



UT80N04

Power MOSFET

80A, 40V N-CHANNEL POWER MOSFET

■ DESCRIPTION

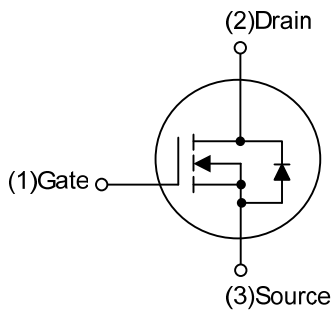
The UTC **UT80N04** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and high switching speed.

The UTC **UT80N04** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

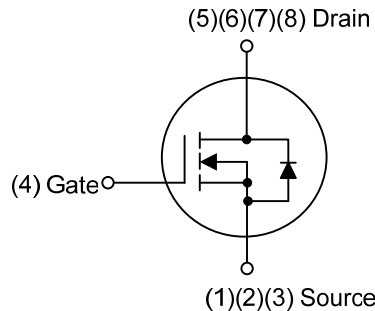
■ FEATURES

- * $R_{DS(ON)} \leq 5.9 \text{ m}\Omega @ V_{GS}=10\text{V}, I_D=40\text{A}$
- $R_{DS(ON)} \leq 8.5 \text{ m}\Omega @ V_{GS}=4.5\text{V}, I_D=40\text{A}$
- * High Switching Speed

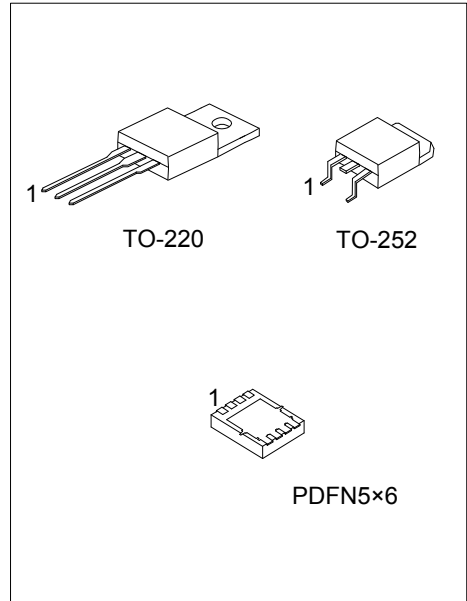
■ SYMBOL



TO-220/TO-252



PDFN5x6



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT80N04L-TA3-T	UT80N04G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT80N04L-TN3-R	UT80N04G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT80N04L-P5060-R	UT80N04G-P5060-R	PDFN5x6	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT80N04G-TA3-T</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package 	<ul style="list-style-type: none"> (1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252, P5060: PDFN5x6 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-252	PDFN5x6
<p>UTC UT80N04 Lot Code ← [] [] [] [] [] → 1 L: Lead Free G: Halogen Free Date Code</p>	<p>UTC UT 80N04 Lot Code ← • [] [] [] [] [] → Date Code</p>

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous ($V_{GS}=10\text{V}$)	I_D	80	A
	Pulsed (Note 2)	I_{DM}	160	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	111	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	7.9	V/ns
Power Dissipation	TO-220	P_D	170	W
	TO-252		58	W
	PDFN5x6		45	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
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. $L=0.1\text{mH}$, $I_{AS}=47.3\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$, 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-220	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
	PDFN5x6		65	$^{\circ}\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.73	$^{\circ}\text{C}/\text{W}$
	TO-252		2.16	$^{\circ}\text{C}/\text{W}$
	PDFN5x6		2.77	$^{\circ}\text{C}/\text{W}$

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

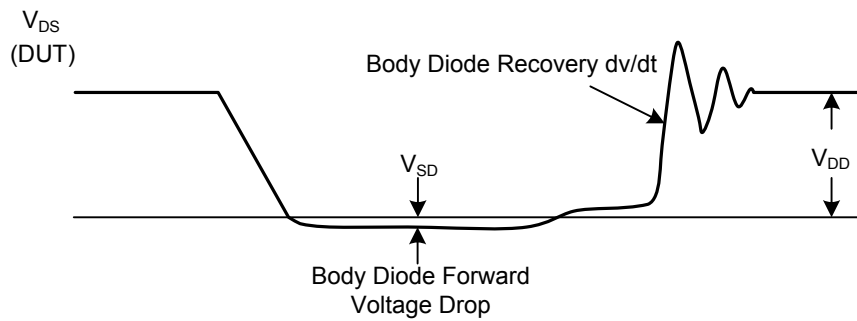
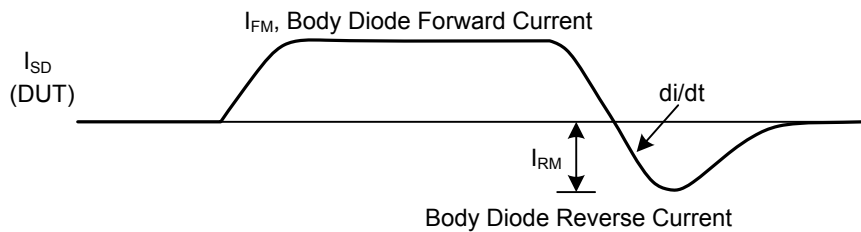
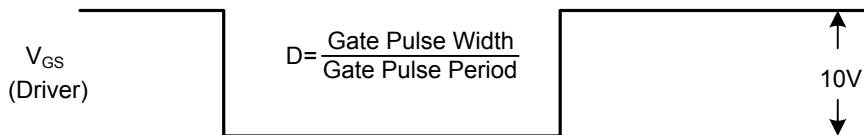
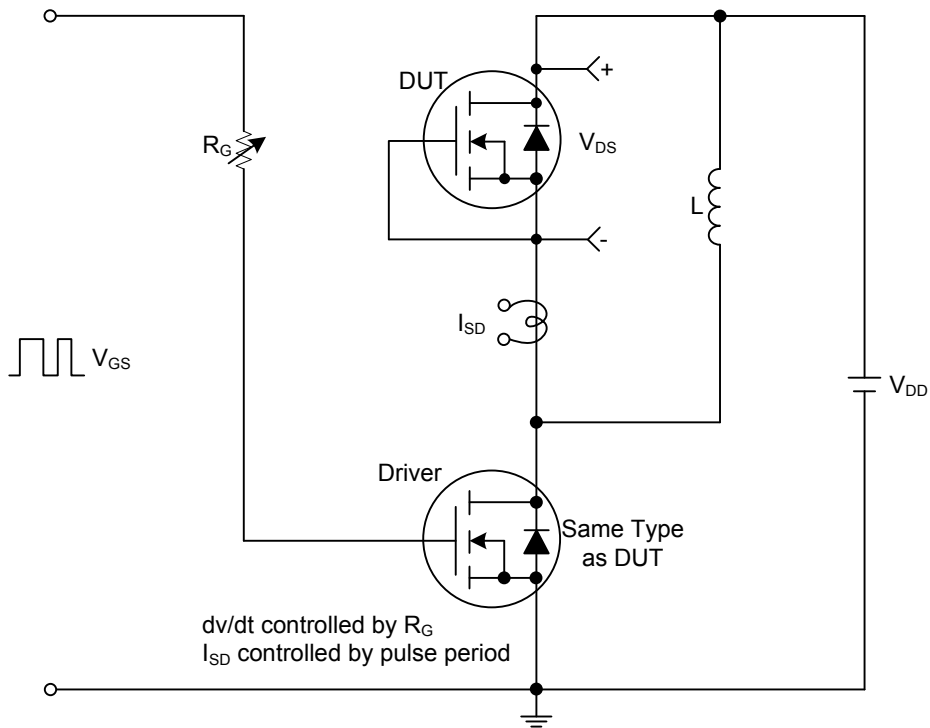
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	40			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V			1	μA
Gate- Source Leakage Current	Forward	I _{GSS}			+100	nA
	Reverse				-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	R _{DS(ON)}	V _{GS} =10V, I _D =40A			5.9	mΩ
		V _{GS} =4.5V, I _D =40A			8.5	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		2910		pF
Output Capacitance	C _{OSS}			312		pF
Reverse Transfer Capacitance	C _{RSS}			275		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =32V, V _{GS} =10V, I _D =80A (Note 2)		107		nC
Gate to Source Charge	Q _{GS}			14		nC
Gate to Drain Charge	Q _{GD}			35		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =20V, V _{GS} =10V, I _D =80A, R _G =3Ω, (Note 2)		9		ns
Rise Time	t _R			18		ns
Turn-OFF Delay Time	t _{D(OFF)}			61		ns
Fall-Time	t _F			27		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				80	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				160	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =80A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F =30A, V _{GS} =0V, di/dt=100A/μs		51		ns
Body Diode Reverse Recovery Charge	Q _{rr}				50	

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

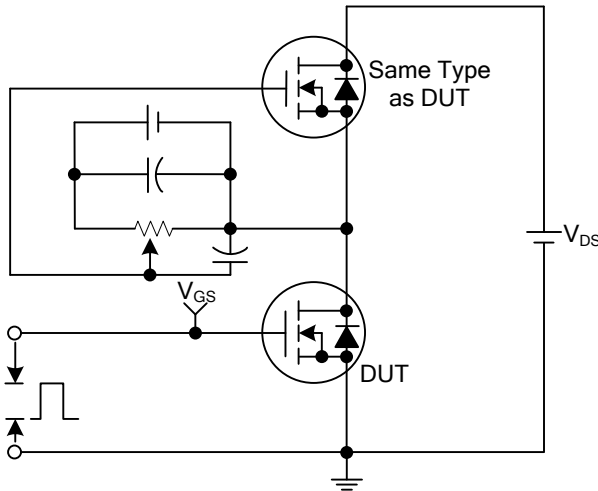
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

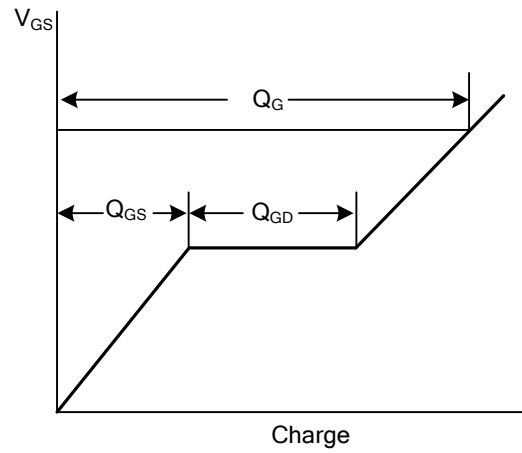


Peak Diode Recovery dv/dt Test Circuit and Waveforms

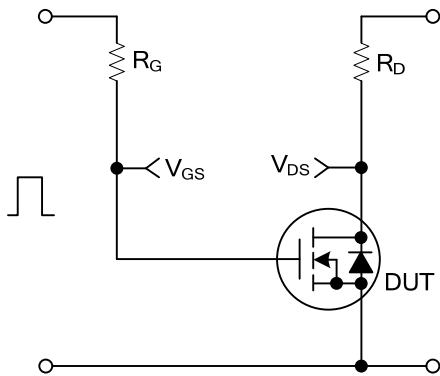
■ TEST CIRCUITS AND WAVEFORMS



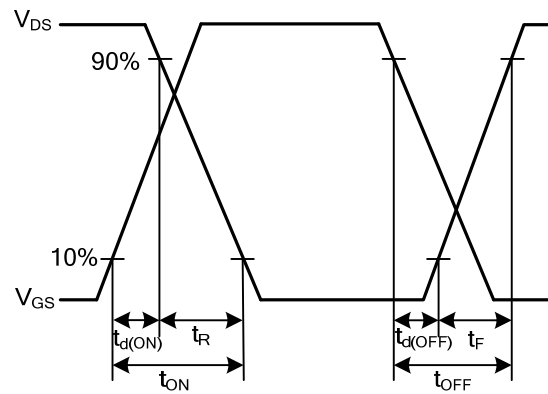
Gate Charge Test Circuit



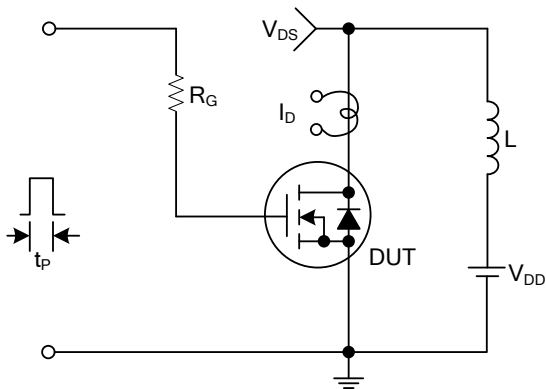
Gate Charge Waveforms



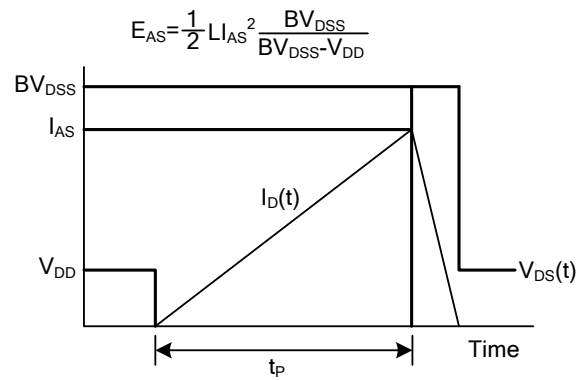
Resistive Switching Test Circuit



Resistive Switching Waveforms

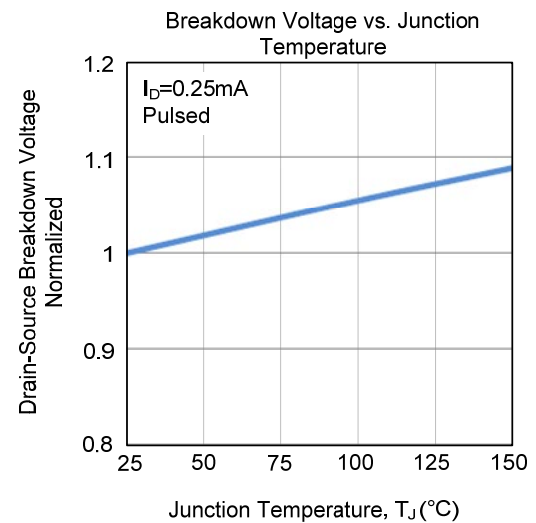
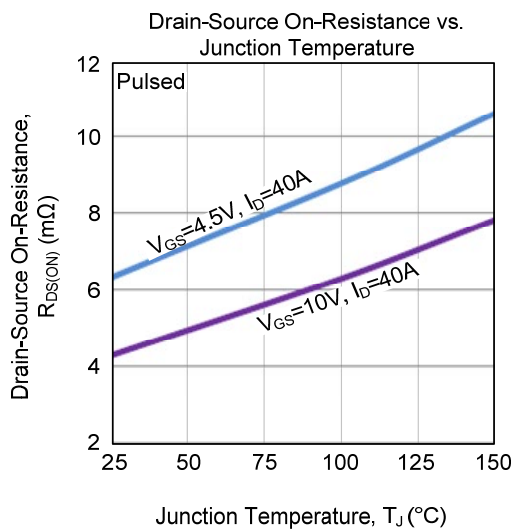
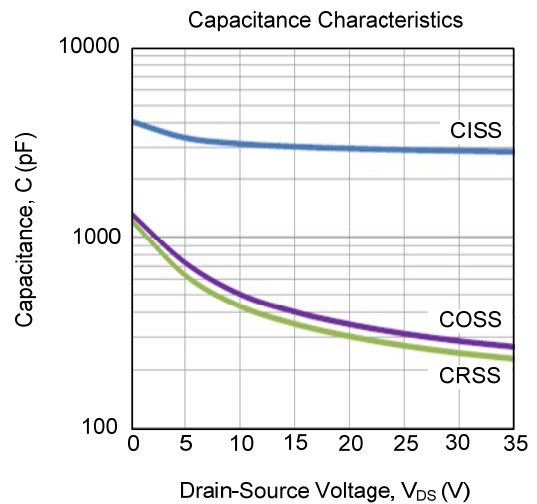
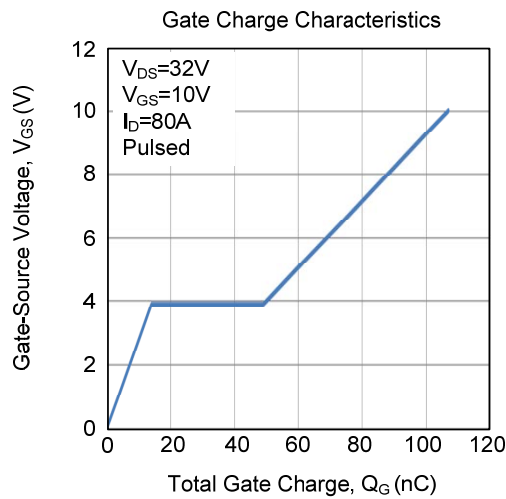
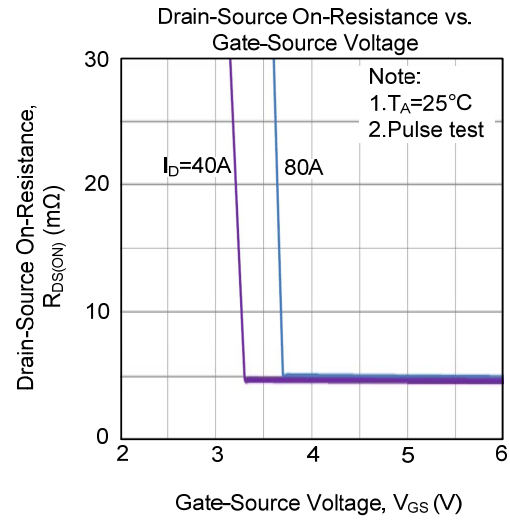
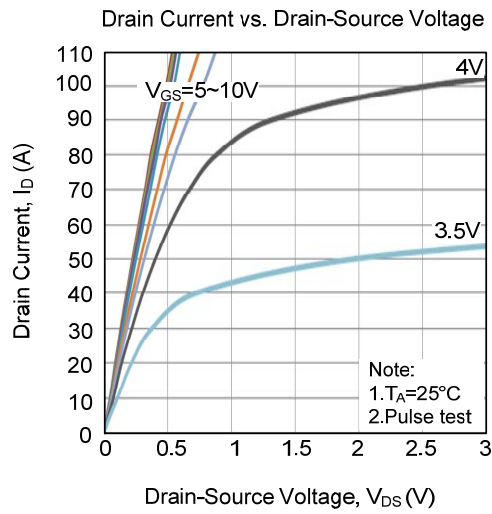


Unclamped Inductive Switching Test Circuit

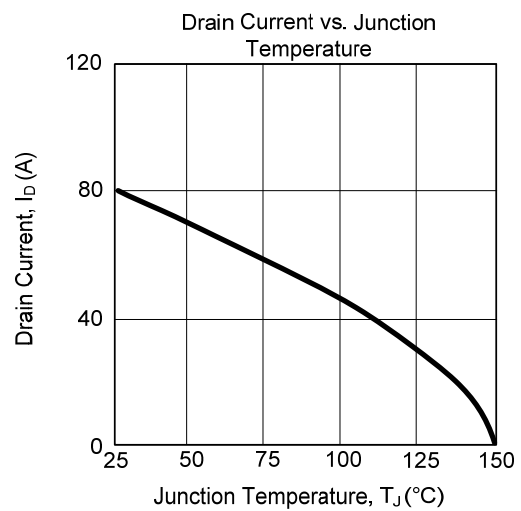
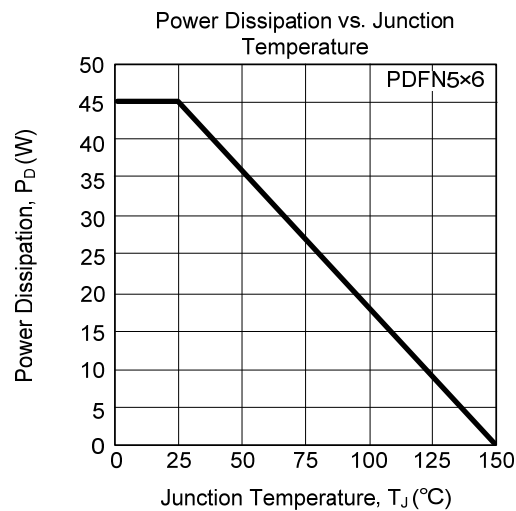
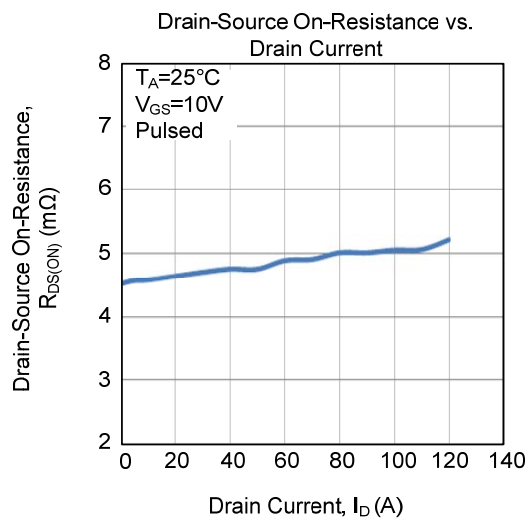
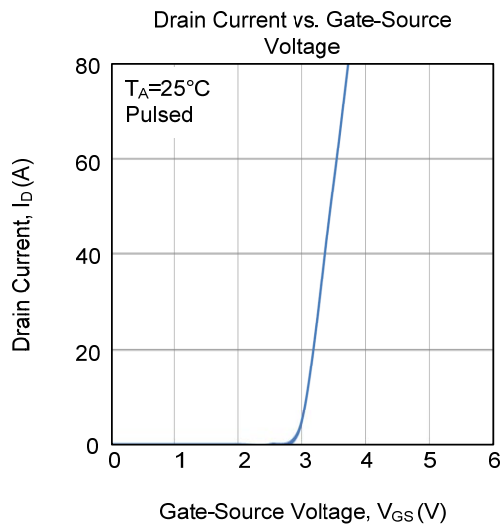
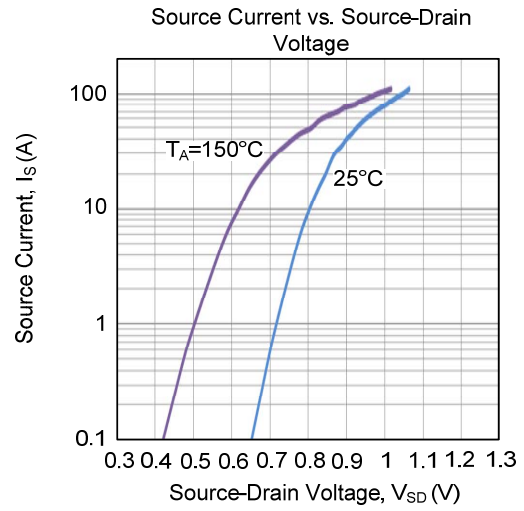
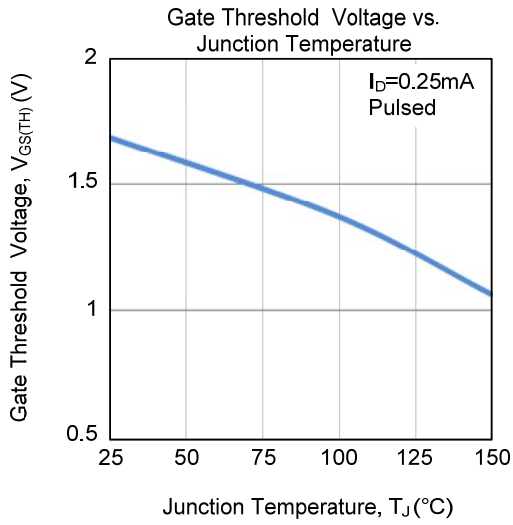


Unclamped Inductive Switching Waveforms

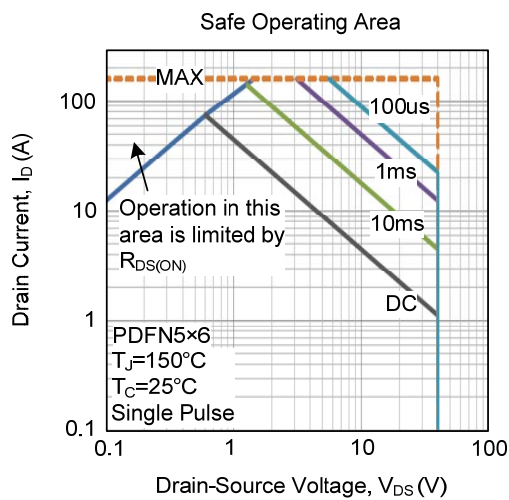
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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