



UT3406

Power MOSFET

3.6A, 30V N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

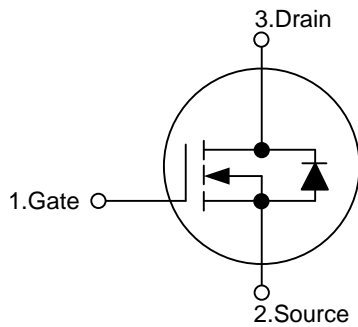
DESCRIPTION

The **UT3406** uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and can be operated at low gate voltages. This device is perfect fit for use as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} \leq 65 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=3.6\text{A}$
- * $R_{DS(ON)} \leq 105 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=2.8\text{A}$

SYMBOL



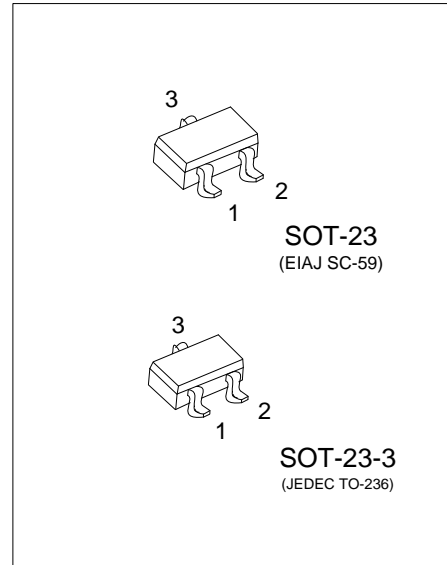
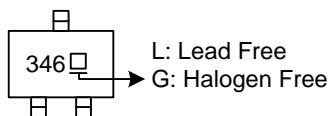
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3406L-AE2-R	UT3406G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT3406L-AE3-R	UT3406G-AE3-R	SOT-23	G	S	D	Tape Reel

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

	<p>(1) R: Tape Reel</p> <p>(2) AE2: SOT-23-3, AE3: SOT-23</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	30	V
Gate-Source Voltage		V _{GSS}	±20	V
Continuous Drain Current (T _A = 25°C)		I _D	3.6	A
Pulsed Drain Current (Note 2)		I _{DM}	15	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	66	mJ
Power Dissipation (T _A = 25°C)	SOT-23-3	P _D	0.5	W
	SOT-23		0.6	W
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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} = 11.5A, V_{DD} = 100V, R_G = 25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3	θ _{JA}	250	°C/W
	SOT-23		208	°C/W

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

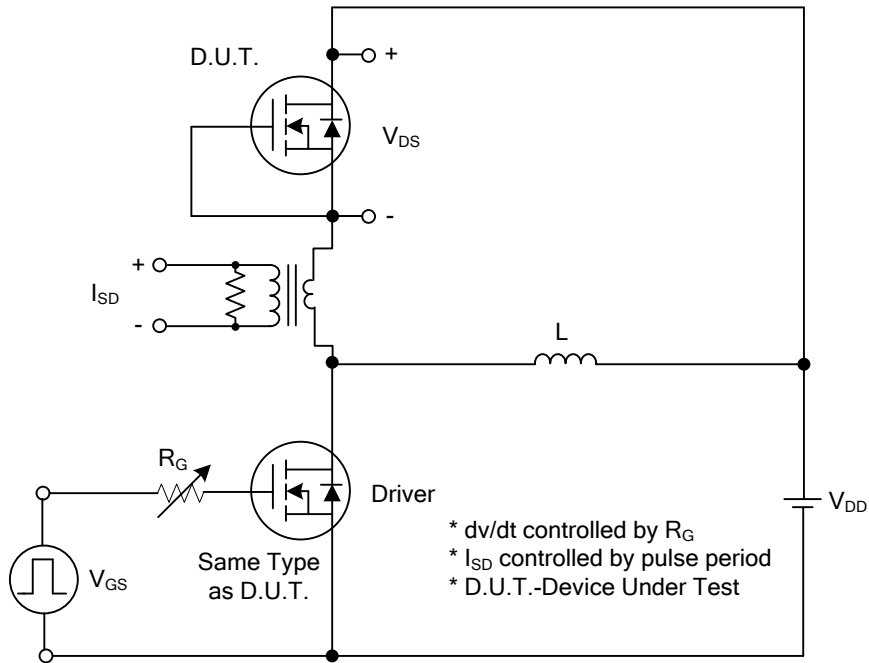
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0 V, I _D =250 μA	30			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =24 V, V _{GS} =0 V			1	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20 V, V _{DS} =0 V			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250 μA	1.0		3.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10 V, I _D =3.6 A		50	65	mΩ
		V _{GS} =4.5 V, I _D =2.8 A		75	105	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} =0 V, f=1MHz		145		pF
Output Capacitance	C _{OSS}			43		pF
Reverse Transfer Capacitance	C _{RSS}			35		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{DS} =24V, V _{GS} =10V, I _D =3.6A		6		nC
Gate Source Charge	Q _{GS}			1.5		nC
Gate Drain Charge	Q _{GD}			0.7		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =3.6A R _G =3Ω		4		ns
Turn-ON Rise Time	t _R			14		ns
Turn-OFF Delay Time	t _{D(OFF)}			6		ns
Turn-OFF Fall-Time	t _F			18		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				3.6	A
Maximum Body-Diode Pulsed Current	I _{SM}				15	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =1.0A			1.0	V

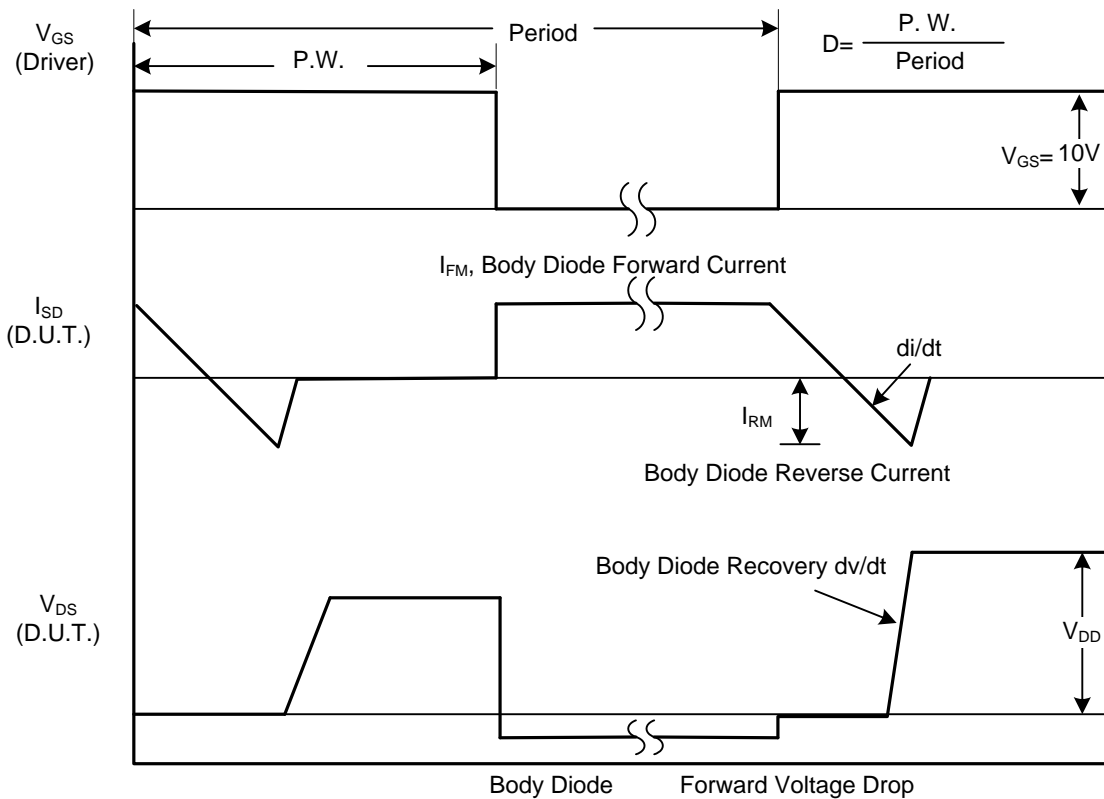
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

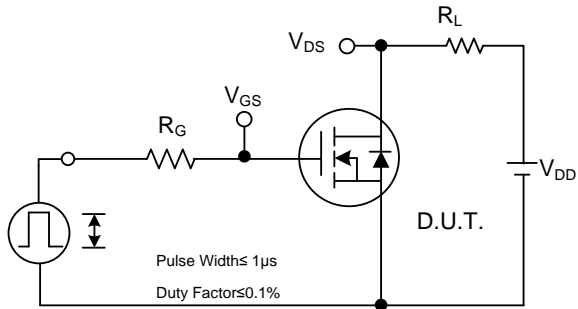


Peak Diode Recovery dv/dt Test Circuit

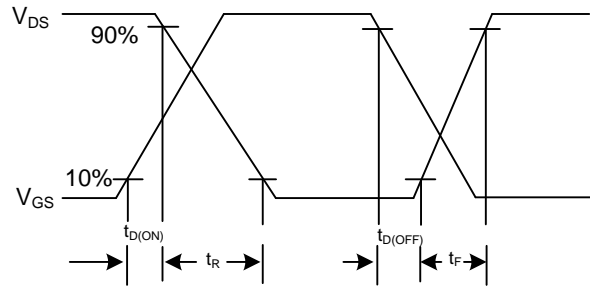


Peak Diode Recovery dv/dt Waveforms

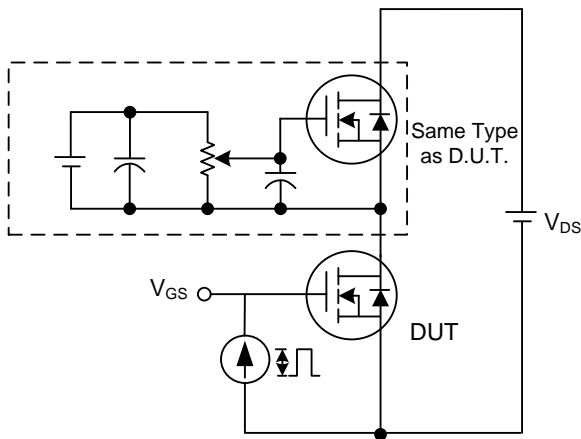
■ TEST CIRCUITS AND WAVEFORMS



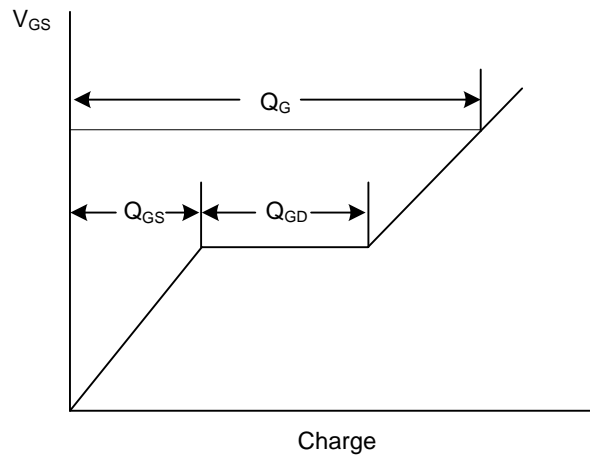
Switching Test Circuit



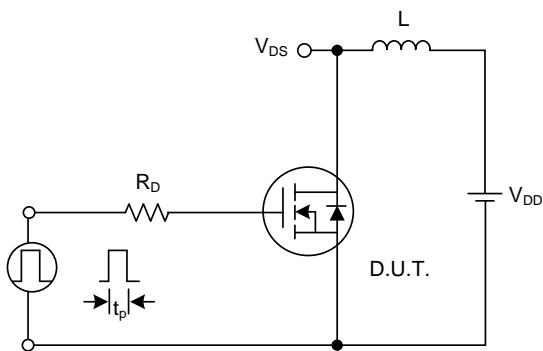
Switching Waveforms



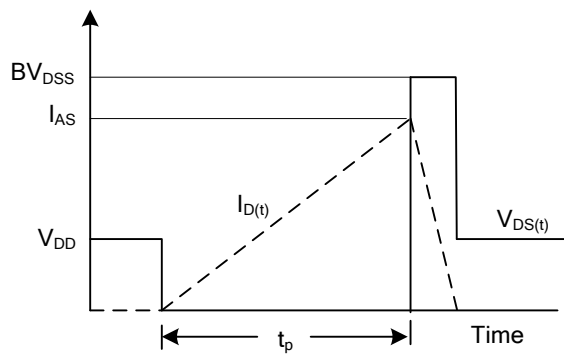
Gate Charge Test Circuit



Gate Charge Waveform

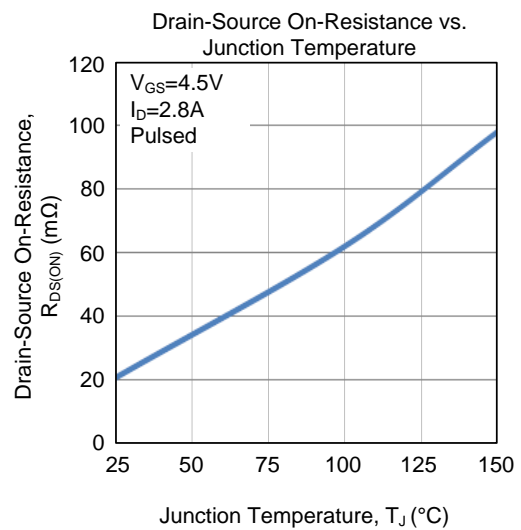
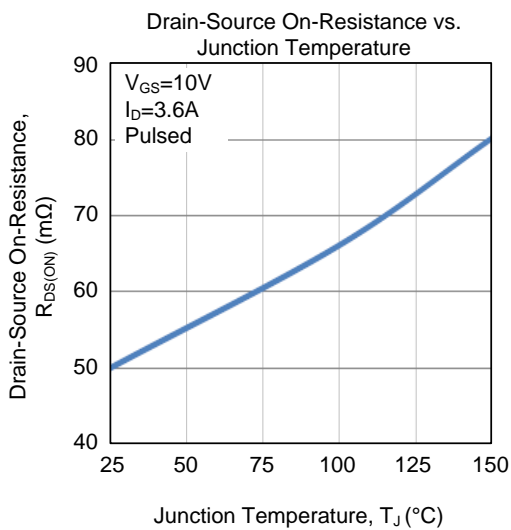
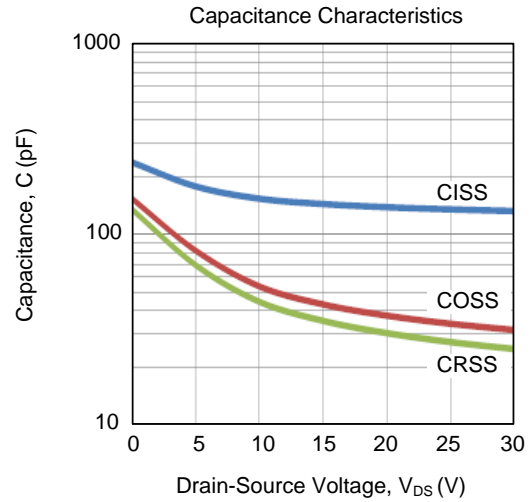
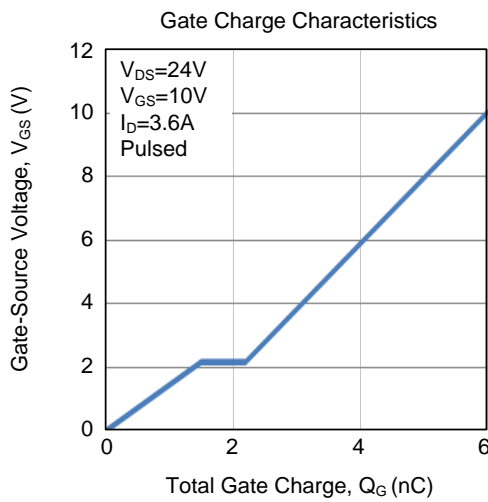
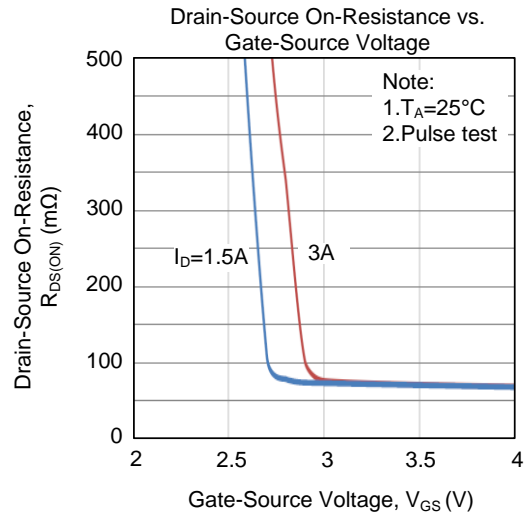
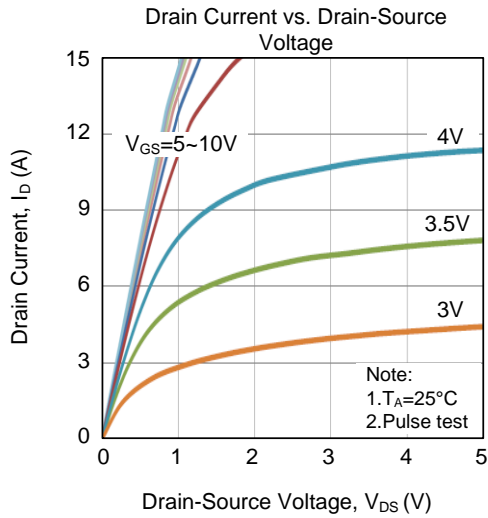


Unclamped Inductive Switching Test Circuit

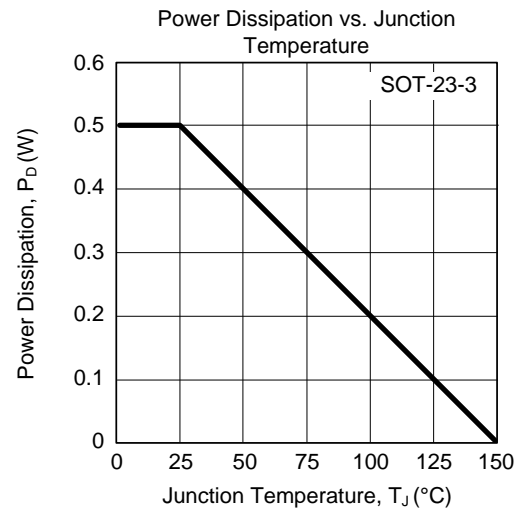
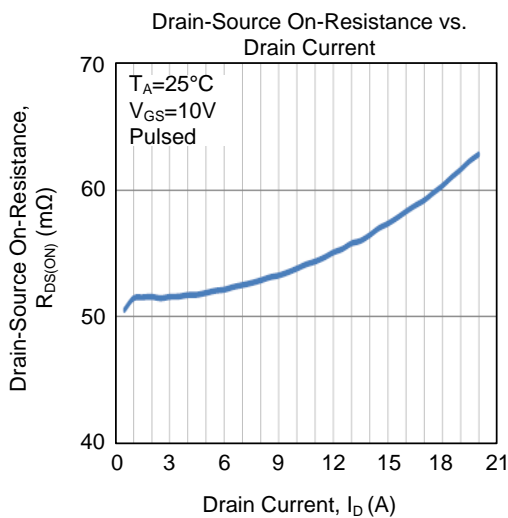
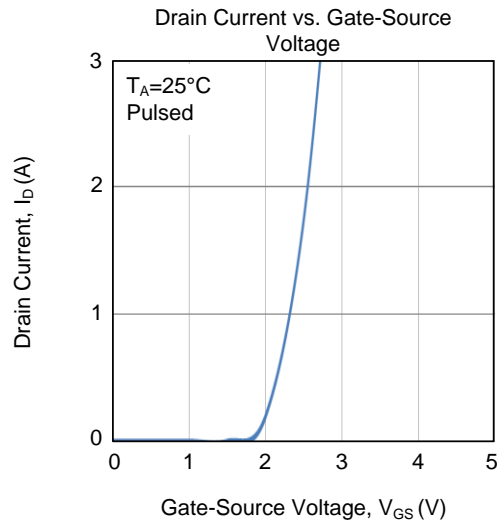
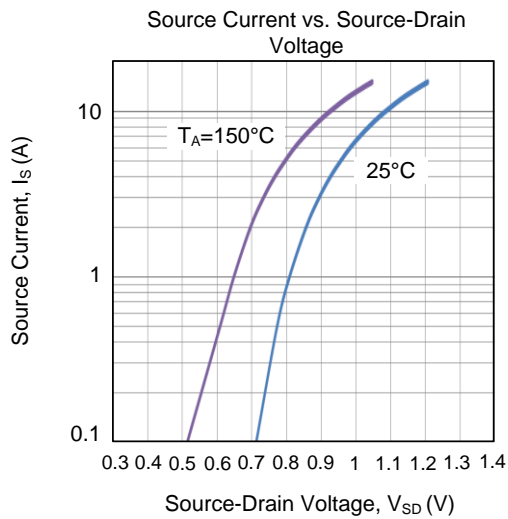
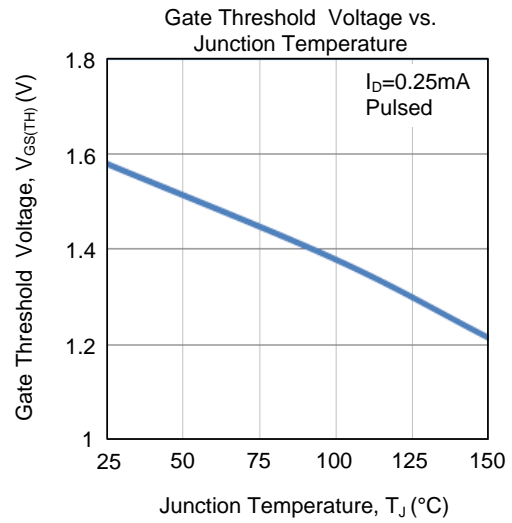
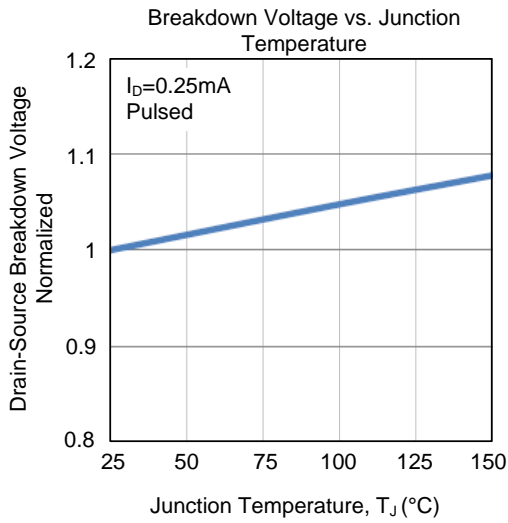


Unclamped Inductive Switching Waveforms

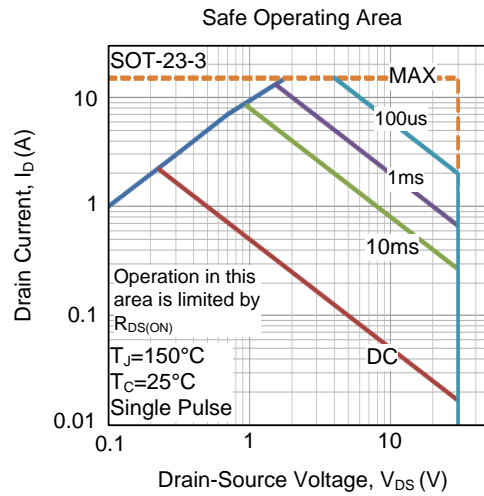
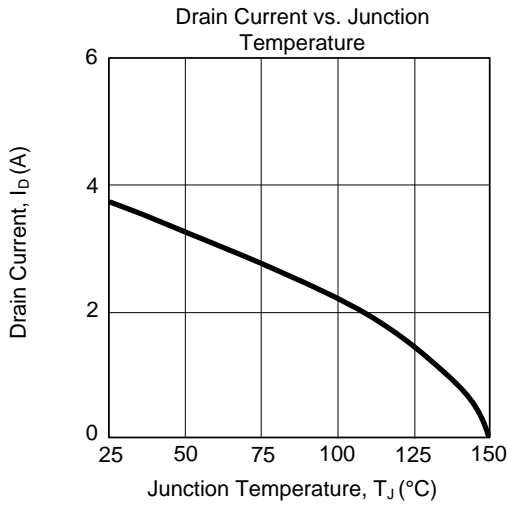
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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