



UT5P02V

POWER MOSFET

-5.0A, -20V P-CHANNEL POWER MOSFET

DESCRIPTION

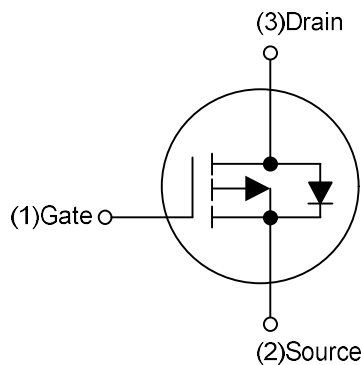
The UTC **UT5P02V** is a P-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance and low gate charge, etc.

The UTC **UT5P02V** is suitable for load switch and battery protection applications.

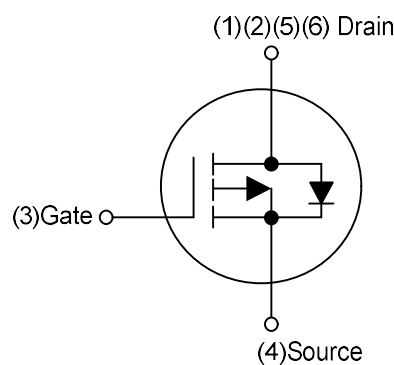
FEATURES

- * $R_{DS(ON)} \leq 38 \text{ m}\Omega$ @ $V_{GS} = -10\text{V}$, $I_D = -5.0\text{A}$
- * $R_{DS(ON)} \leq 50 \text{ m}\Omega$ @ $V_{GS} = -4.5\text{V}$, $I_D = -4.6\text{A}$
- * $R_{DS(ON)} \leq 75 \text{ m}\Omega$ @ $V_{GS} = -2.5\text{V}$, $I_D = -3.5\text{A}$
- * Low Gate Charge
- * Green & Pb Free

SYMBOL



SOT-23



SOT-26

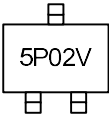
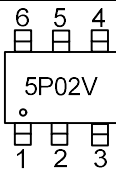
ORDERING INFORMATION

Ordering Number	Package	Pin Assignment						Packing
		1	2	3	4	5	6	
UT5P02VG-AE3-R	SOT-23	G	S	D	-	-	-	Tape Reel
UT5P02VG-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel

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

	(1) Packing Type	(1) R: Tape Reel
	(2) Package Type	(2) AE3: SOT-23, AG6: SOT-26
	(3) Green Package	(3) G: Halogen Free and Lead Free

MARKING

SOT-23	SOT-26
 A diagram of a SOT-23 package. It is a small rectangle with three pins. The top pin is labeled with a small square symbol. The bottom two pins are labeled with small square symbols. The text "5P02V" is printed in the center of the package.	 A diagram of a SOT-26 package. It is a small rectangle with six pins. The top three pins are labeled 6, 5, and 4 from left to right. The bottom three pins are labeled 1, 2, and 3 from left to right. The text "5P02V" is printed in the center of the package, with a small dot below it.

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	± 12	V
Drain Current	DC	I_D	-5	A
	Pulsed (Note 2)	I_{DM}	-10	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	22	mJ
Power Dissipation	SOT-23	P_D	1.15	W
	SOT-26		1.2	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. $L = 1\text{mH}$, $I_{AS} = -6.6\text{A}$, $V_{DD} = -20\text{V}$, $R_G = 25\ \Omega$ Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23	θ_{JA}	110	$^{\circ}\text{C/W}$
	SOT-26		104	$^{\circ}\text{C/W}$
Junction to Case	SOT-23	θ_{JC}	95	$^{\circ}\text{C/W}$
	SOT-26		90	$^{\circ}\text{C/W}$

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

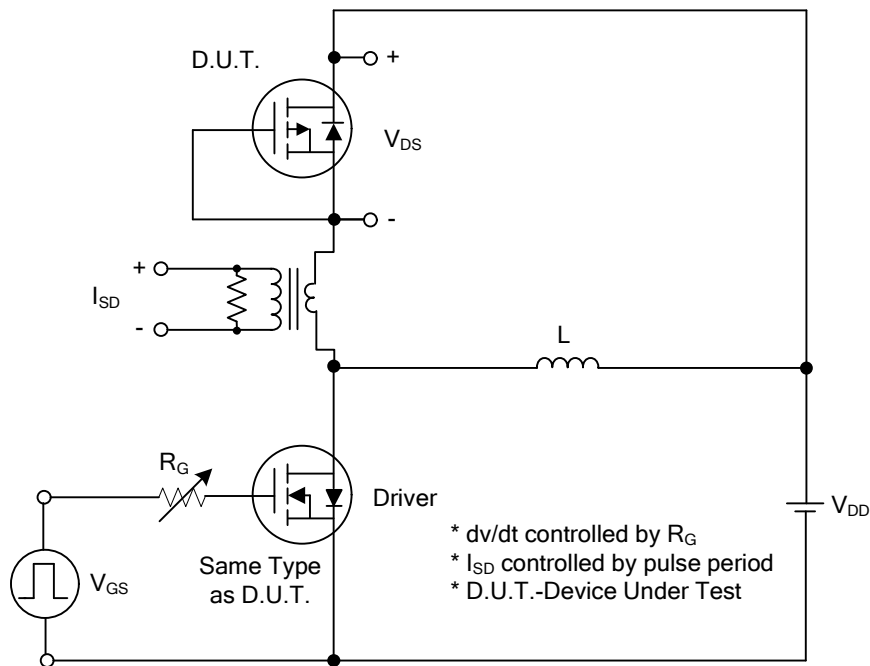
■ ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =-250μA	-20			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+12V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-12V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} = V _{GS} , I _D =-250μA	-0.5		-1.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =-10V, I _D =-5.0A			38	mΩ
			V _{GS} =-4.5V, I _D =-4.6A			50	mΩ
			V _{GS} =-2.5V, I _D =-3.5A			75	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-10V, f=1.0MHz		1115		pF
Output Capacitance		C _{OSS}			191		pF
Reverse Transfer Capacitance		C _{RSS}			166		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =-16V, V _{GS} =-10V, I _D =-5.0A, (Note 1, 2)		32		nC
Gate to Source Charge		Q _{GS}			2.6		nC
Gate to Drain Charge		Q _{GD}			5.7		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DS} =-10V, V _{GS} =-10V, I _D =-5.0A, R _G =3.3Ω (Note 1, 2)		5		ns
Rise Time		t _R			17		ns
Turn-OFF Delay Time		t _{D(OFF)}			54		ns
Fall-Time		t _F			30		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I _S				-5	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				-10	A
Diode Forward Voltage		V _{SD}	I _F =-5.0A, V _{GS} =0V			-1.4	V

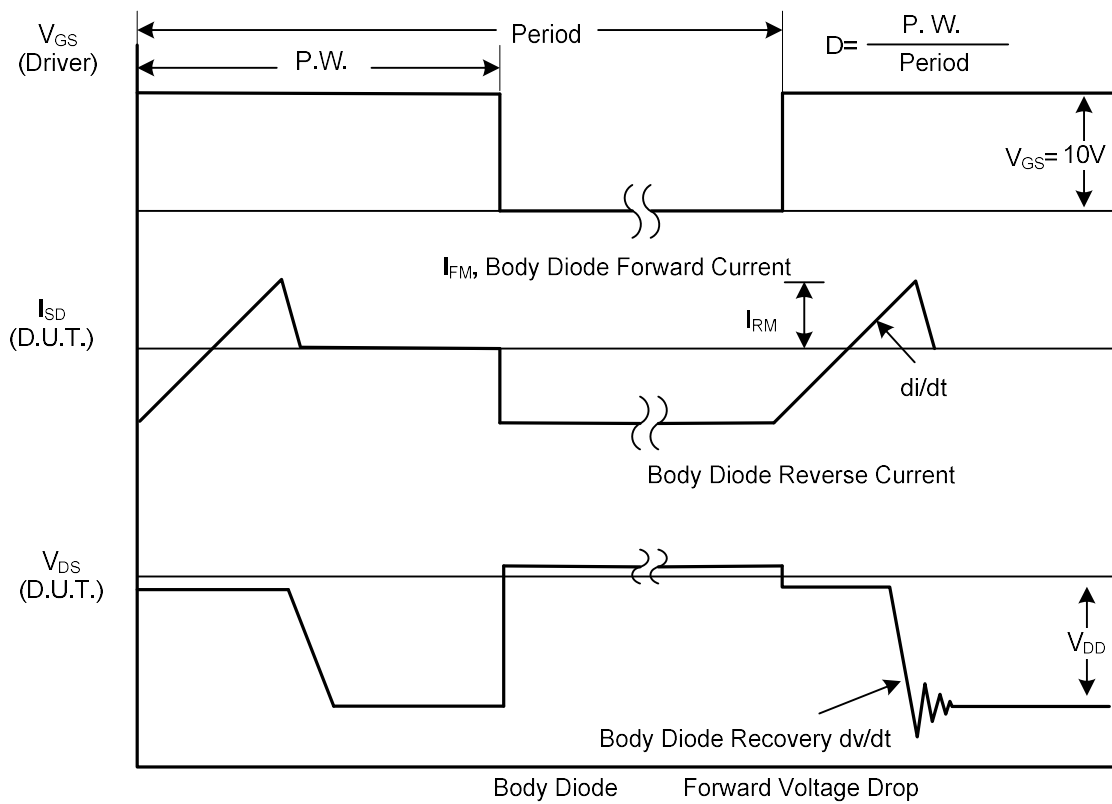
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

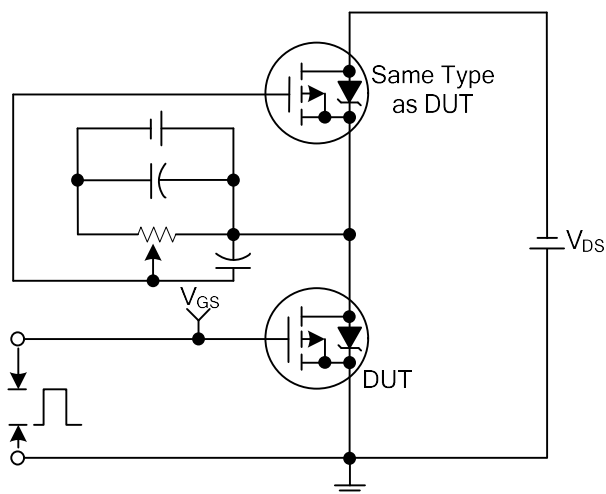


Peak Diode Recovery dv/dt Test Circuit

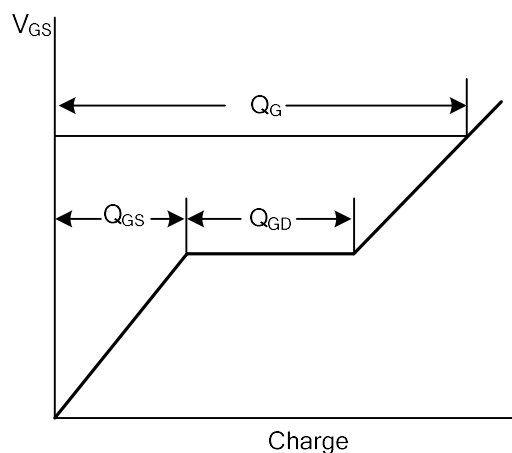


Peak Diode Recovery dv/dt Waveforms

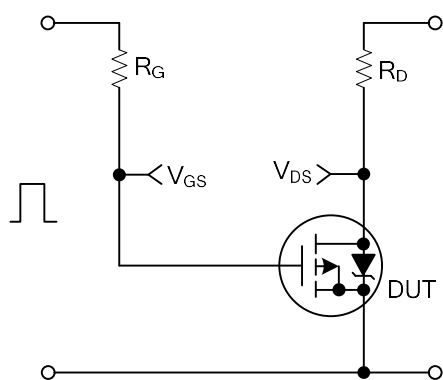
■ TEST CIRCUITS AND WAVEFORMS



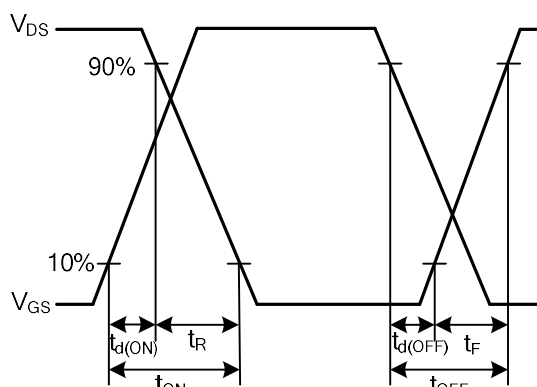
Gate Charge Test Circuit



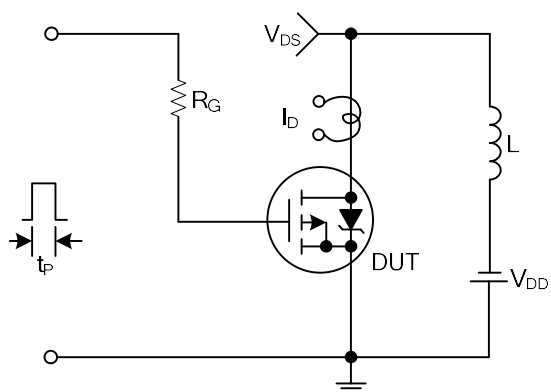
Gate Charge Waveforms



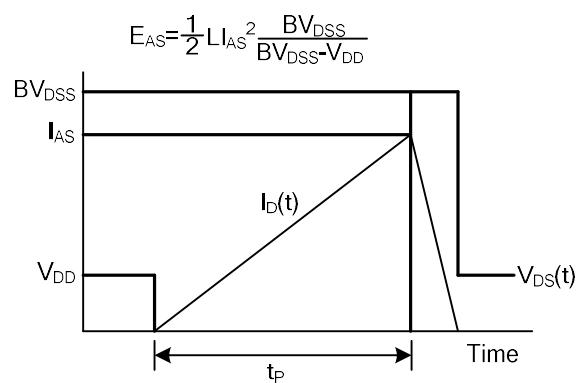
Resistive Switching Test Circuit



Resistive Switching Waveforms

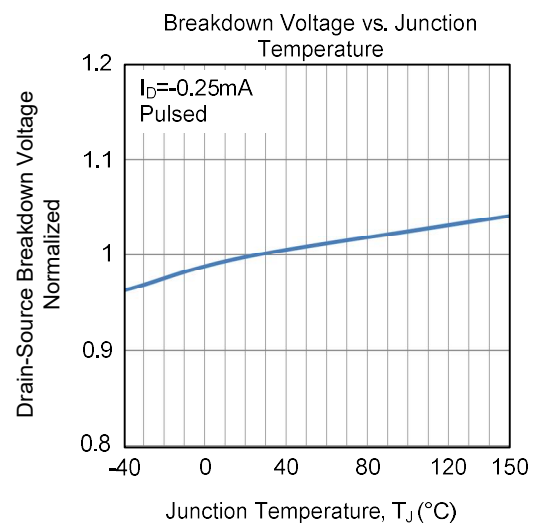
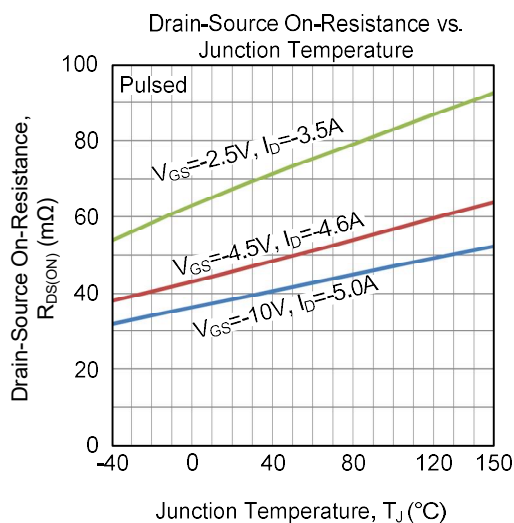
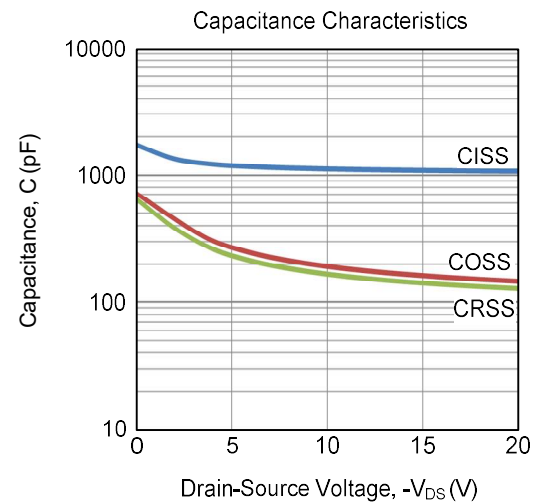
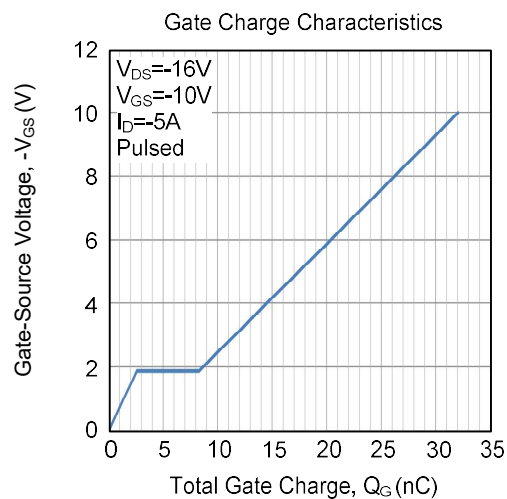
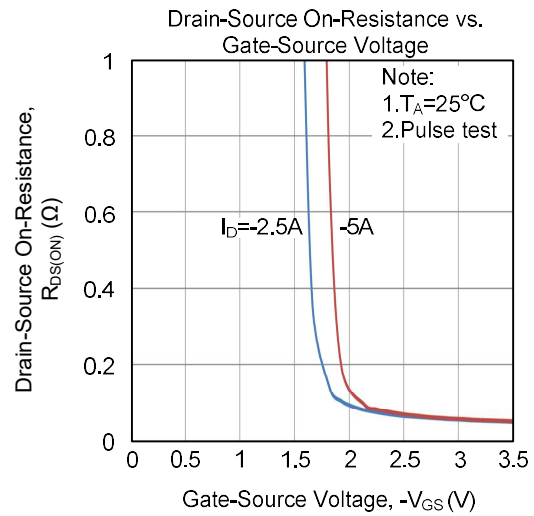
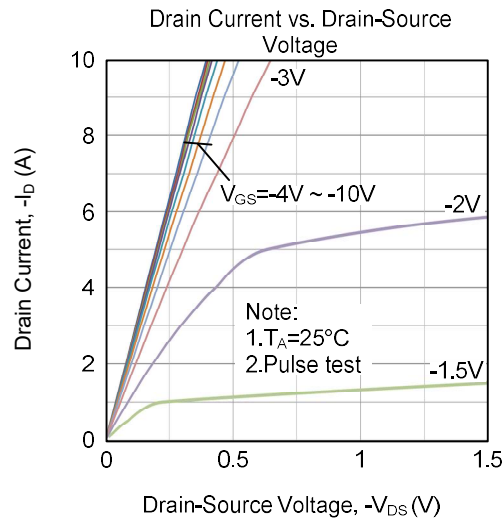


Unclamped Inductive Switching Test Circuit

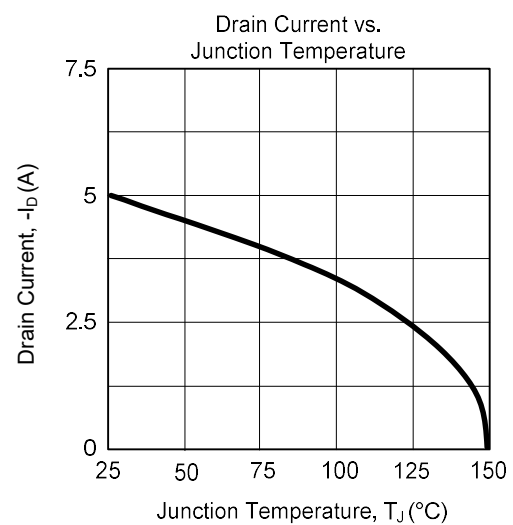
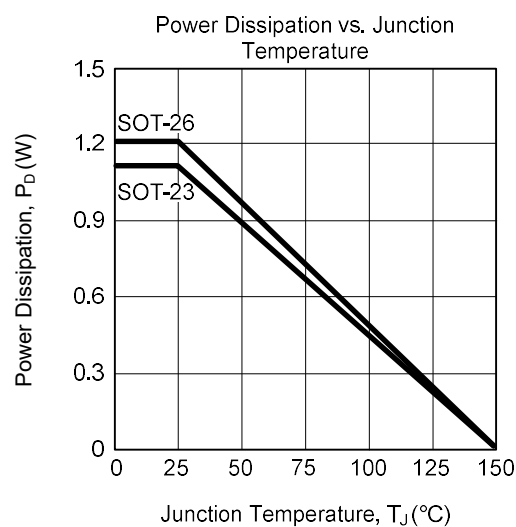
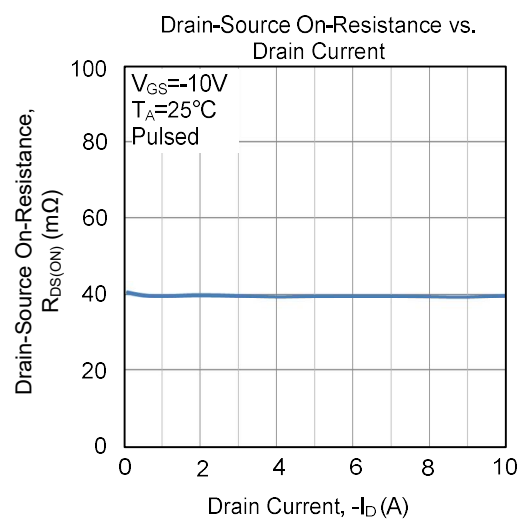
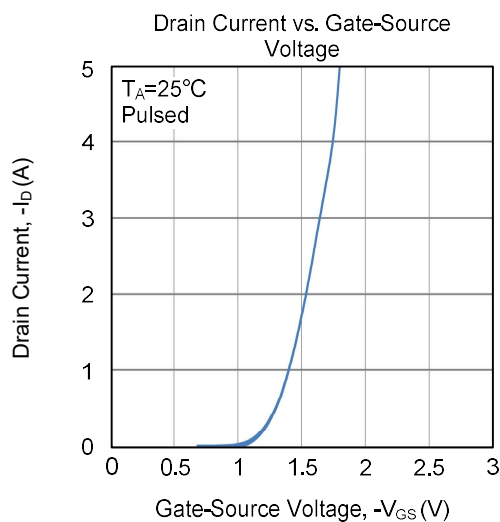
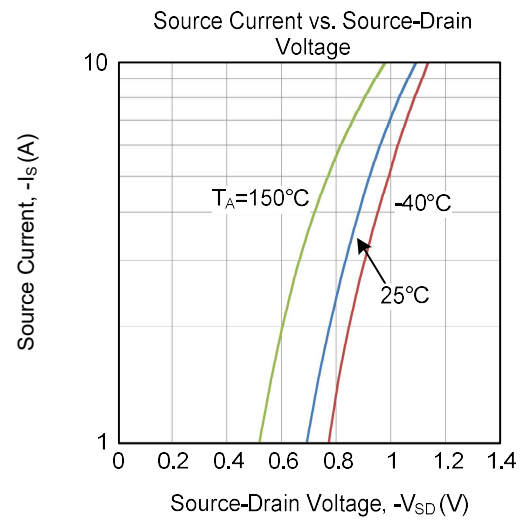
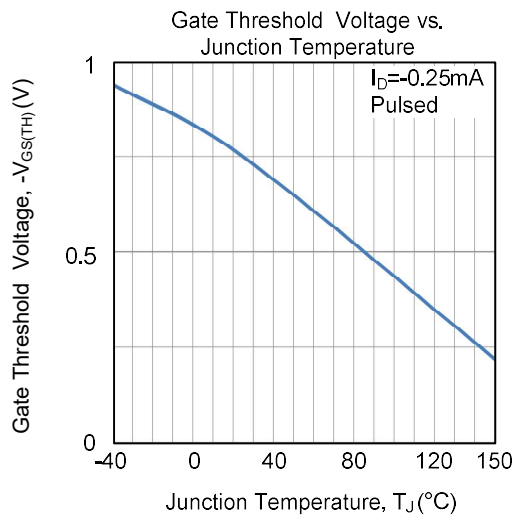


Unclamped Inductive Switching Waveforms

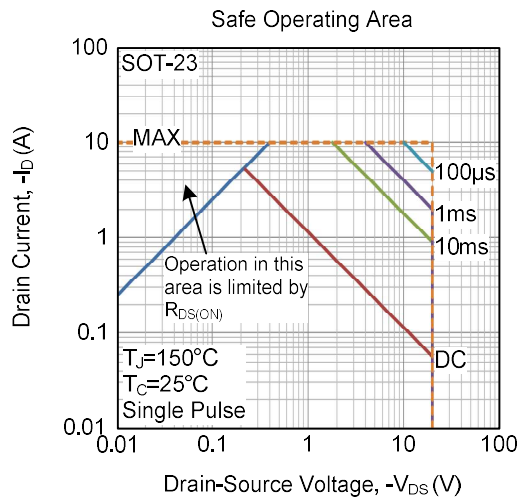
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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