



30NM65

Power MOSFET

30A, 650V N-CHANNEL SUPER-JUNCTION MOSFET

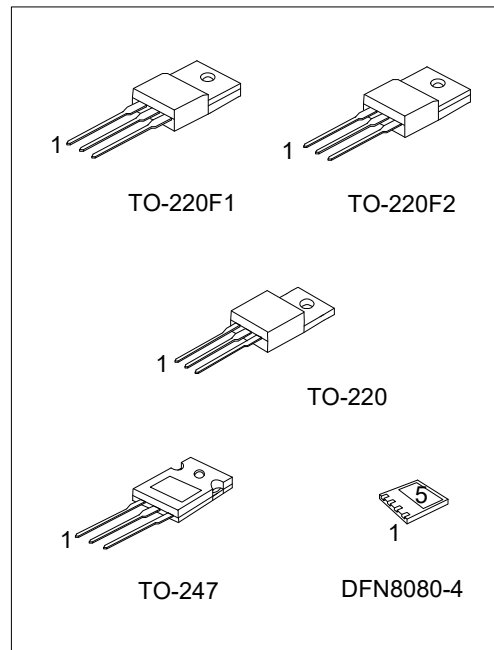
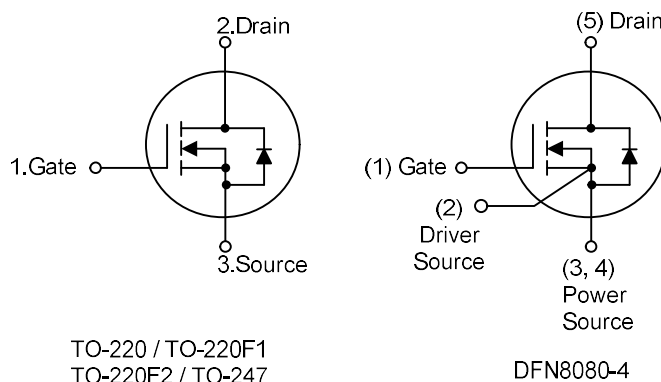
DESCRIPTION

The **UTC 30NM65** is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at AC-DC converters for power applications.

FEATURES

- * $R_{DS(ON)} \leq 0.14 \Omega$ @ $V_{GS}=10V$, $I_D=15A$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
30NM65L-TA3-T	30NM65G-TA3-T	TO-220	G	D	S	-	-	Tube
30NM65L-TF1-T	30NM65G-TF1-T	TO-220F1	G	D	S	-	-	Tube
30NM65L-TF2-T	30NM65G-TF2-T	TO-220F2	G	D	S	-	-	Tube
30NM65L-T47-T	30NM65G-T47-T	TO-247	G	D	S	-	-	Tube
30NM65L-K04-8080-R	30NM65G-K04-8080-R	DFN8080-4	G	S	S	S	D	Tape Reel

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

30NM65G-TA3-T (1) Packing Type (2) Package Type (3) Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, T47: TO-247, K04-8080: DFN8080-4 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

TO-220 / TO-220F1 / TO-220F2 / TO-247	DFN8080-4
UTC 30NM65 □□□□□□ 1 Lot Code ← → Date Code L: Lead Free G: Halogen Free	UTC 30NM65 • □□□□□□ Lot Code ← → Date Code

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	650	V
Gate-Source Voltage		V _{GSS}	±30	V
Drain Current	Continuous	I _D	30	A
	Pulsed (Note 2)	I _{DM}	90	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	737	mJ
Peak Diode Recovery dv/dt		dv/dt	7.8	V/ns
Power Dissipation	TO-220	P _D	128	W
	TO-220F1/TO-220F2		40	W
	TO-247		150	W
	DFN8080-4		70	W
Junction Temperature		T _J	+150	°C
Operating Temperature		T _{OPR}	-55 ~ +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 = 47mH, I_{AS} = 5.6A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F1	θ _{JA}	62.5	°C/W
	TO-220F2			
	TO-247		40	°C/W
	DFN8080-4		35 (Note)	°C/W
Junction to Case	TO-220	θ _{JC}	0.97	°C/W
	TO-220F1/TO-220F2		3.125	°C/W
	TO-247		0.83	°C/W
	DFN8080-4		1.78 (Note)	°C/W

Note: Surface mounted on 1 in² copper pad of FR4 board; 270°C/W when mounted on min. copper pad.

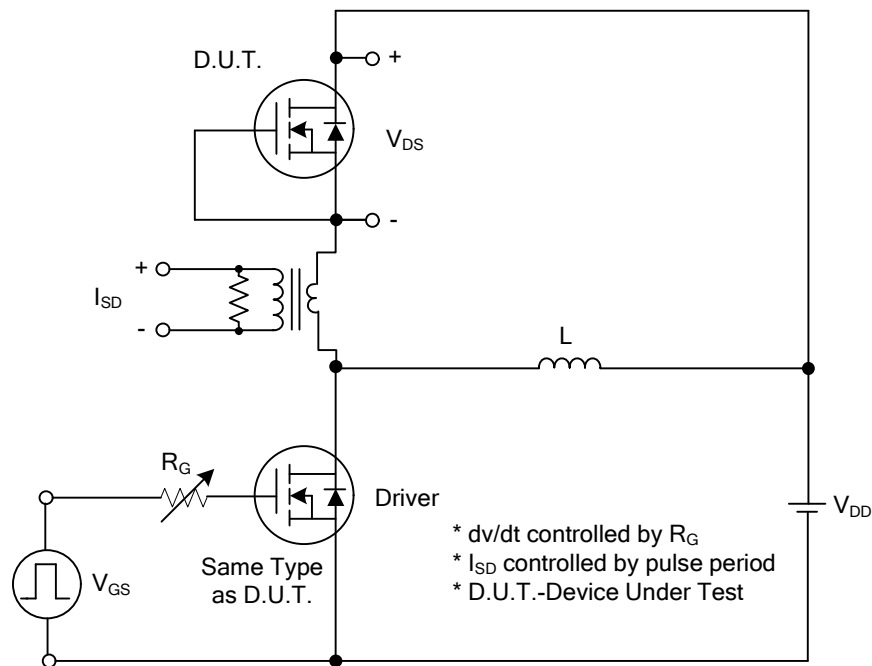
ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	650			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =650V, V _{GS} =0V			50	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.5		4.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =15A			0.14	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		2575		pF
Output Capacitance		C _{OSS}			1435		pF
Reverse Transfer Capacitance		C _{RSS}			85		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =200V, V _{GS} =10V, I _D =30A, I _G =1mA (Note 1,2)		77.2		nC
Gate to Source Charge		Q _{GS}			18.8		nC
Gate to Drain Charge		Q _{GD}			30.8		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω, V _{GS} =10V (Note 1,2)		95		ns
Rise Time		t _R			270		ns
Turn-OFF Delay Time		t _{D(OFF)}			695		ns
Fall-Time		t _F			400		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				30	A
Maximum Body-Diode Pulsed Current		I _{SM}				90	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,		540		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs		10.5		μC

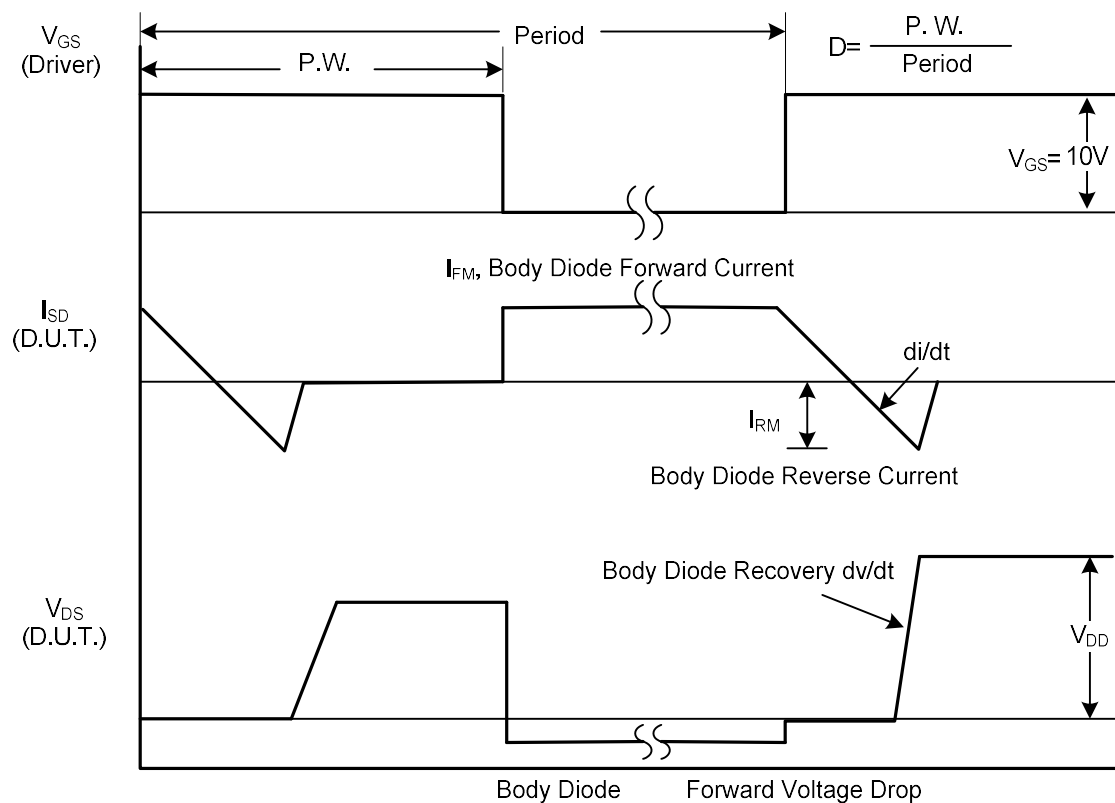
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



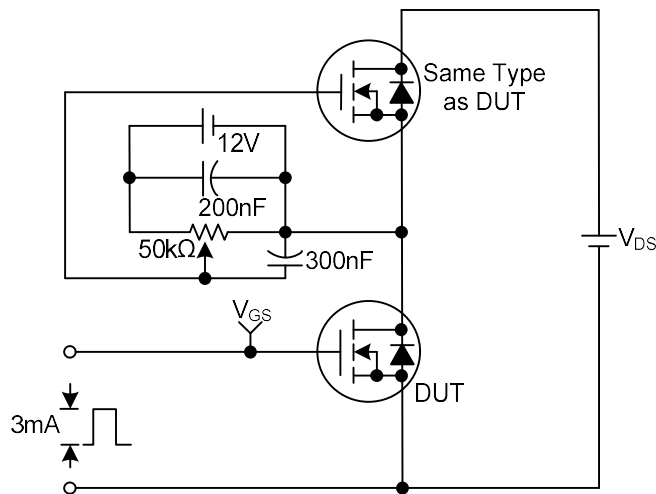
Peak Diode Recovery dv/dt Test Circuit



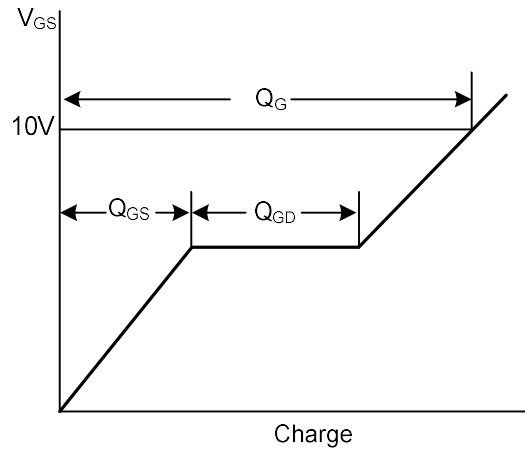
Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS

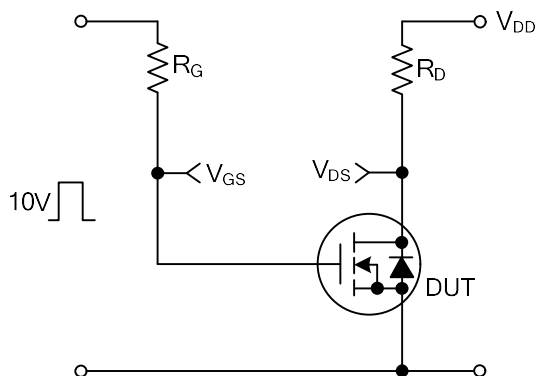
Gate Charge Test Circuit



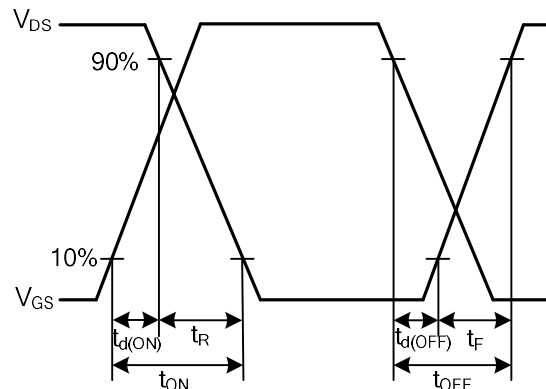
Gate Charge Waveforms



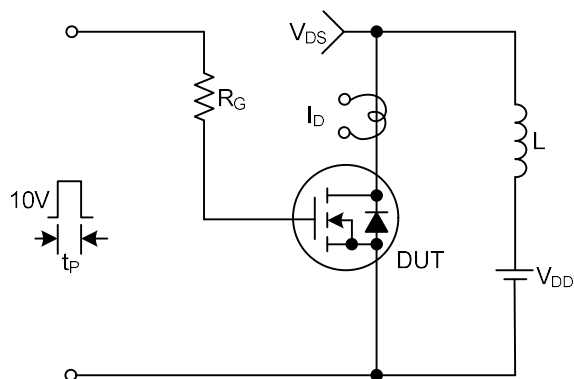
Resistive Switching Test Circuit



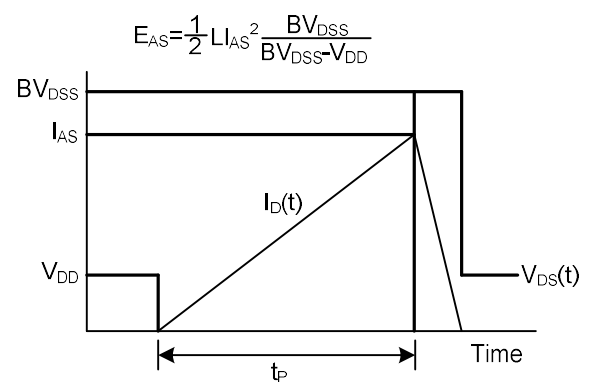
Resistive Switching Waveforms



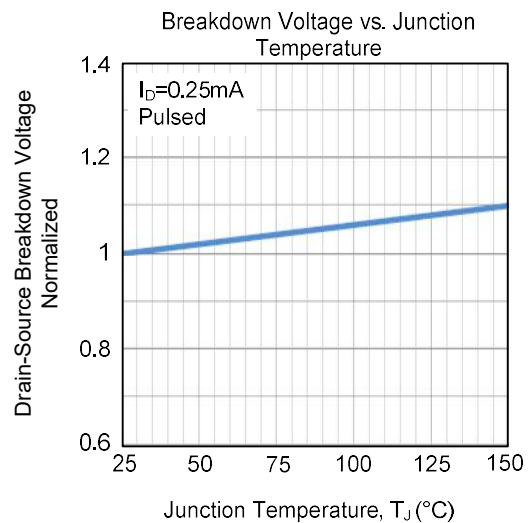
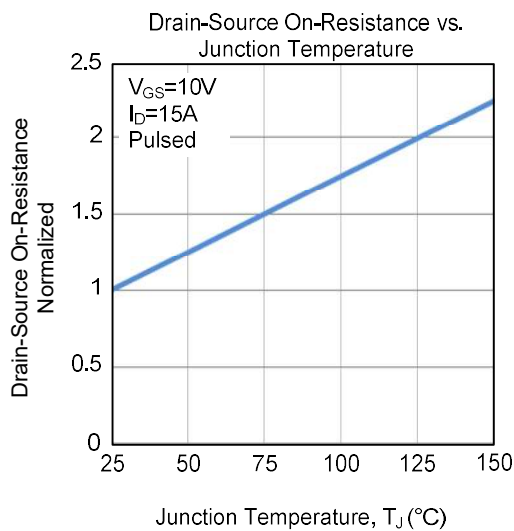
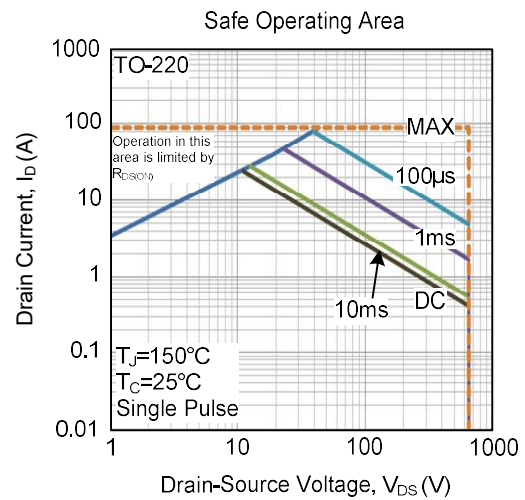
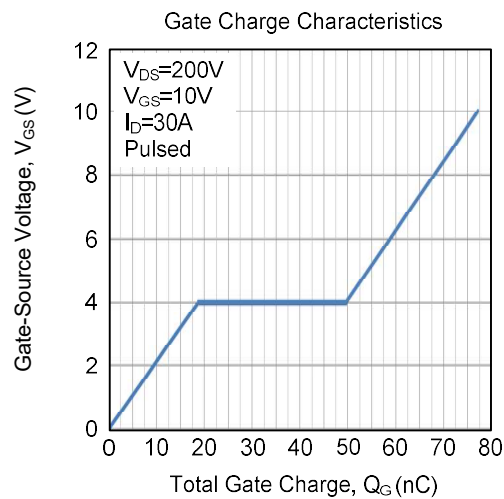
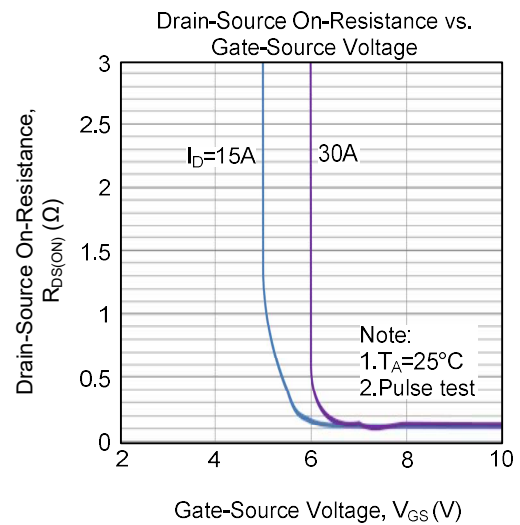
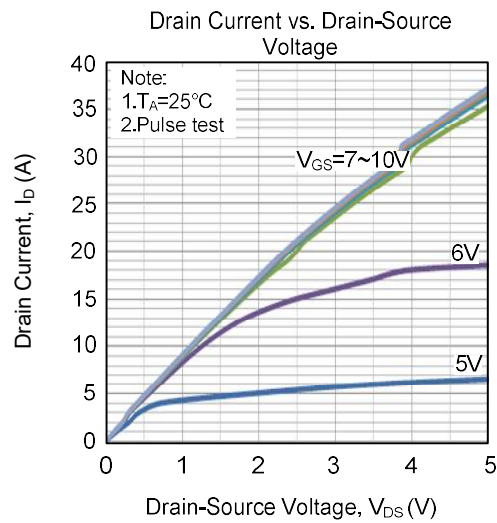
Unclamped Inductive Switching Test Circuit



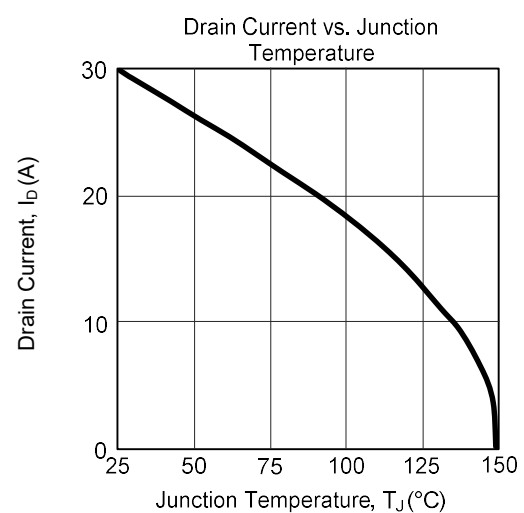
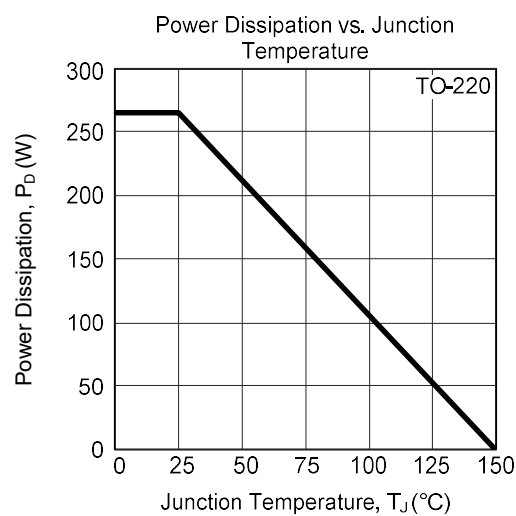
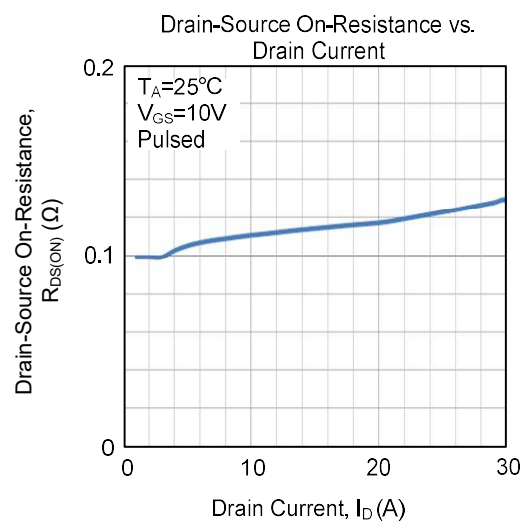
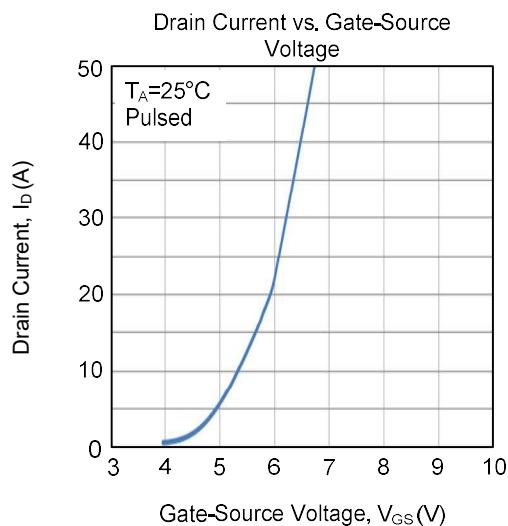
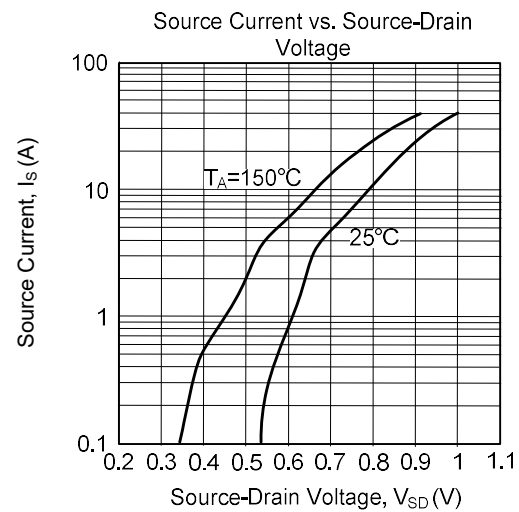
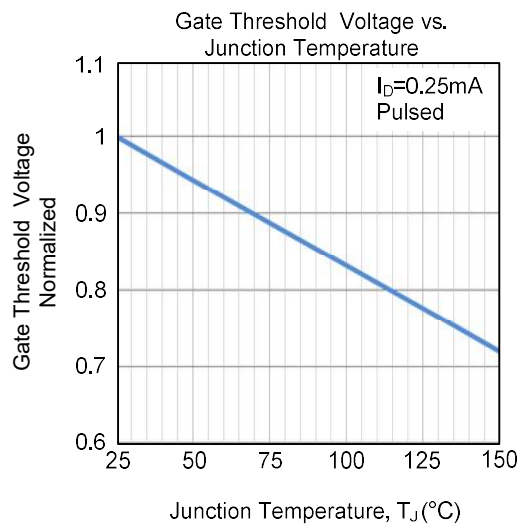
Unclamped Inductive Switching Waveforms



TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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