



UT16NN04

Power MOSFET

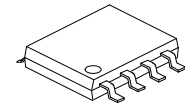
DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

The UTC **UT16NN04** is a N-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with low $R_{DS(on)}$ characteristic by high cell density trench technology.

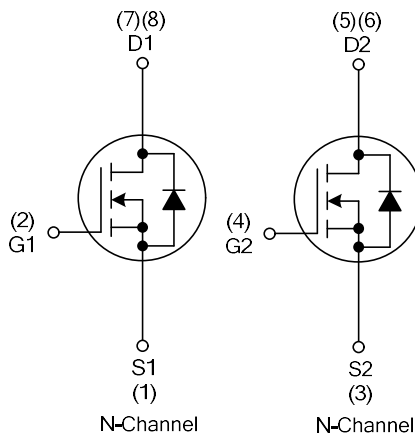
FEATURES

- * $R_{DS(ON)} \leq 26 \text{ m}\Omega$ @ $V_{GS} = 10V$, $I_D = 8.0A$
- * $R_{DS(ON)} \leq 35 \text{ m}\Omega$ @ $V_{GS} = 4.5V$, $I_D = 5.0A$
- * Fast Switching Speed
- * Simple Drive Requirement



SOP-8

SYMBOL



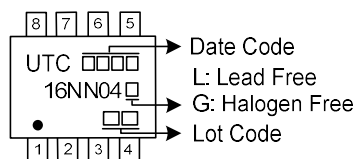
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT16NN04L-S08-R	UT16NN04G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

UT16NN04G-S08-R		(1) Packing Type	(1) R: Tape Reel
		(2) Package Type	(2) S08: SOP-8
		(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (T_C=25°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	I _D	8	A
	Pulsed (Note 2)	I _{DM}	32	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	4.6	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	0.6	V/nS
Power Dissipation		P _D	1.5	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} = 9.6A, V_{DD} = 30V, R_G = 25Ω, Starting T_J = 25°C.
 4. I_{SD} ≤ 8.0A, di/dt ≤ 200A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J = 25°C.

■ THERMAL DATA (NOTE)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	125	°C/W
Junction to Case	θ _{JC}	83	°C/W

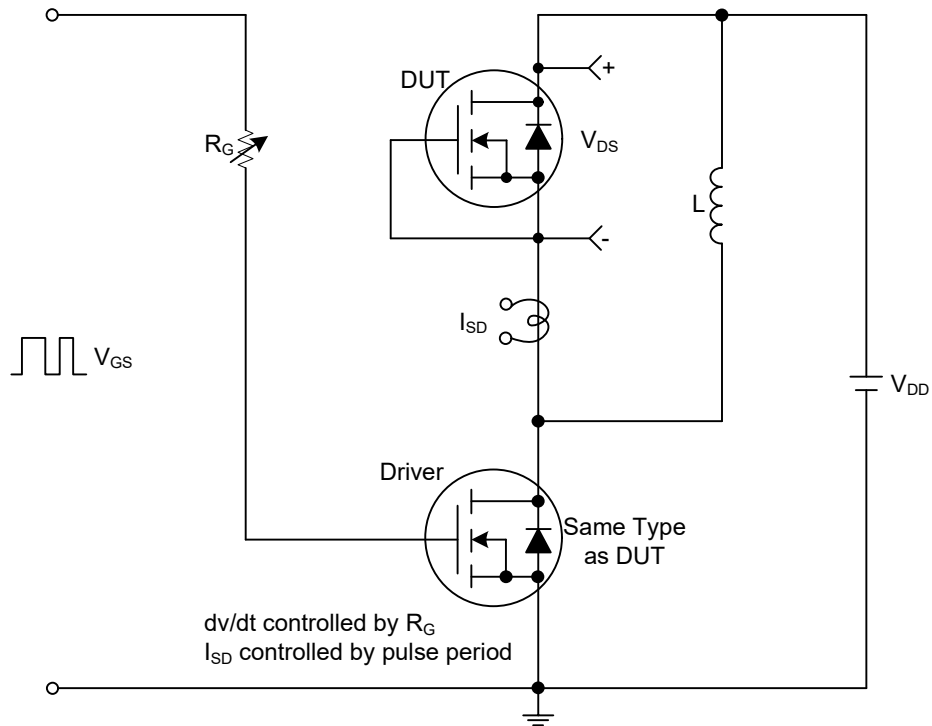
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

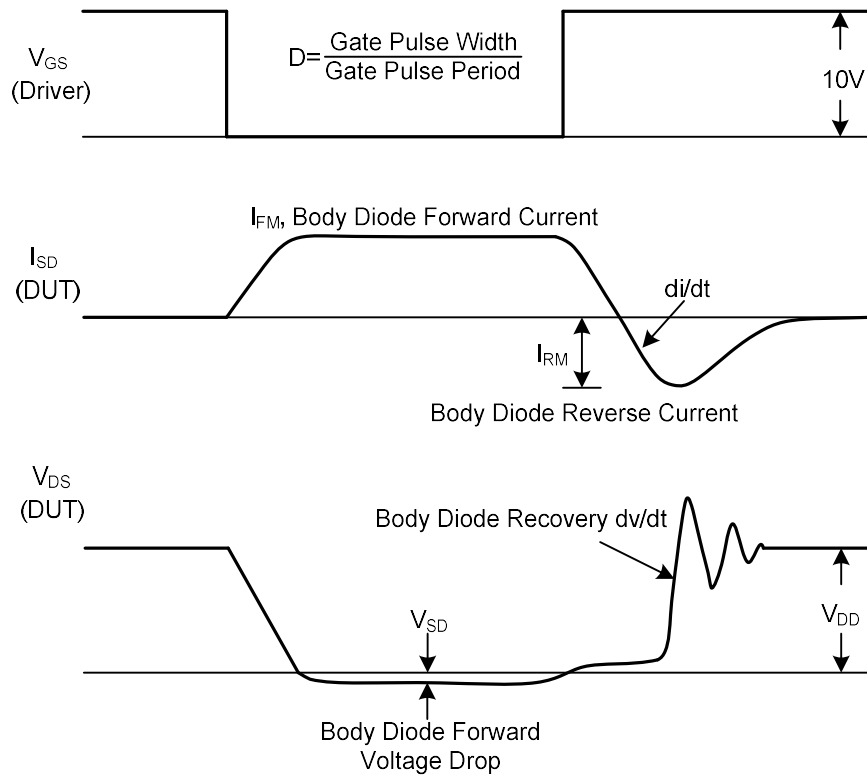
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	40			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =40V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{DS} =0V, V _{GS} =20V			100	nA
	Reverse		V _{DS} =0V, V _{GS} =-20V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =8.0A			26	mΩ
			V _{GS} =4.5V, I _D =5.0A			35	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =20V, V _{GS} =0V, f=1.0MHz		517		pF
Output Capacitance		C _{OSS}			75		pF
Reverse Transfer Capacitance		C _{RSS}			66		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =32V, V _{GS} =10V, I _D =8.0A (Note 1, 2)		23		nC
Gate-Source Charge		Q _{GS}			3		nC
Gate-Drain Charge		Q _{GD}			5		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =20V, V _{GS} =10V, I _D =8.0A, R _G =3Ω (Note 1, 2)		5		ns
Turn-ON Rise Time		t _R			16		ns
Turn-OFF Delay Time		t _{D(OFF)}			17		ns
Turn-OFF Fall Time		t _F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				8	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =8.0A, V _{GS} =0V			1.4	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =8.0A, V _{GS} =0V,		35		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		16		nC

- Notes: 1. Pulse Test: Pulse width ≤ 600μs, Duty cycle ≤ 2%.
 2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



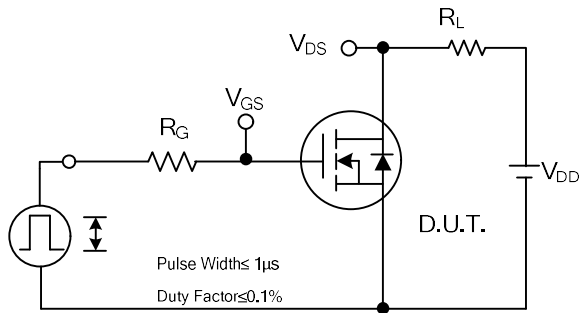
Peak Diode Recovery dv/dt Test Circuit



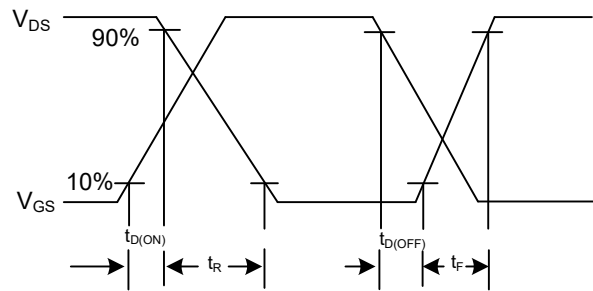
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

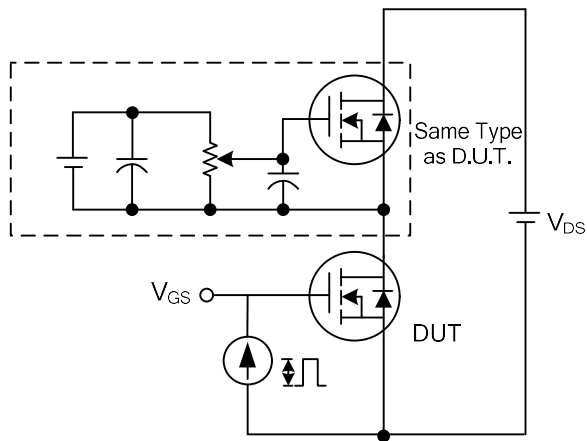
■ TEST CIRCUITS AND WAVEFORMS



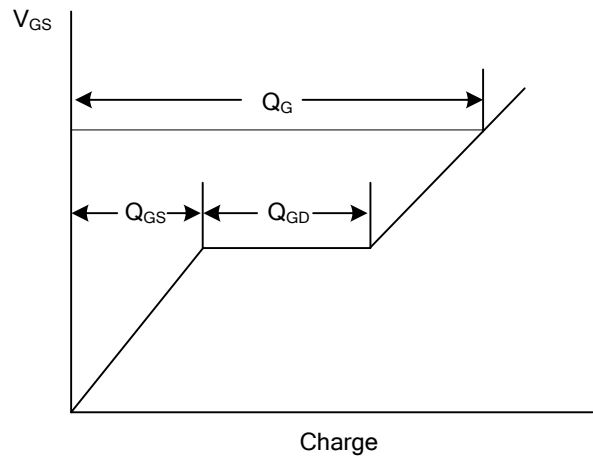
Switching Test Circuit



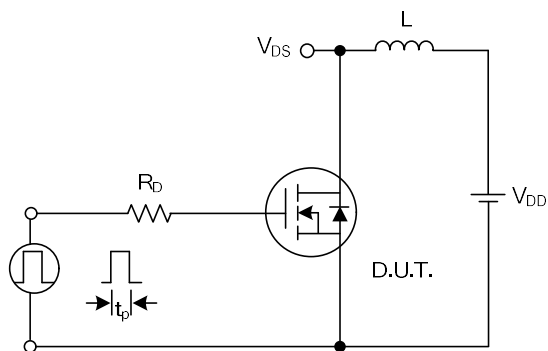
Switching Waveforms



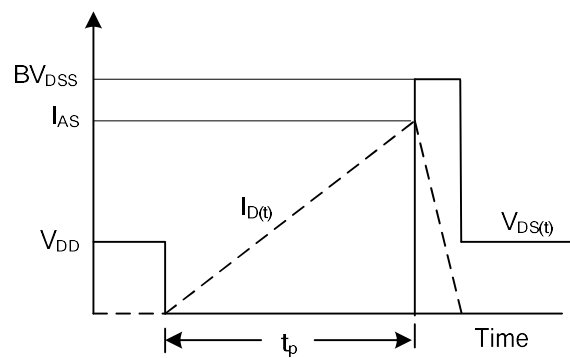
Gate Charge Test Circuit



Gate Charge Waveform

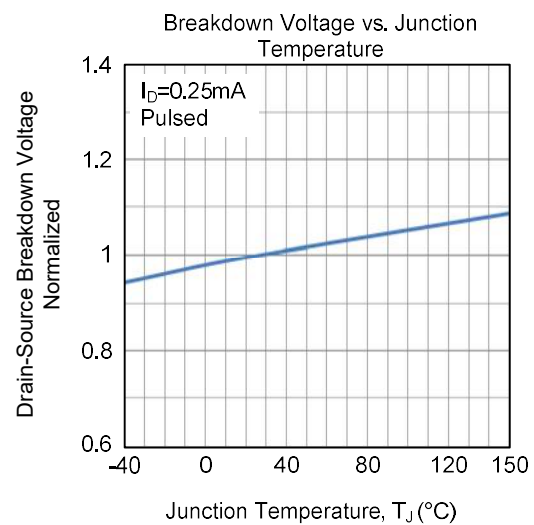
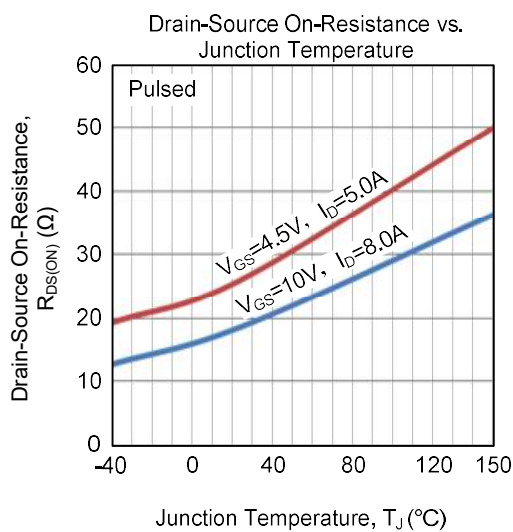
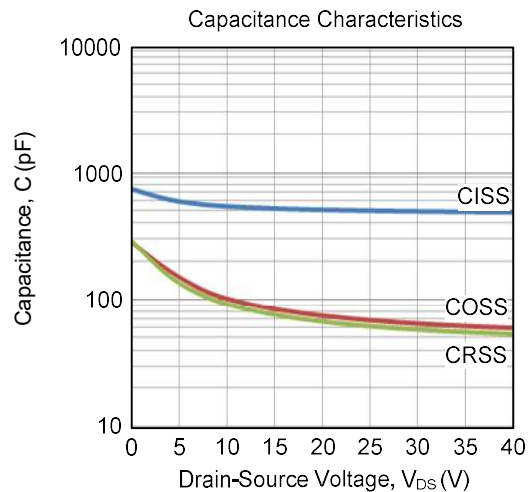
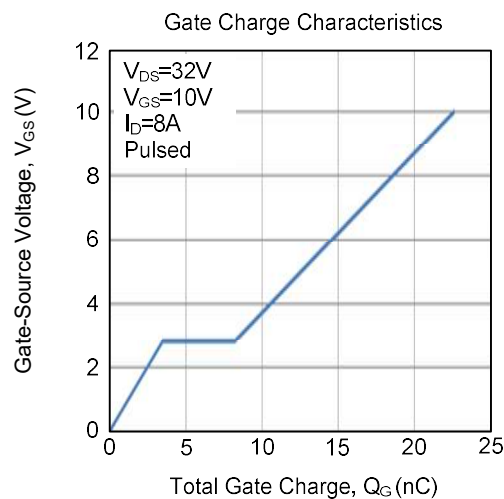
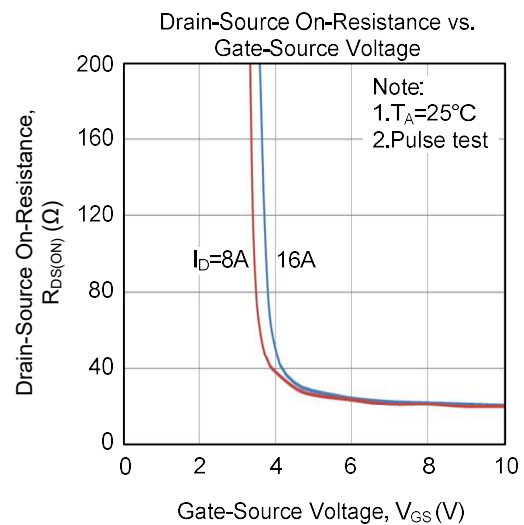
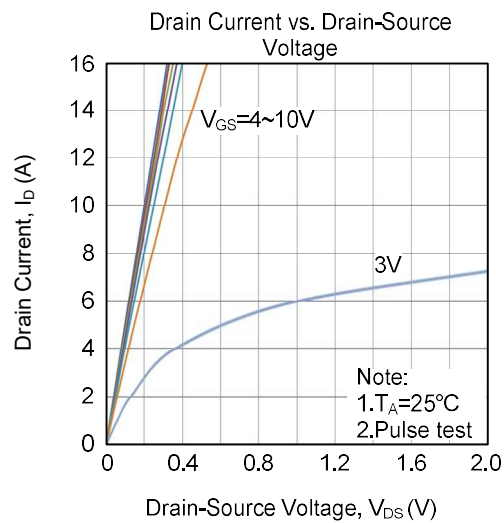


Unclamped Inductive Switching Test Circuit

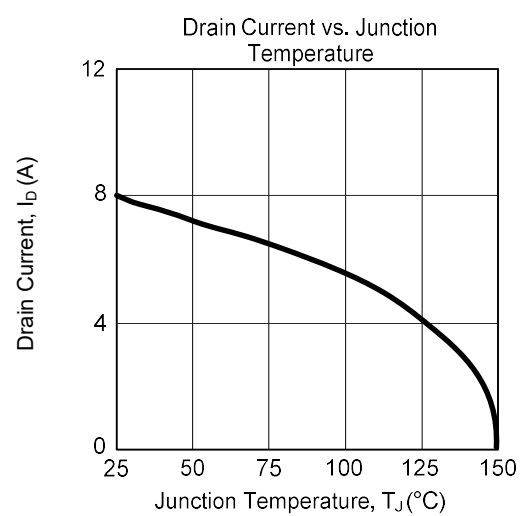
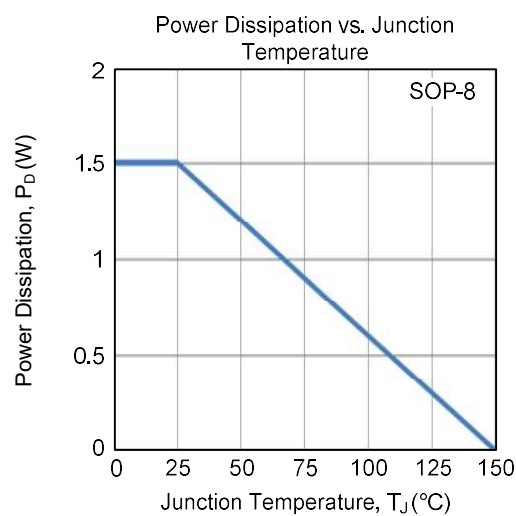
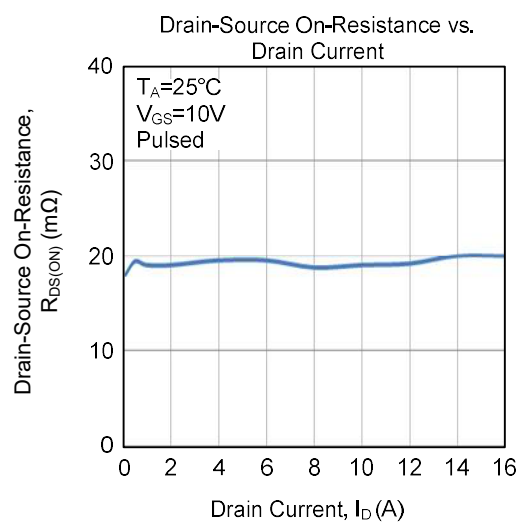
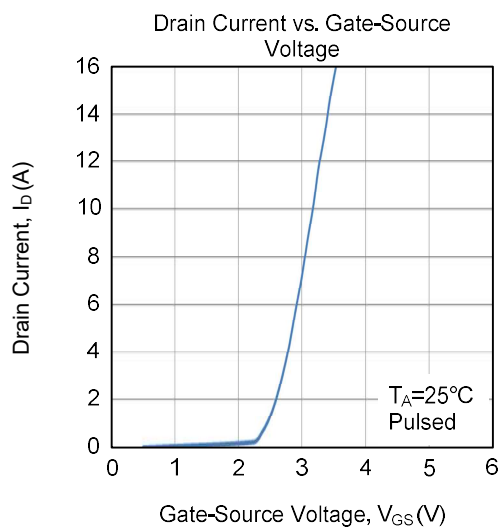
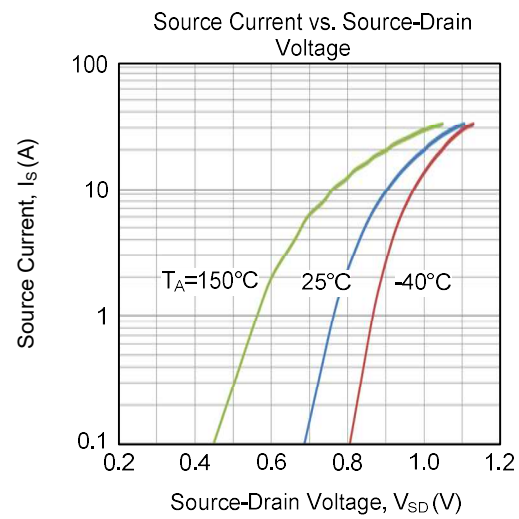
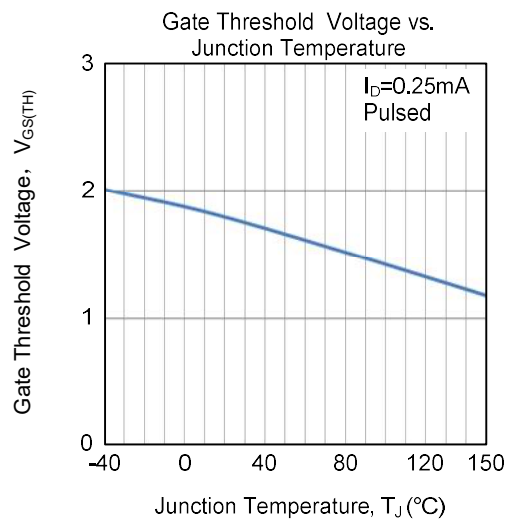


Unclamped Inductive Switching Waveforms

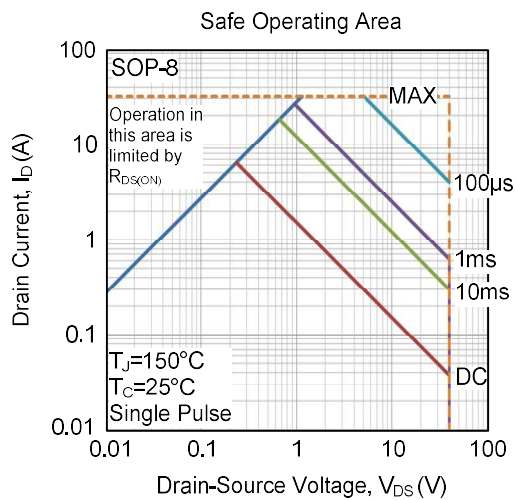
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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