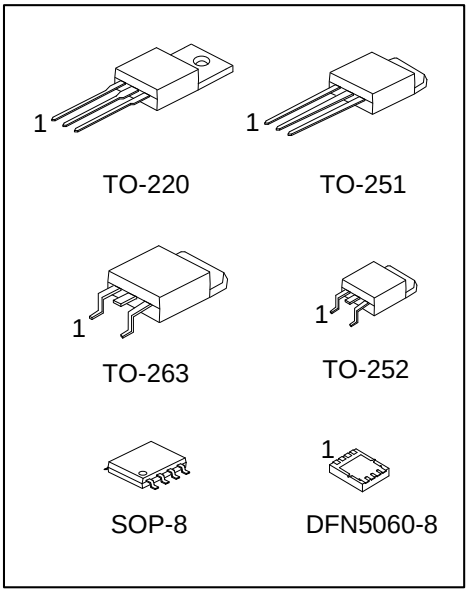
UTT20N06

Power MOSFET

20A, 60V N-CHANNEL POWER MOSFET



■ DESCRIPTION

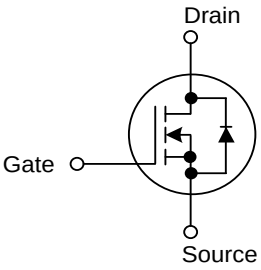
The UTC **UTT20N06** is an N-channel enhancement mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **UTT20N06** is universally applied in low voltage, such as automotive, high efficiency switching for DC/DC converters and DC motor control.

■ FEATURES

* $R_{DS(ON)}$ ≤ 50 mΩ @ V_{GS}=10V, I_D=5.0A
  $R_{DS(ON)}$ ≤ 65 mΩ @ V_{GS}=4.5V, I_D=5.0A
* High switching speed

■ SYMBOL



■ ORDERING INFORMATION

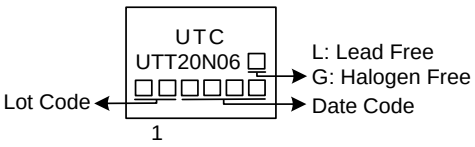
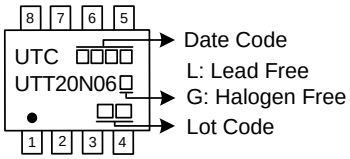
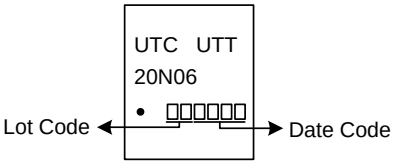
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UTT20N06L-TA3-T	UTT20N06G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UTT20N06L-TM3-T	UTT20N06G-TM3-T	TO-251	G	D	S						Tube
UTT20N06L-TN3-R	UTT20N06G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UTT20N06L-TQ2-T	UTT20N06G-TQ2-T	TO-263	G	D	S	-	-	-	-	-	Tube
UTT20N06L-TQ2-R	UTT20N06G-TQ2-R	TO-263	G	D	S	-	-	-	-	-	Tape Reel
UTT20N06L-S08-R	UTT20N06G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UTT20N06L-K08-5060-R	UTT20N06G-K08-5060-R	DFN5060-8	S	S	S	G	D	D	D	D	Tape Reel

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

UTT20N06G-TA3-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TM3: TO-251, TN3: TO-252
TQ2: TO-263, S08: SOP-8, K08-5060: DFN5060-8
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
TO-220 / TO-251 TO-252 / TO-263	
SOP-8	
DFN5060-8	

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	20	A
	Pulsed	I_{DM}	40	A
Single Pulsed Avalanche Energy		E_{AS}	170	mJ
Power Dissipation	TO-220/TO-263	P_D	89	W
	TO-251/TO-252		50	W
	SOP-8		5.2	W
	DFN5060-8		30	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62	°C/W
	TO-251/TO-252		110	°C/W
	SOP-8		100 (Note)	°C/W
	DFN5060-8		35 (Note)	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	1.4	°C/W
	TO-251/TO-252		2.5 (Note)	°C/W
	SOP-8		24 (Note)	°C/W
	DFN5060-8		4.16 (Note)	°C/W

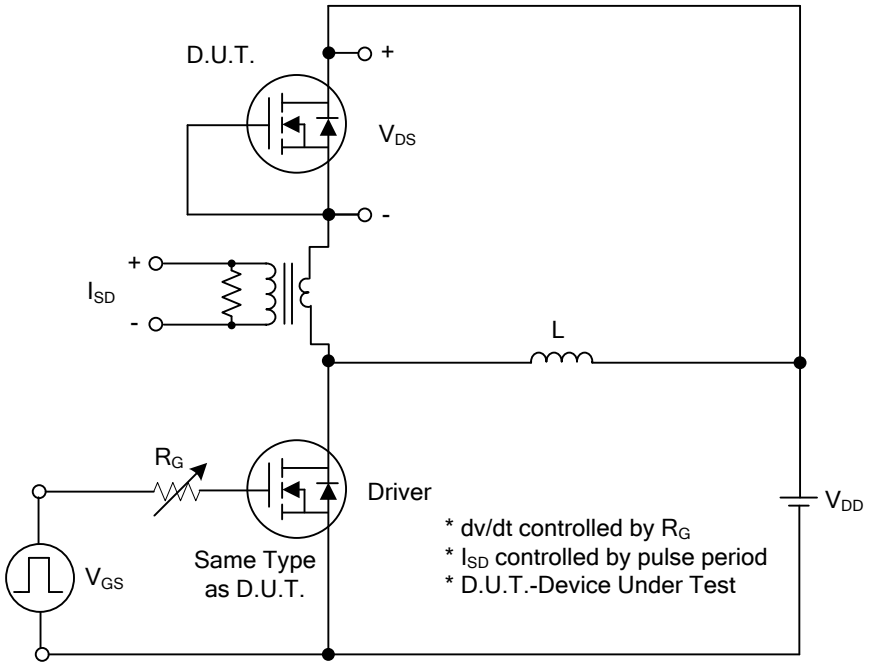
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

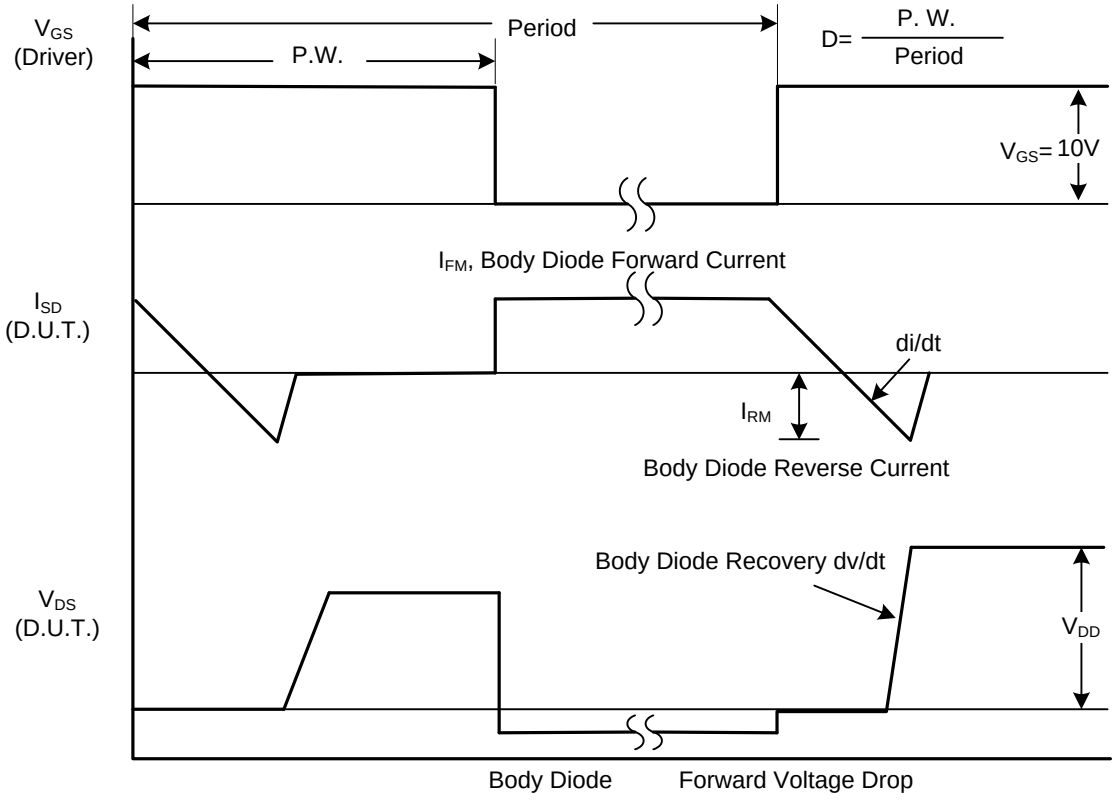
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=60V, V_{GS}=0V			1	μA
			V_{DS}=48V, V_{GS}=0V, T_C=125°C			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+16V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-16V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=5.0A			50	mΩ
			V_{GS}=4.5V, I_D=5.0A			65	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		850		pF
Output Capacitance		C_{OSS}			65		pF
Reverse Transfer Capacitance		C_{RSS}			52		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=10V, V_{GS}=30V, I_D=20A I_G=1mA (Note 1, 2)		20		nC
Gate to Source Charge		Q_{GS}			3		nC
Gate to Drain Charge		Q_{GD}			3		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DS}=30V, V_{GS}=10V, I_D=20A, R_G=3.3Ω (Note 1, 2)		8		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			20		ns
Fall-Time		t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				20	A
Maximum Body-Diode Pulsed Current		I_{SM}				40	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=20A, V_{GS}=0V			1.2	V
Reverse Recovery Time		t_{rr}	I_S=20A, V_{GS}=0V, dI/dt=100A/μs		45		nS
Reverse Recovery Charge		Q_{rr}			90		nC

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

■ TEST CIRCUITS AND WAVEFORMS

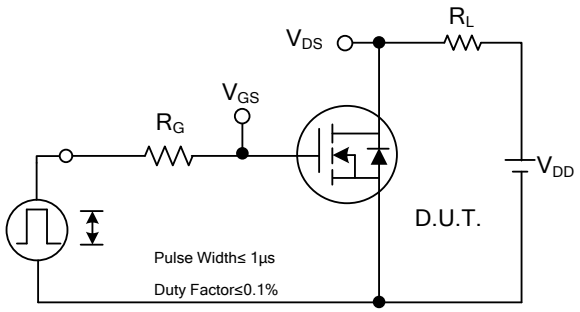


Peak Diode Recovery dv/dt Test Circuit

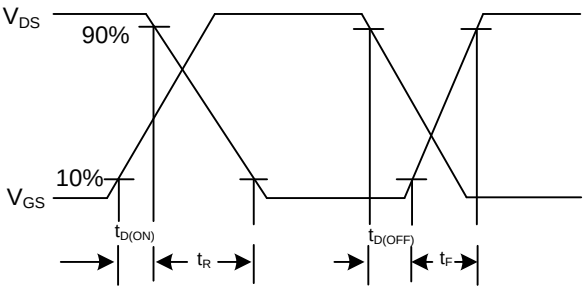


Peak Diode Recovery dv/dt Waveforms

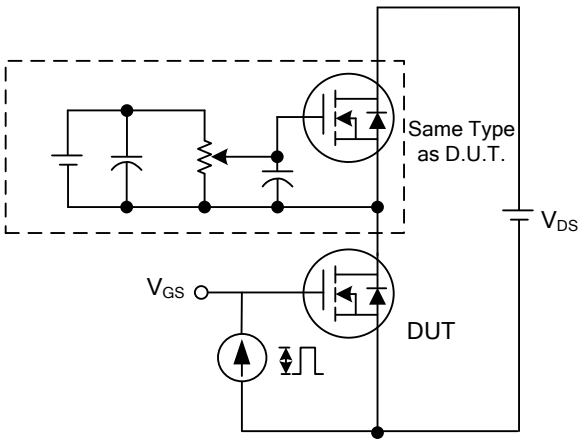
■ TEST CIRCUITS AND WAVEFORMS



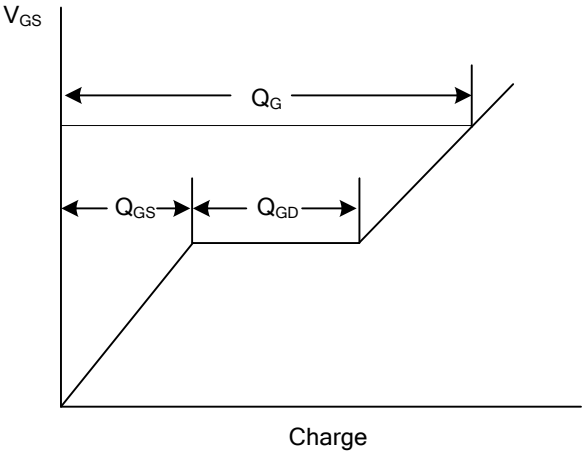
Switching Test Circuit



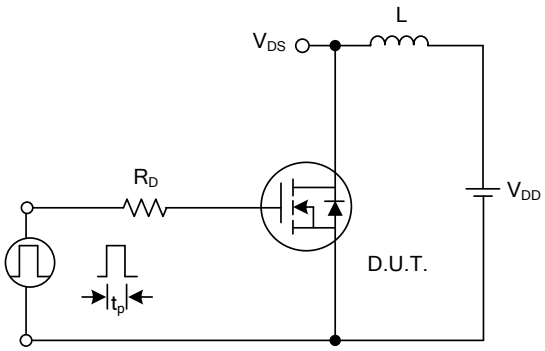
Switching Waveforms



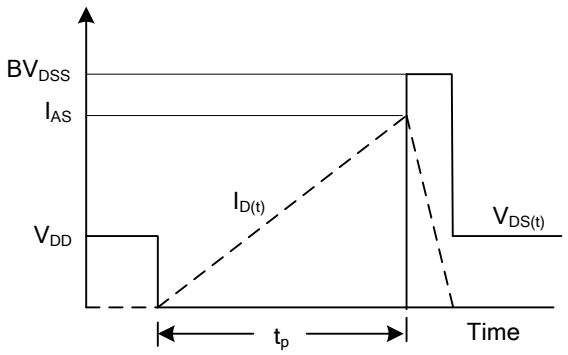
Gate Charge Test Circuit



Gate Charge Waveform



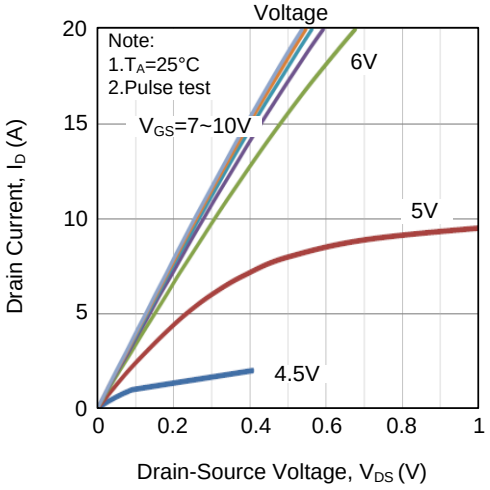
Unclamped Inductive Switching Test Circuit



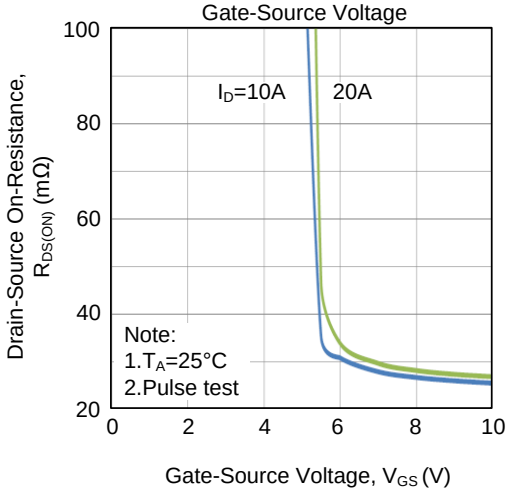
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

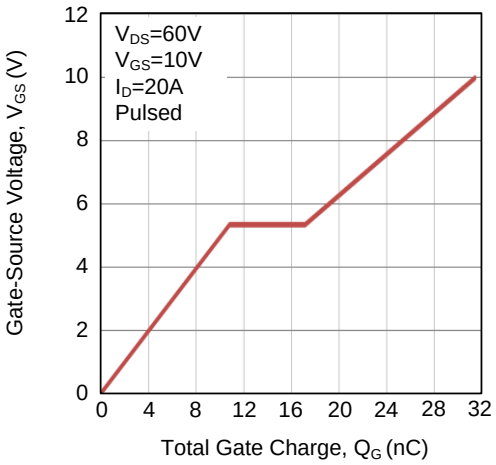
Drain Current vs. Drain-Source Voltage



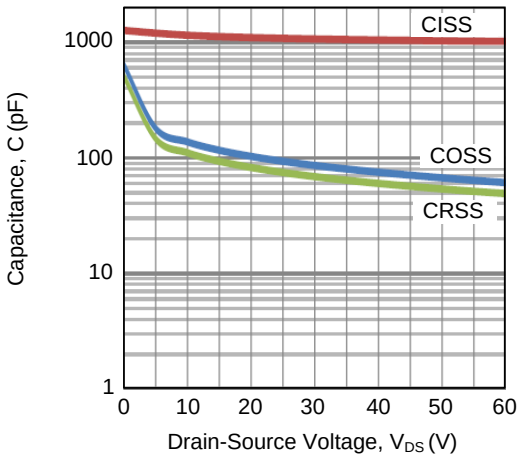
Drain-Source On-Resistance vs. Gate-Source Voltage



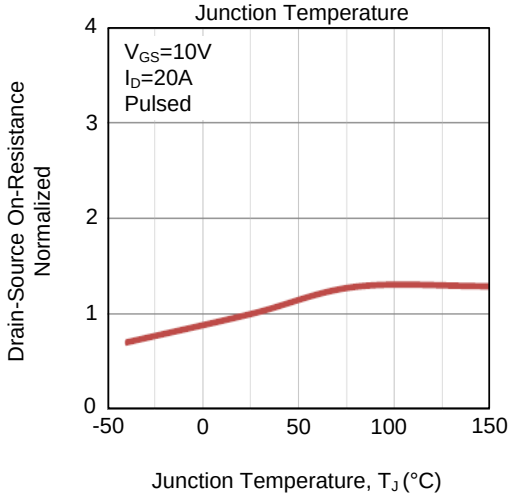
Gate Charge Characteristics



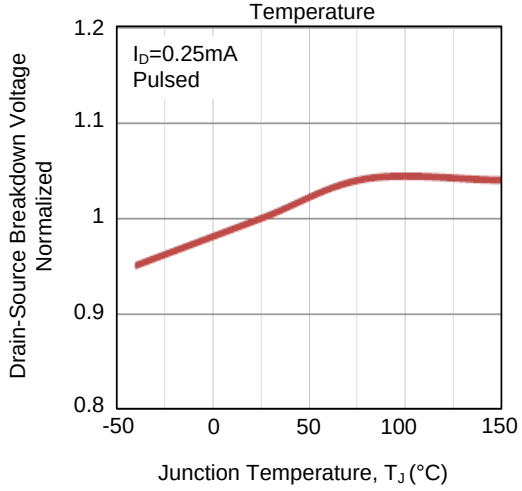
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

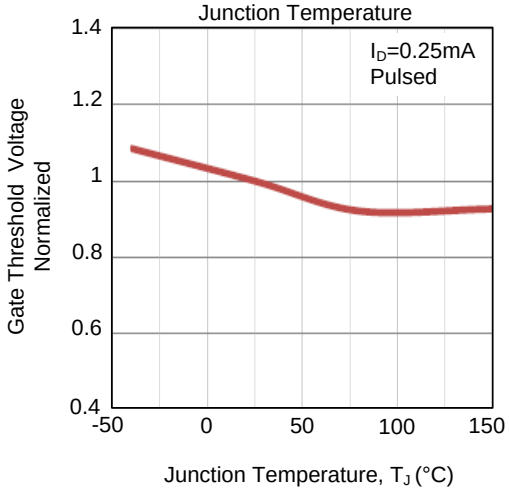


Breakdown Voltage vs. Junction Temperature

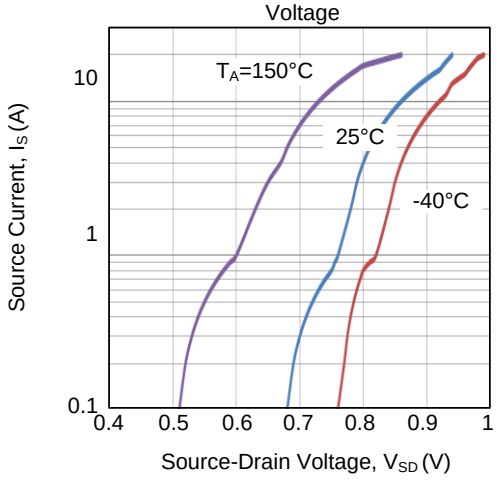


■ TYPICAL CHARACTERISTICS (Cont.)

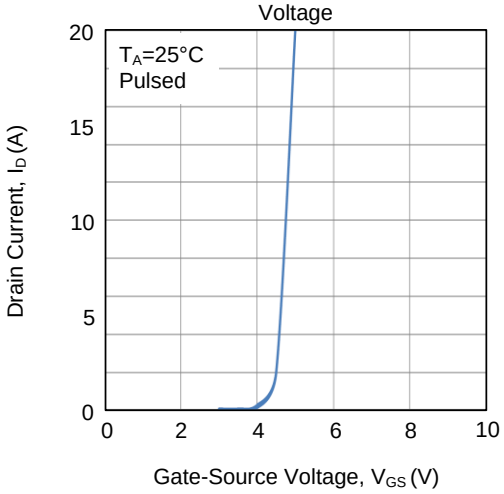
Gate Threshold Voltage vs. Junction Temperature



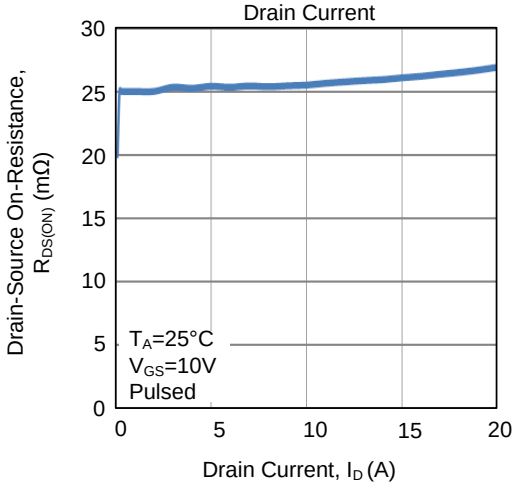
Source Current vs. Source-Drain Voltage



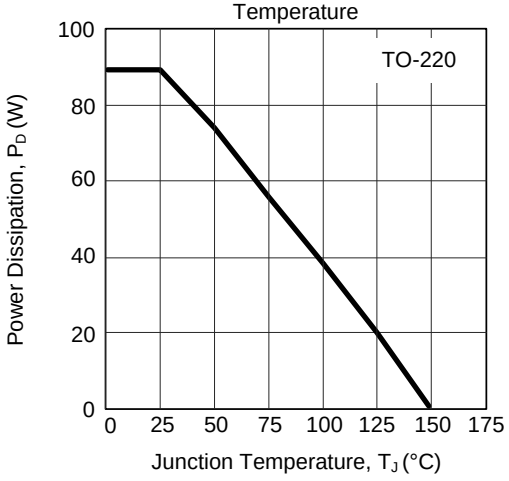
Drain Current vs. Gate-Source Voltage



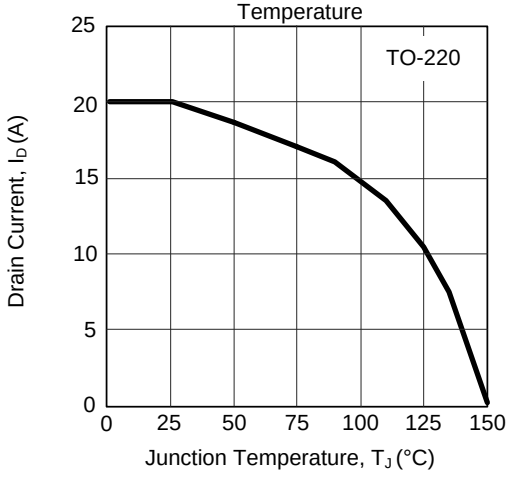
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)