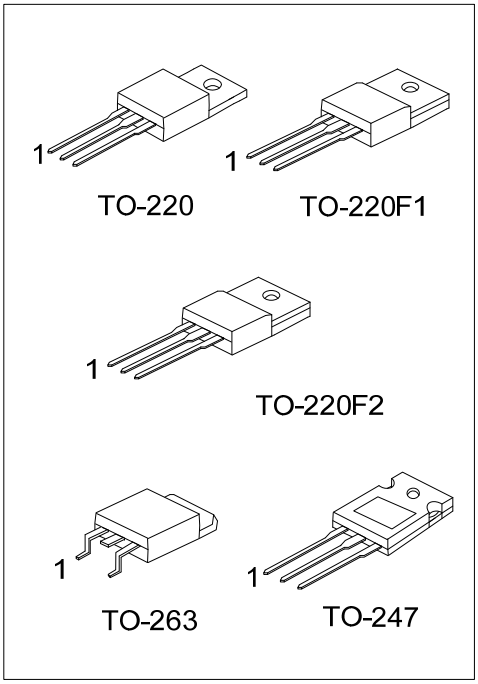
UTT65N20

Power MOSFET

65A, 200V N-CHANNEL POWER MOSFET



■ DESCRIPTION

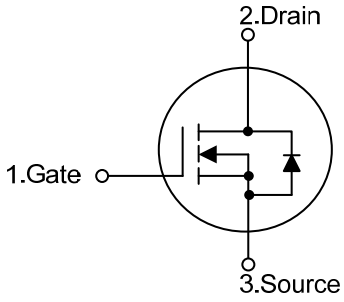
The UTC **UTT65N20** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and high switching speed.

The UTC **UTT65N20** is suitable for high voltage synchronous rectifier and AC/DC converters, etc.

■ FEATURES

* $R_{DS(ON)} \leq 32\ m\Omega$ @ V_{GS}=10V, I_D=32.5A
* Fast switching capability
* Avalanche energy tested
* Improved dv/dt capability, high ruggedness

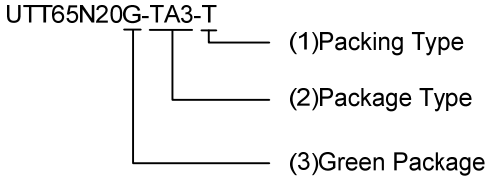
■ SYMBOL



■ ORDERING INFORMATION

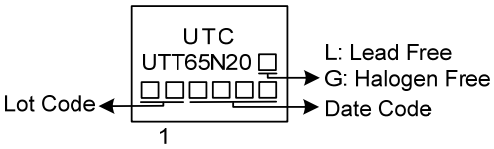
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT65N20L-TA3-T	UTT65N20G-TA3-T	TO-220	G	D	S	Tube
UTT65N20L-TF1-T	UTT65N20G-TF1-T	TO-220F1	G	D	S	Tube
UTT65N20L-TF2-T	UTT65N20G-TF2-T	TO-220F2	G	D	S	Tube
UTT65N20L-TQ2-T	UTT65N20G-TQ2-T	TO-263	G	D	S	Tube
UTT65N20L-TQ2-R	UTT65N20G-TQ2-R	TO-263	G	D	S	Tape Reel
UTT65N20L-T47-T	UTT65N20G-T47-T	TO-247	G	D	S	Tube

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



(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2
T47: TO-247, TQ2: TO-263
(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}	200	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current		I_D	65	A
Pulsed Drain Current (Note 2)		I_{DM}	130	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	15.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	33.1	V/ns
Power Dissipation	TO-220/TO-263	P_D	130	W
	TO-220F1/TO-220F2		52	W
	TO-247		180	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} = 17.7A, V_{DD} = 50V, R_G = 25 Ω Starting T_J = 25°C.
4. I_{SD} ≤ 30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

■ THERMAL DATA

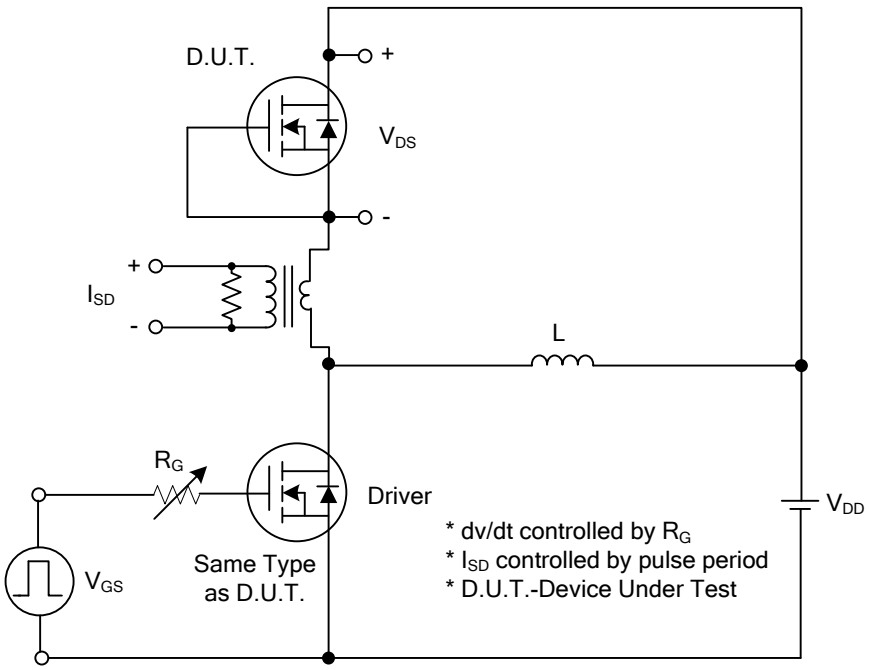
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F1 TO-220F2/TO-263	θ_{JA}	62.5	°C/W
	TO-247		50	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	0.96	°C/W
	TO-220F1/TO-220F2		2.4	°C/W
	TO-247		0.69	°C/W

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

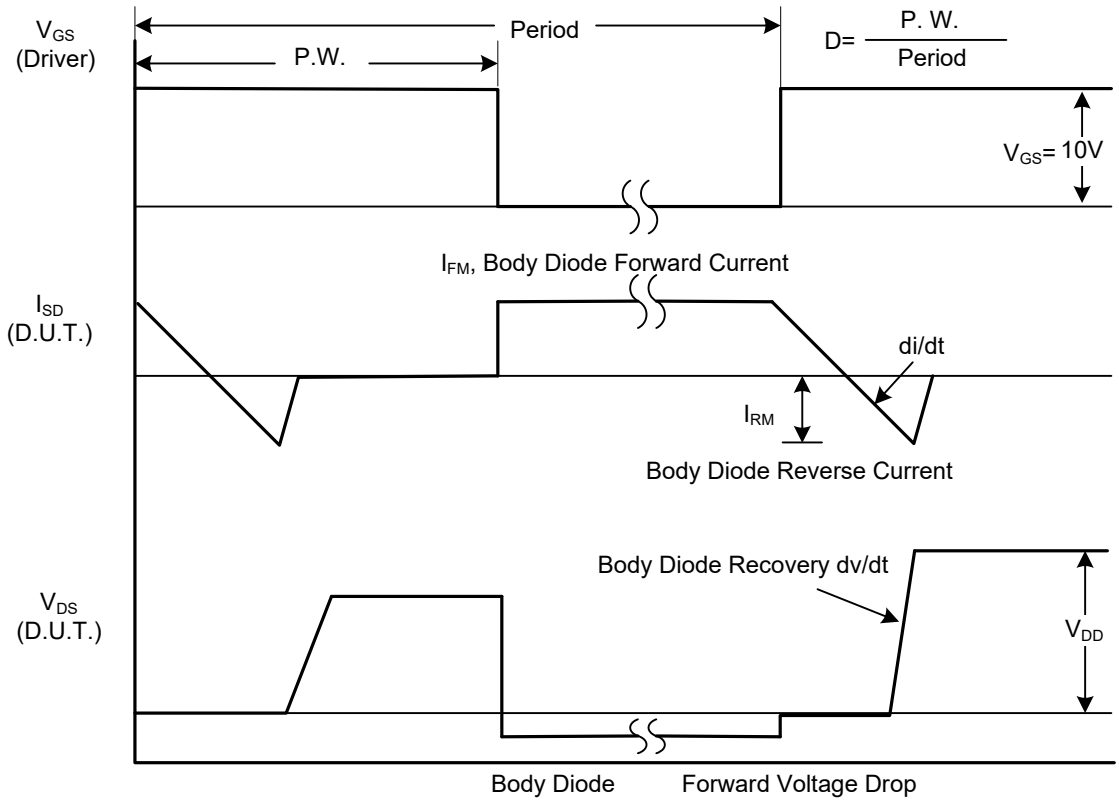
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250μA	200			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=200V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=32.5A			32	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		8375		pF
Output Capacitance		C_{OSS}			408.6		pF
Reverse Transfer Capacitance		C_{RSS}			269.4		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=160V, V_{GS}=10V, I_D=65A I_G=1mA (Note 1, 2)		173.3		nC
Gate-Source Charge		Q_{GS}			67		nC
Gate-Drain Charge		Q_{GD}			43.6		nC
Turn-On Delay Time (Note 1)		$t_{D(ON)}$	V_{DS}=100V, V_{GS}=10V, I_D=65A, R_G=6Ω (Note 1, 2)		42.4		ns
Turn-On Rise Time		t_R			26.1		ns
Turn-Off Delay Time		$t_{D(OFF)}$			109		ns
Turn-Off Fall Time		t_F			51.8		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I_S				65	A
Maximum Body-Diode Pulsed Current		I_{SM}				130	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=65A , V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=65A , V_{GS}=0V di/dt=100A/μs		170		ns
Reverse Recovery Charge		Q_{rr}			2.1		μC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

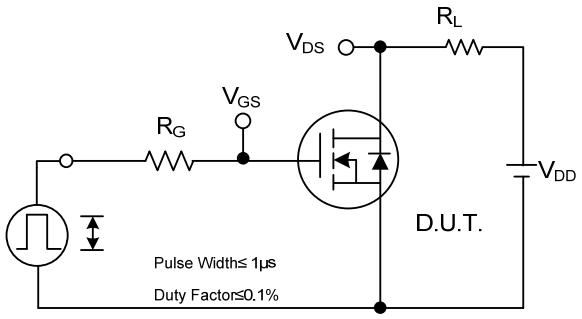


Peak Diode Recovery dv/dt Test Circuit

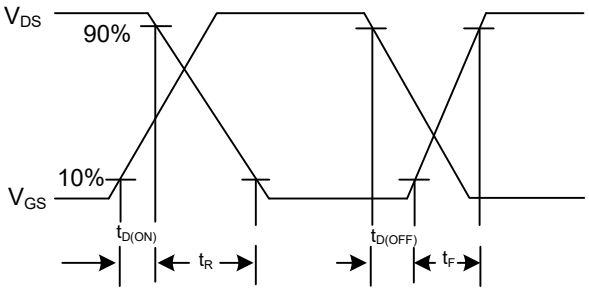


Peak Diode Recovery dv/dt Waveforms

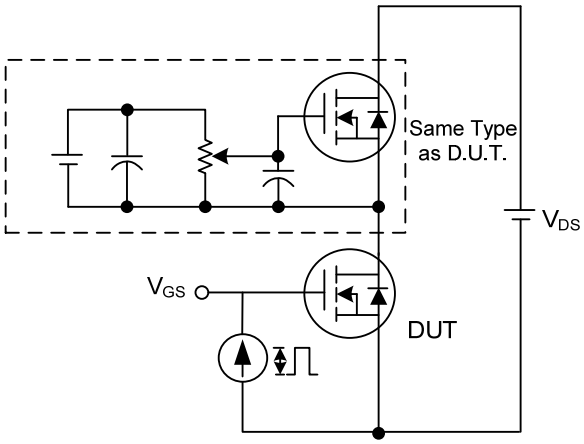
■ TEST CIRCUITS AND WAVEFORMS



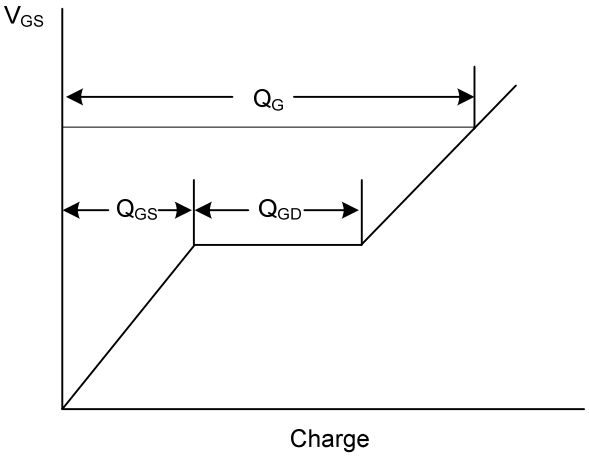
Switching Test Circuit



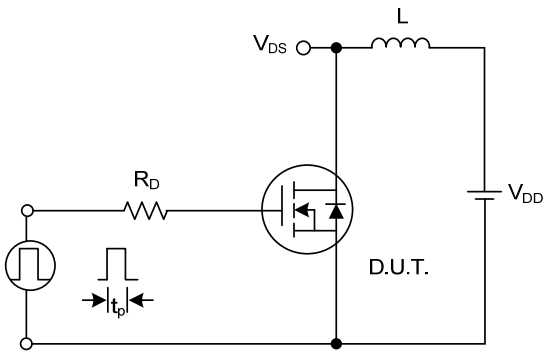
Switching Waveforms



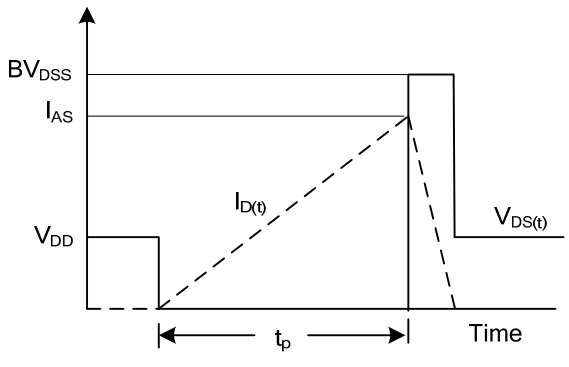
Gate Charge Test Circuit



Gate Charge Waveform



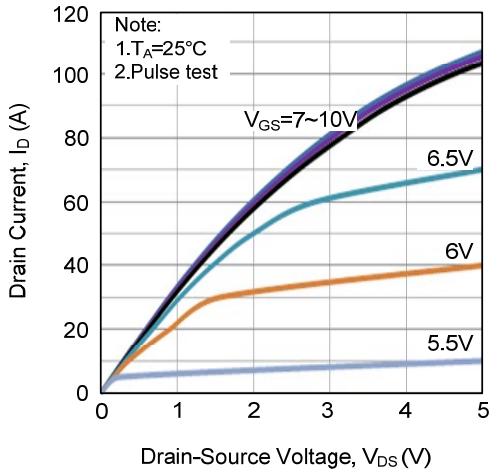
Unclamped Inductive Switching Test Circuit



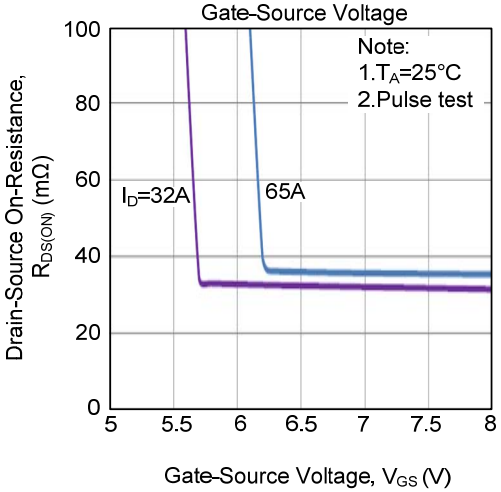
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

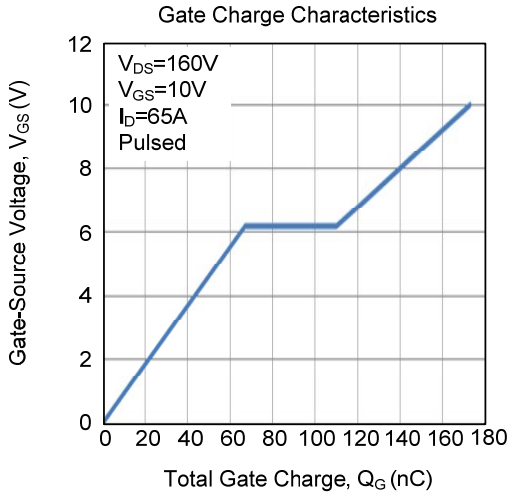
Drain Current vs. Drain-Source Voltage



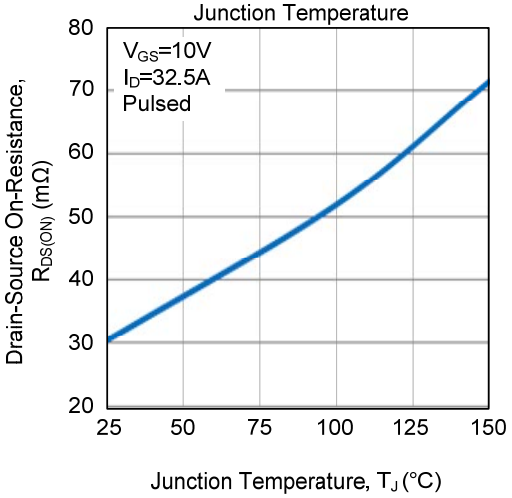
Drain-Source On-Resistance vs. Gate-Source Voltage



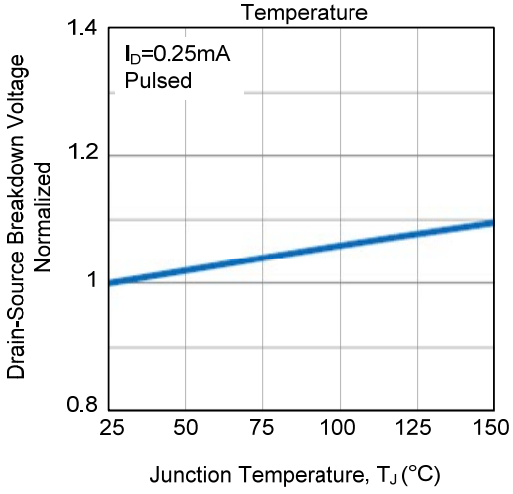
Gate Charge Characteristics



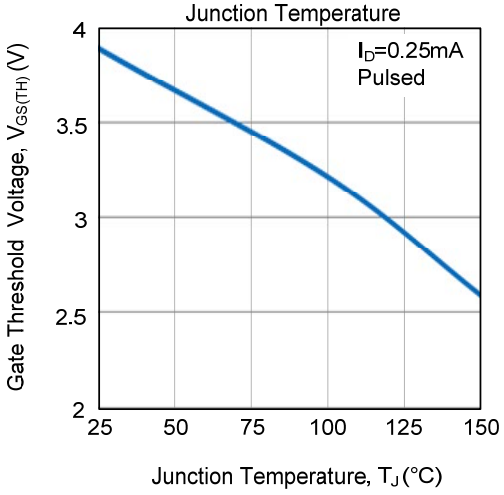
Drain-Source On-Resistance vs. Junction Temperature



Breakdown Voltage vs. Junction Temperature

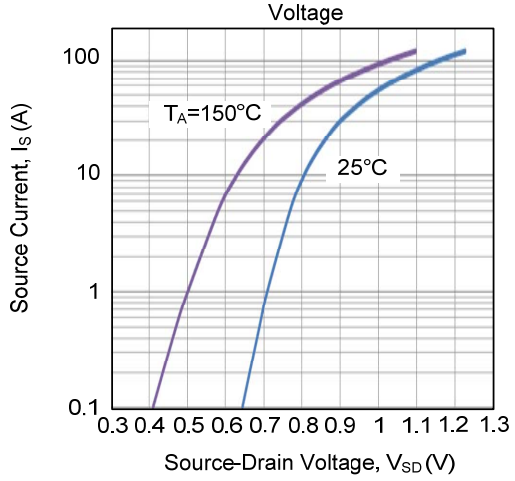


Gate Threshold Voltage vs. Junction Temperature

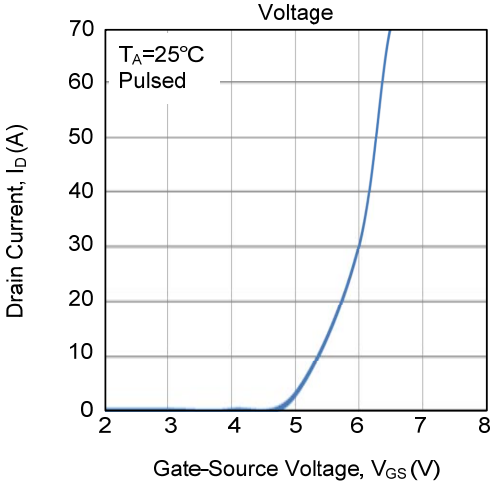


■ TYPICAL CHARACTERISTICS (Cont.)

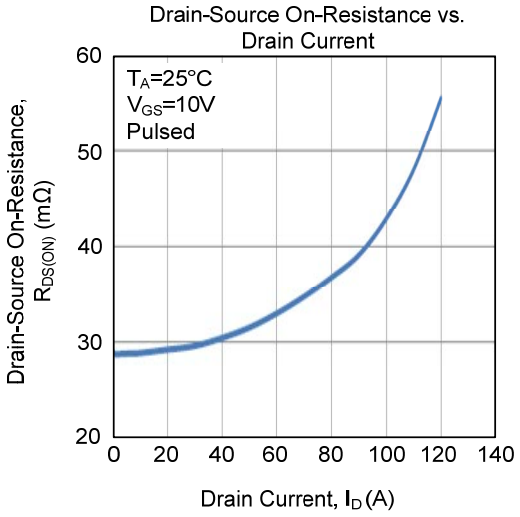
Source Current vs. Source-Drain Voltage



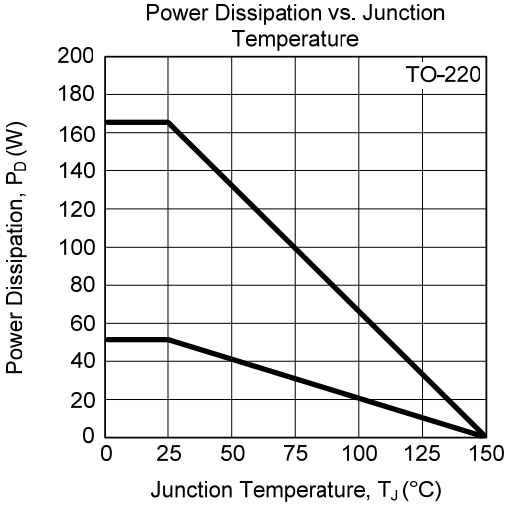
Drain Current vs. Gate-Source Voltage



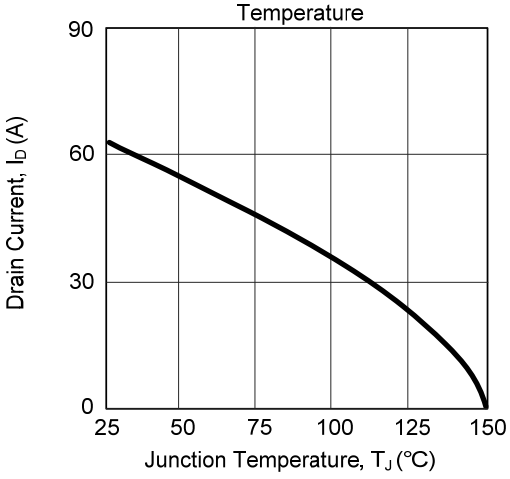
Drain-Source On-Resistance vs. Drain Current



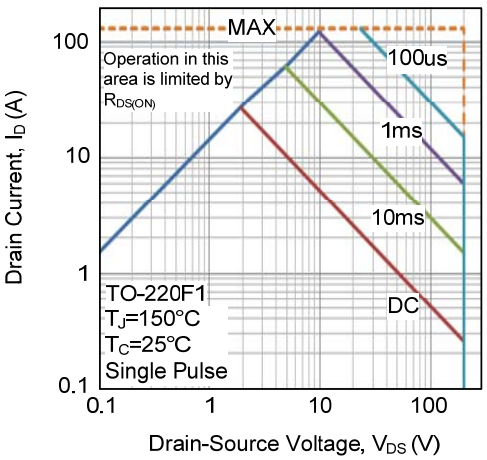
Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



Safe Operating Area



■ TYPICAL CHARACTERISTICS (Cont.)