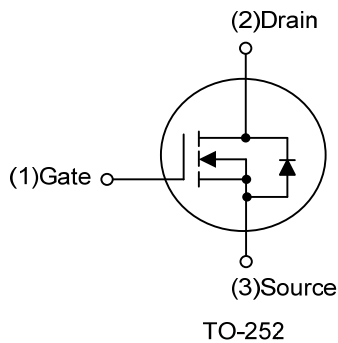
The UTC **UT30N06H** uses UTC's advanced proprietary, planar stripe, DMOS technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as high current switching applications.

FEATURES

- * $R_{DS(ON)} \leq 16 \text{ m}\Omega @ V_{GS} = 10\text{V}, I_D = 15\text{A}$
- * Low capacitance
- * Low gate charge
- * Fast switching capability
- * Avalanche energy specified



SYMBOL



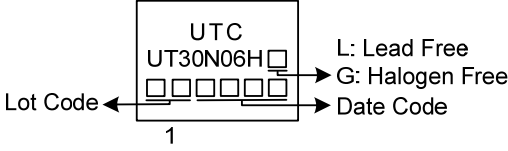
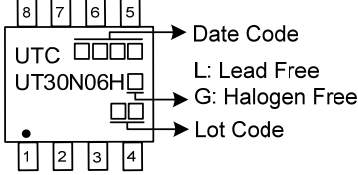
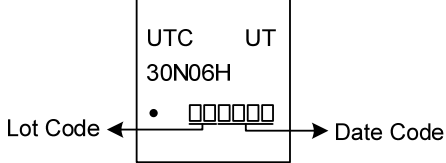
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT30N06HL-TN3-R	UT30N06HG-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT30N06HL-S08-R	UT30N06HG-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT30N06HL-P5060-R	UT30N06HG-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT30N06HG-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, S08: SOP-8, P5060: PDFN5x6</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

PACKAGE	MARKING
TO-252	 <p>Diagram showing marking on a TO-252 package. The marking includes 'UTC' and 'UT30N06H'. Below the part number are five boxes: the first is empty, the second contains 'L', the third contains 'G', and the last two are empty. Arrows point from these boxes to 'Lot Code' (left) and 'Date Code' (right). A legend indicates 'L: Lead Free' and 'G: Halogen Free'. A '1' is centered below the marking area.</p>
SOP-8	 <p>Diagram showing marking on an SOP-8 package. The marking includes 'UTC' and 'UT30N06H'. Above the part number are boxes for date code: '8' above the first, '7' above the second, '6' above the third, and '5' above the fourth. Below the part number are boxes for lot code: '1' above the first, '2' above the second, '3' above the third, and '4' above the fourth. Arrows point from the date code boxes to 'Date Code' and from the lot code boxes to 'Lot Code'. A legend indicates 'L: Lead Free' and 'G: Halogen Free'.</p>
PDFN5x6	 <p>Diagram showing marking on a PDFN5x6 package. The marking includes 'UTC' and 'UT30N06H'. Below the part number are five boxes: the first contains 'L', the second contains 'G', and the last three are empty. Arrows point from these boxes to 'Lot Code' (left) and 'Date Code' (right). A legend indicates 'L: Lead Free' and 'G: Halogen Free'.</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current ($T_C=25^\circ\text{C}$)	Continuous	I_D	30	A
	Pulsed (Note 2)	I_{DM}	60	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	25	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.8	V/ns
Power Dissipation	TO-252	P_D	51	W
	SOP-8		4.6	W
	PDFN5x6		22	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. $L = 0.1\text{mH}$, $I_{AS} = 22\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, 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	TO-252	θ_{JA}	110	$^\circ\text{C}/\text{W}$
	SOP-8		125 (Note)	$^\circ\text{C}/\text{W}$
	PDFN5x6		65 (Note)	$^\circ\text{C}/\text{W}$
Junction to Case	TO-252	θ_{JC}	2.45 (Note)	$^\circ\text{C}/\text{W}$
	SOP-8		27 (Note)	$^\circ\text{C}/\text{W}$
	PDFN5x6		5.68 (Note)	$^\circ\text{C}/\text{W}$

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

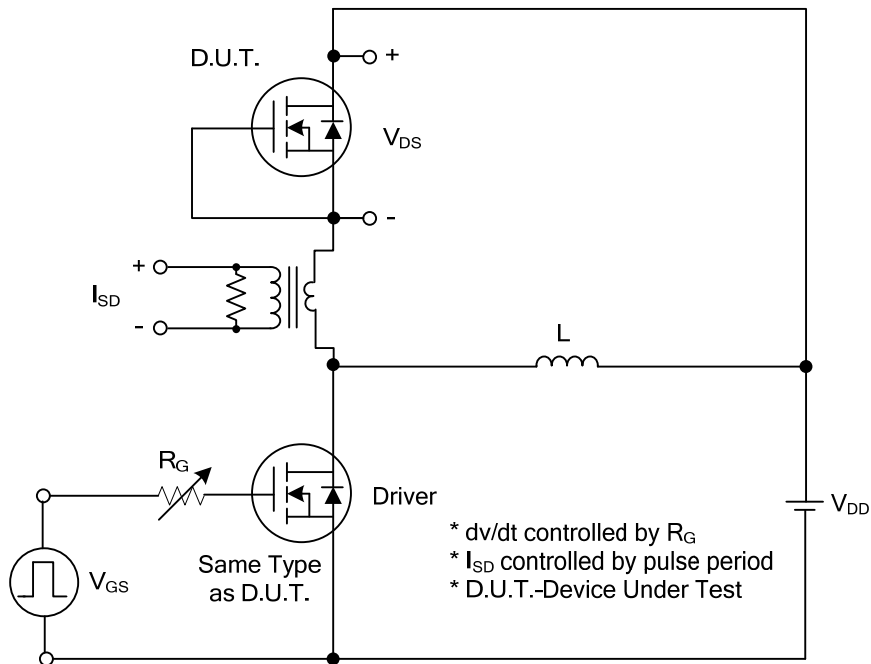
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward	I _{GSS} V _{GS} =20V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =15A			16	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		1380		pF
Output Capacitance	C _{OSS}			145		pF
Reverse Transfer Capacitance	C _{RSS}			120		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =48V, V _{GS} =10V, I _D =15A (Note 1, 2)		41		nC
Gate-Source Charge	Q _{GS}			9		nC
Gate-Drain Charge	Q _{GD}			13		nC
Turn-On Delay Time (Note 1)	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =15A, R _G =3Ω (Note 1, 2)		10		ns
Turn-On Rise Time	t _R			17		ns
Turn-Off Delay Time	t _{D(OFF)}			26		ns
Turn-Off Fall Time	t _F			20		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Body-Diode Continuous Current	I _S				30	A
Maximum Body-Diode Pulsed Current	I _{SM}				60	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =30A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t _{rr}	I _S =30A, V _{GS} =0V, dI _F /dt=100A/μs		20		ns
Body Diode Reverse Recovery Charge	Q _{rr}				12	

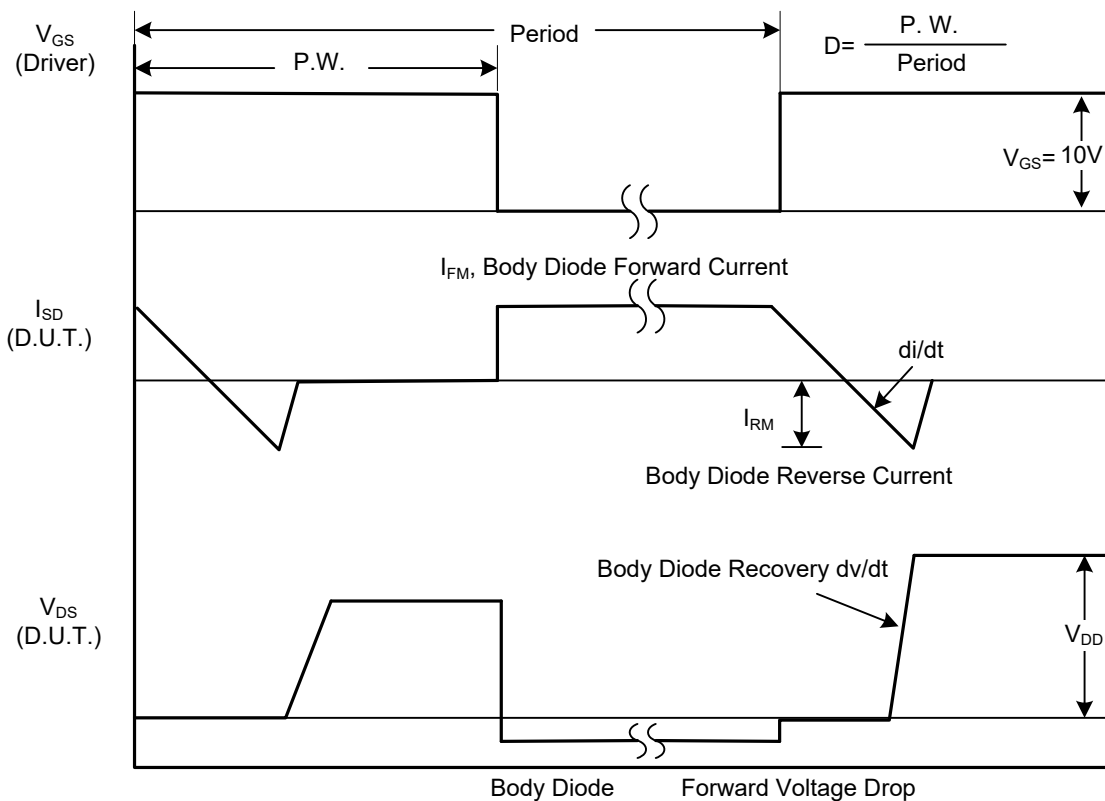
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

TEST CIRCUITS AND WAVEFORMS

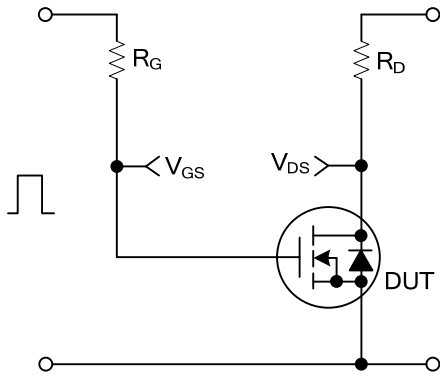


Peak Diode Recovery dv/dt Test Circuit

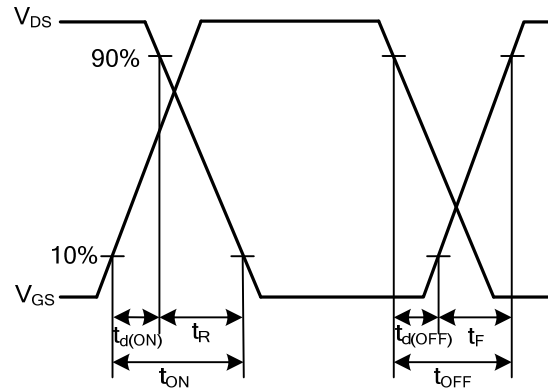


Peak Diode Recovery dv/dt Waveforms

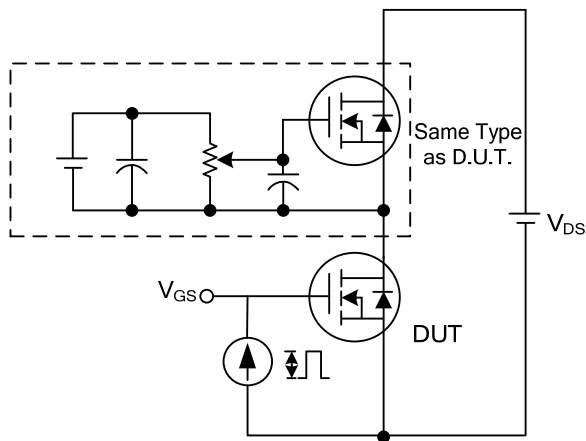
TEST CIRCUITS AND WAVEFORMS



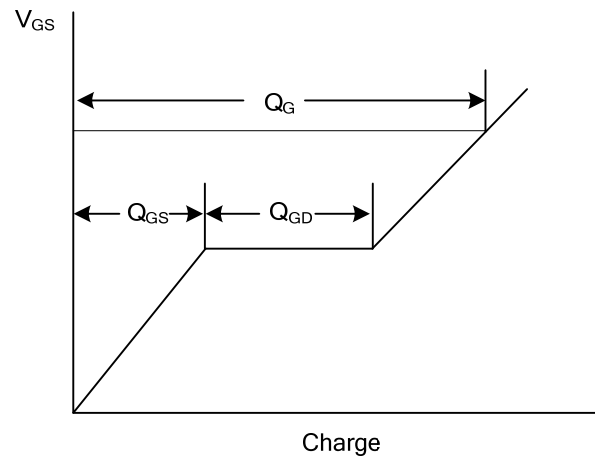
Switching Test Circuit



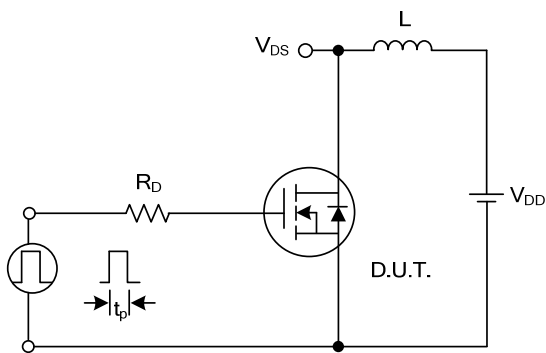
Switching Waveforms



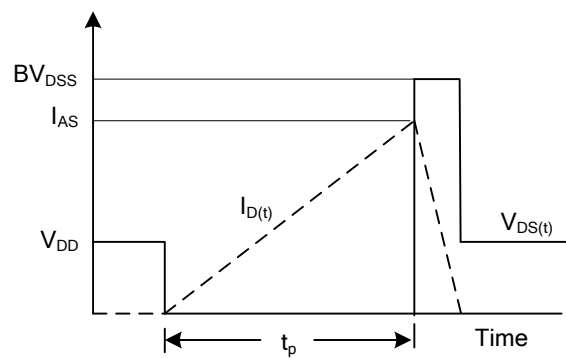
Gate Charge Test Circuit



Gate Charge Waveform

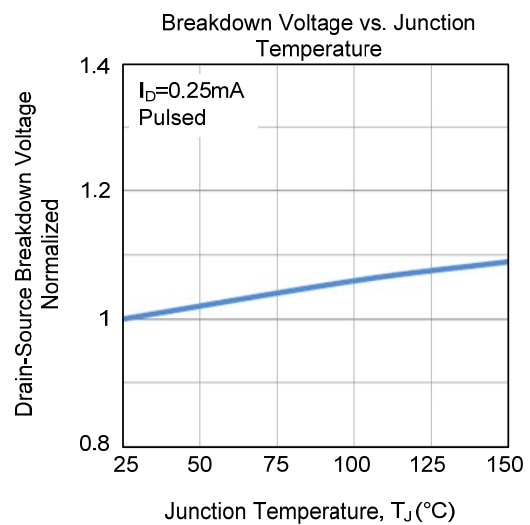
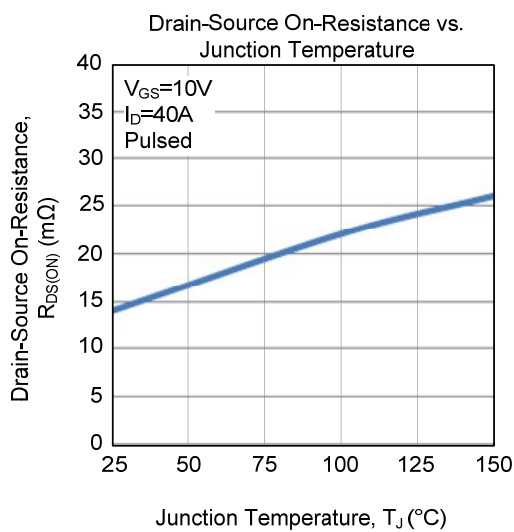
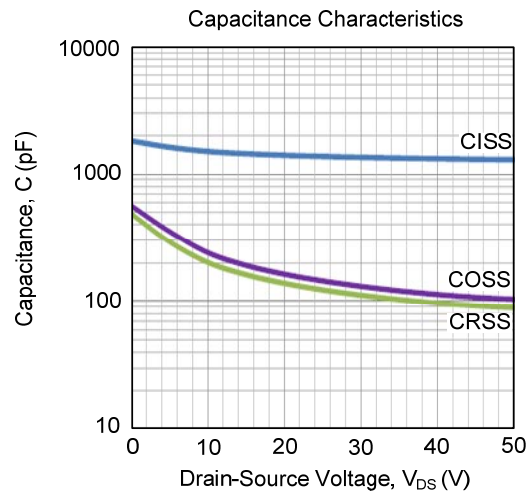
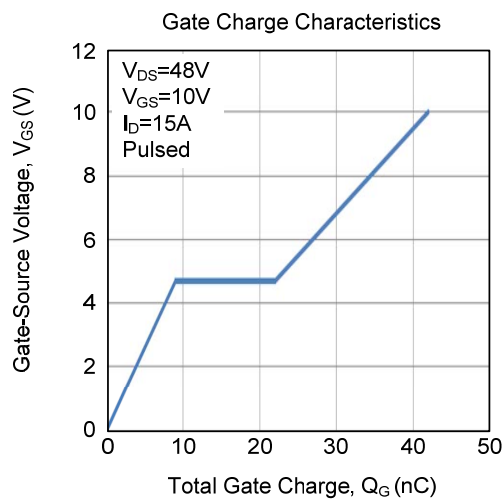
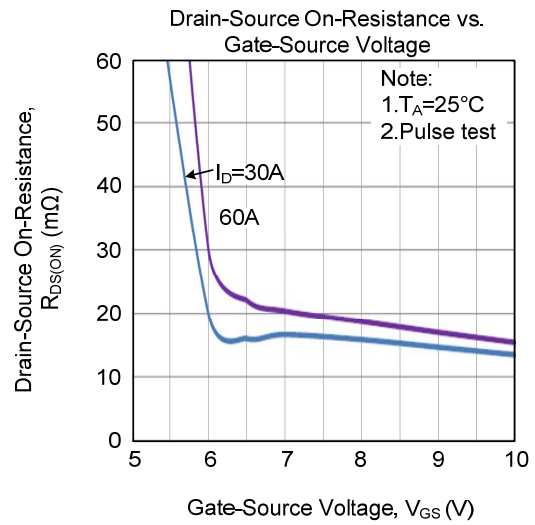
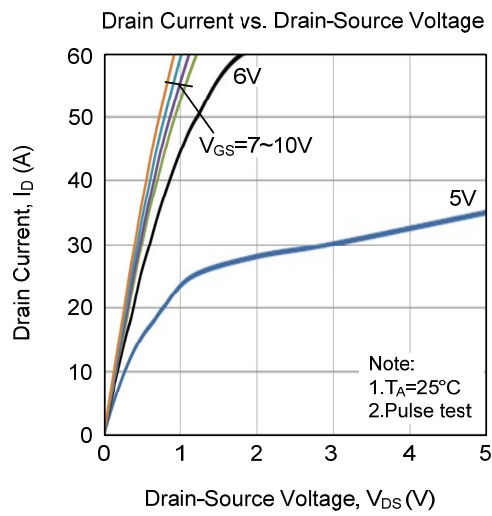


Unclamped Inductive Switching Test Circuit

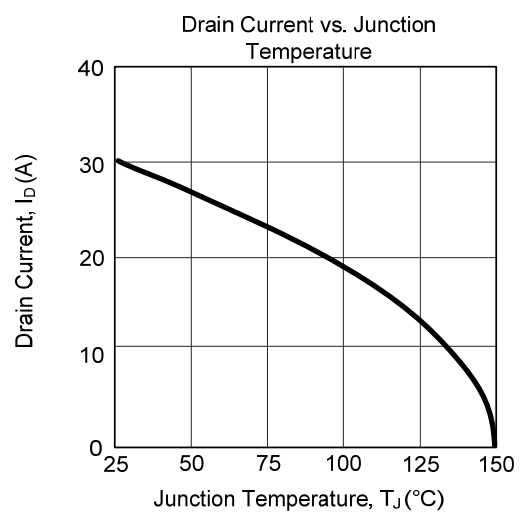
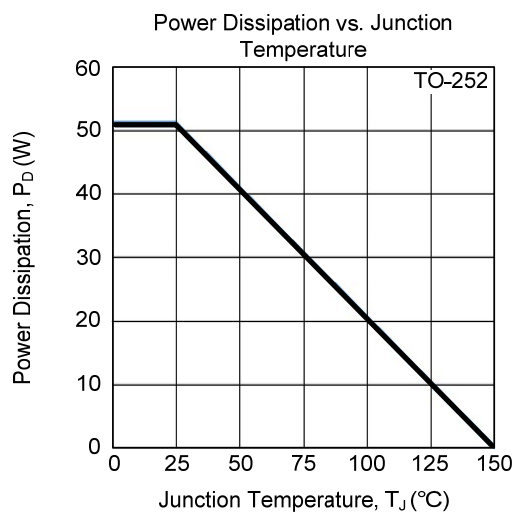
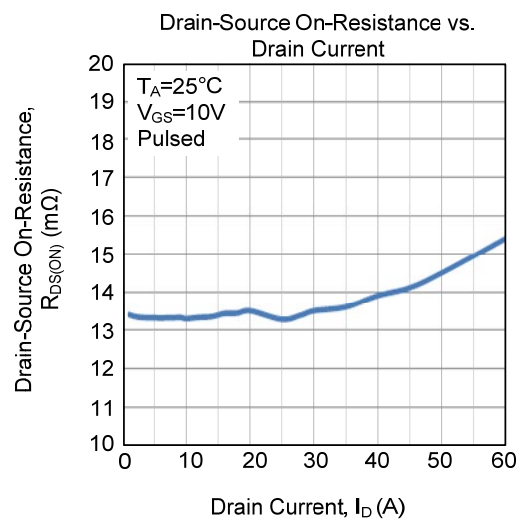
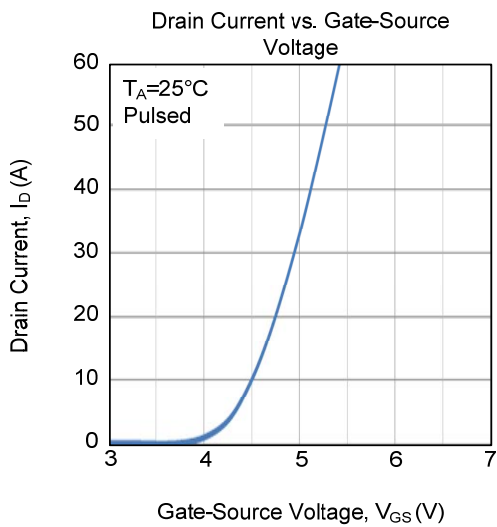
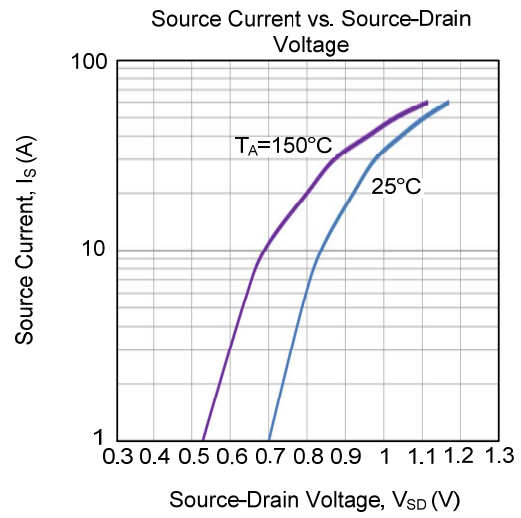
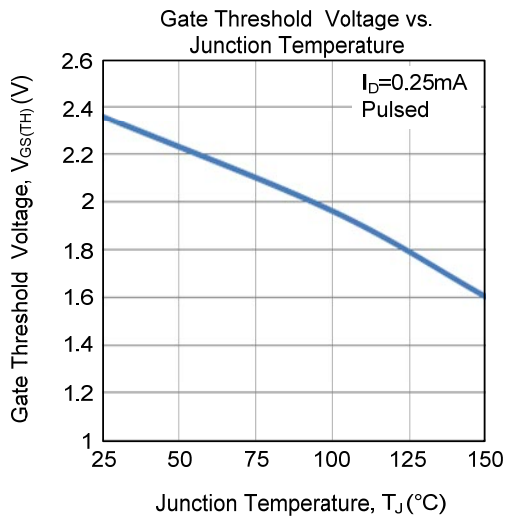


Unclamped Inductive Switching Waveforms

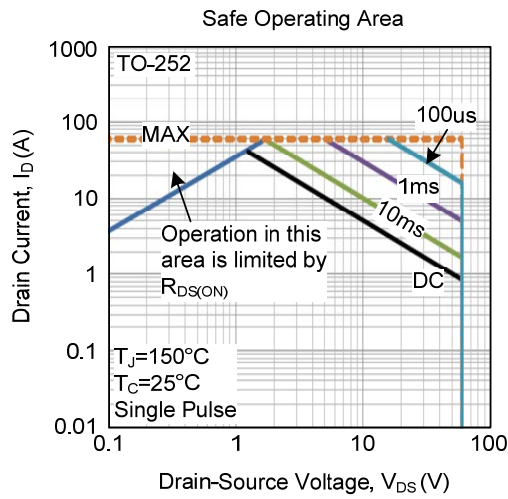
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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