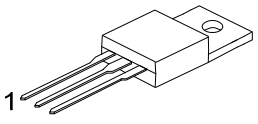
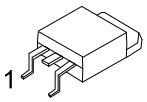
UT120N03

Power MOSFET

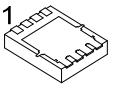
120A, 30V N-CHANNEL ENHANCEMENT MODE



TO-220



TO-252



PDFN5×6

■ DESCRIPTION

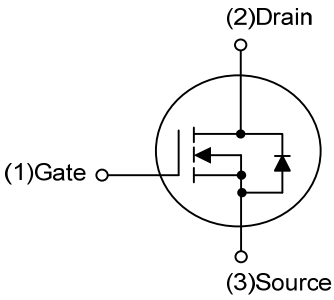
The **UT120N03** is a N-channel power MOSFET using UTC's advanced trench technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UT120N03** is generally applied in DC to DC convertors or synchronous rectifications.

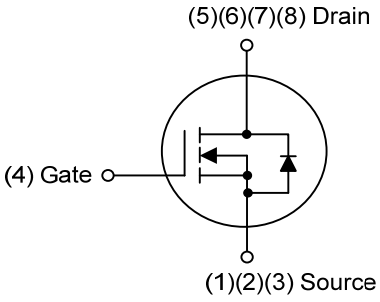
■ FEATURES

* $R_{DS(ON)}$ ≤ 4.0 mΩ @ V_{GS}=10V, I_D=60A
  $R_{DS(ON)}$ ≤ 6.6 mΩ @ V_{GS}=4.5V, I_D=60A
* Fast Switching
* 100% Avalanche Tested
* High Power and Current Handling Capability

■ SYMBOL



TO-220/TO-252



PDFN5×6

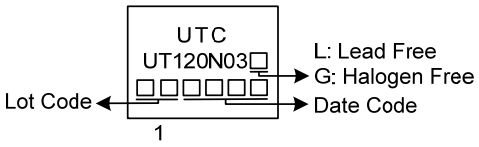
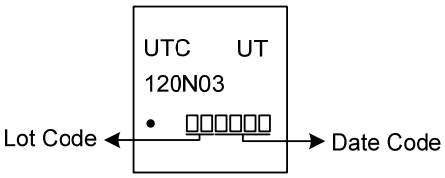
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT120N03L-TA3-T	UT120N03G-TA3-T	TO-220	G	D	S	-	-	-	-	-	Tube
UT120N03L-TN3-R	UT120N03G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT120N03L-P5060-R	UT120N03G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT120N03G-TA3-T (1)Packing Type (2)Package Type (3)Green Package	(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TN3: TO-252, P5060: PDFN5×6 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

TO-220 / TO-252	PDFN5×6
	

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	120	A
	Pulsed (Note 2)	I_{DM}	240	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	141	mJ
Power Dissipation	TO-220	P_D	125	W
	TO-252		52	W
	PDFN5×6		65	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} = 53A, V_{DD} = 30V, R_G = 25 Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-252		110	°C/W
	PDFN5×6		65 (Note)	°C/W
Junction to Case	TO-220	θ_{JC}	1	°C/W
	TO-252		2.4 (Note)	°C/W
	PDFN5×6		1.92 (Note)	°C/W

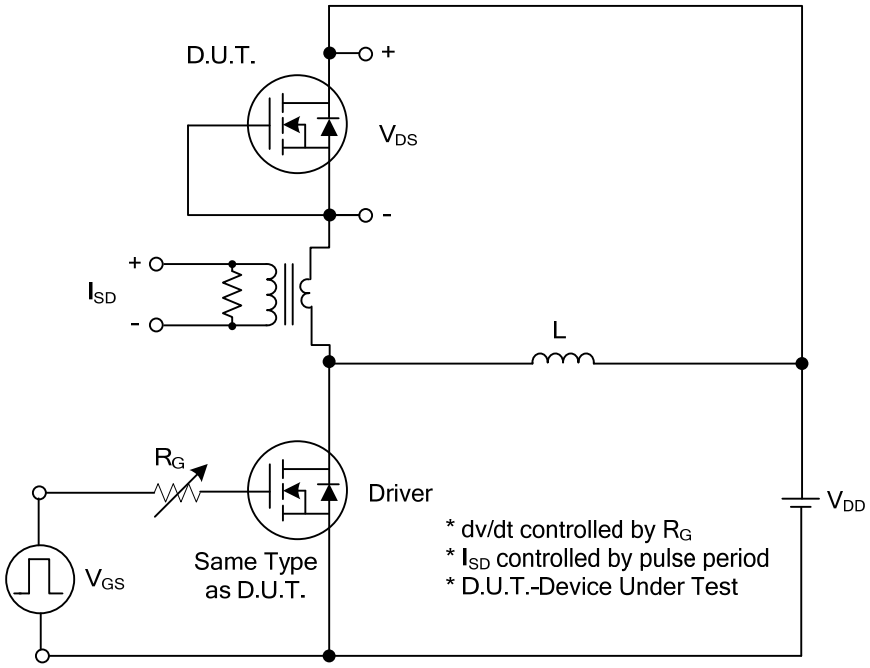
Note: The data tested by surface mounted on a 1 $inch^2$ FR-4 board with 2OZ copper.

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

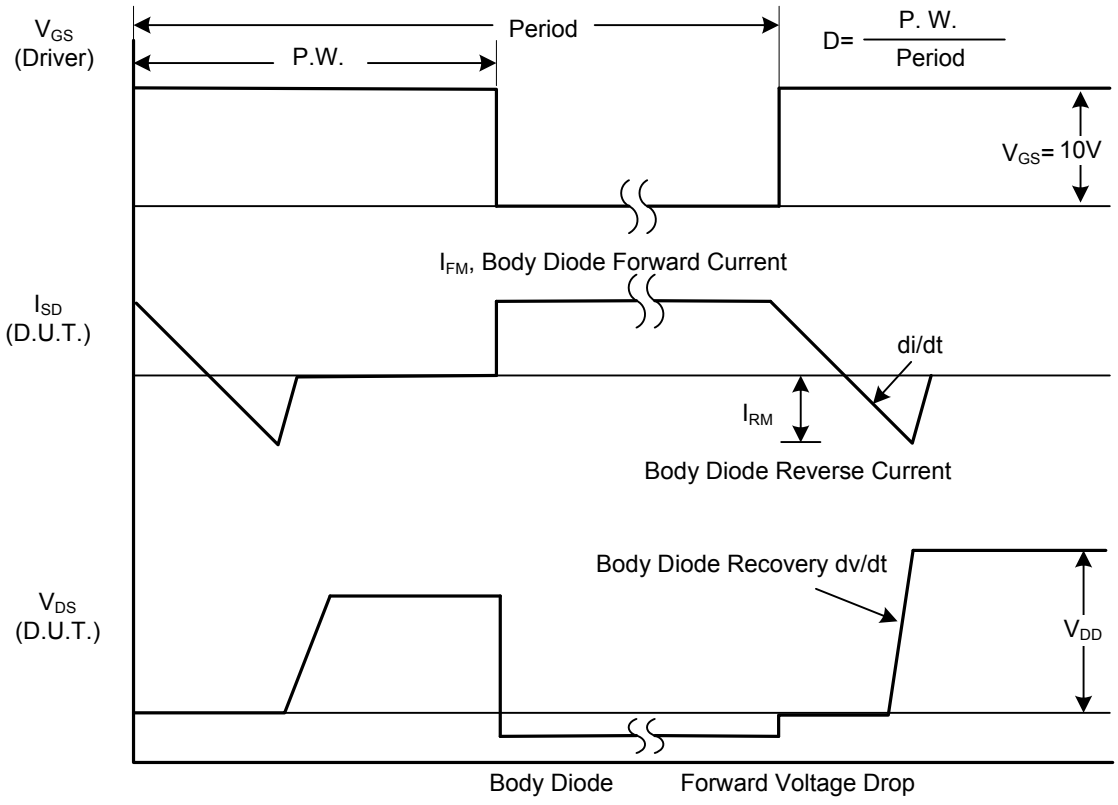
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=60A			4.0	mΩ
		V_{GS}=4.5V, I_D=60A			6.6	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz		4080		pF
Output Capacitance	C_{OSS}			820		pF
Reverse Transfer Capacitance	C_{RSS}			740		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS}=24V, V_{GS}=10V, I_D=120A, I_G=1mA (Note 1, 2)		146		nC
Gate Source Charge	Q_{GS}			12		nC
Gate Drain Charge	Q_{GD}			54		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=15V, V_{GS}=10V, I_D=120A, R_L=3Ω (Note 1, 2)		13.6		ns
Turn-ON Rise Time	t_R			22		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			80		ns
Turn-OFF Fall-Time	t_F			55		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				120	A
Maximum Body-Diode Pulsed Current	I_{SM}				240	A
Diode Forward Voltage	V_{SD}	I_S=120A, V_{GS}=0V			1.4	V

Notes: 1. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.
2. The power dissipation is limited by 150°C junction temperature.

■ TEST CIRCUITS AND WAVEFORMS

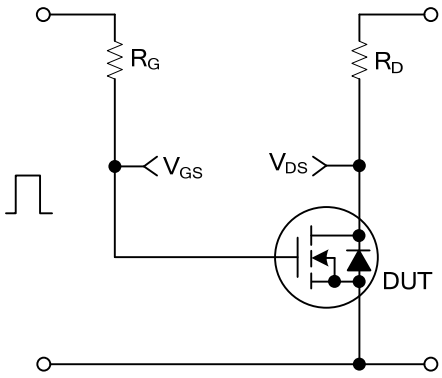


Peak Diode Recovery dv/dt Test Circuit

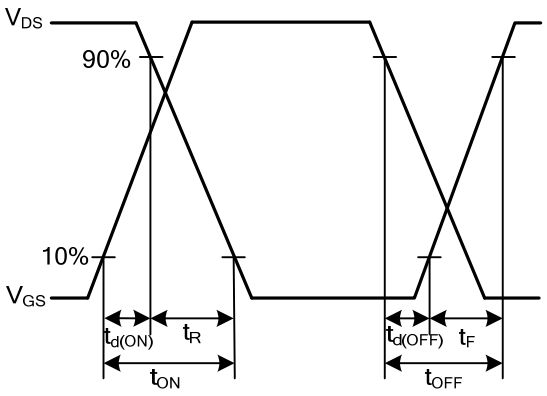


Peak Diode Recovery dv/dt Waveforms

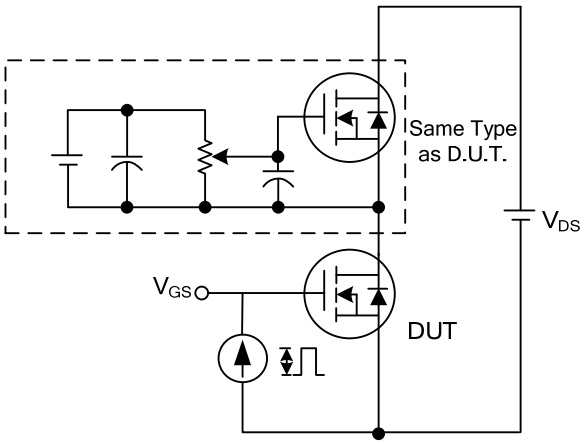
■ TEST CIRCUITS AND WAVEFORMS



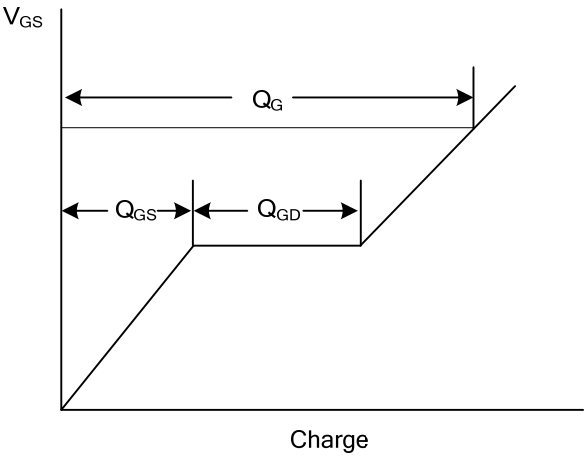
itching Test Circuit



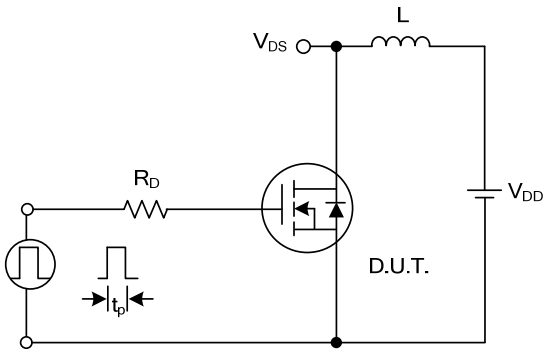
Switching Waveforms



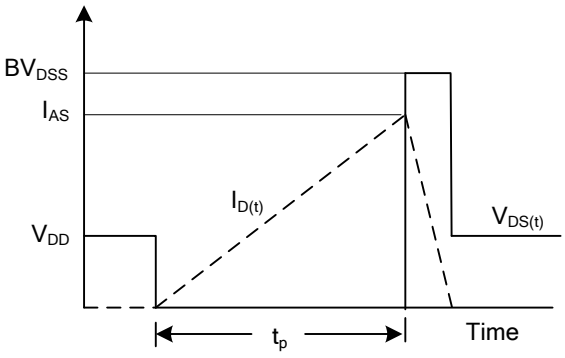
Gate Charge Test Circuit



Gate Charge Waveform

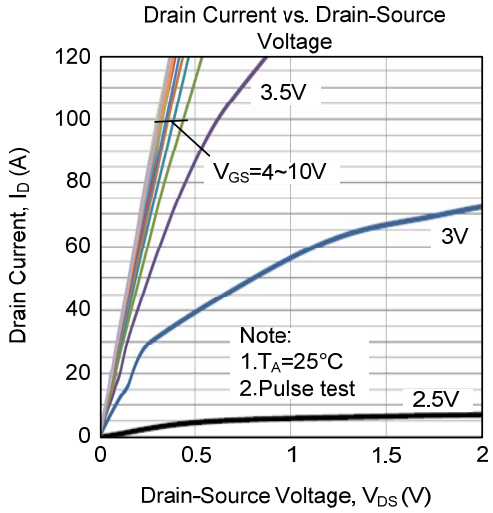


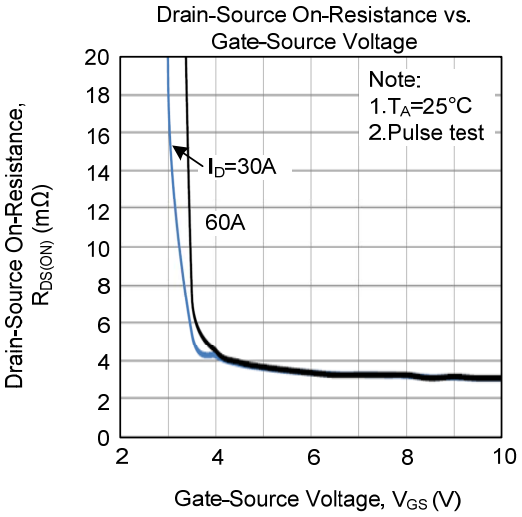
Unclamped Inductive Switching Test Circuit

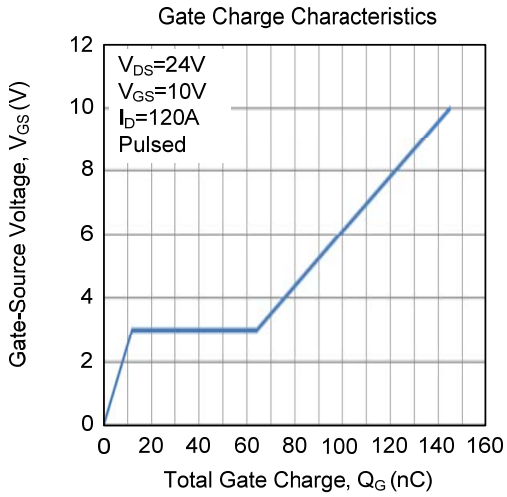


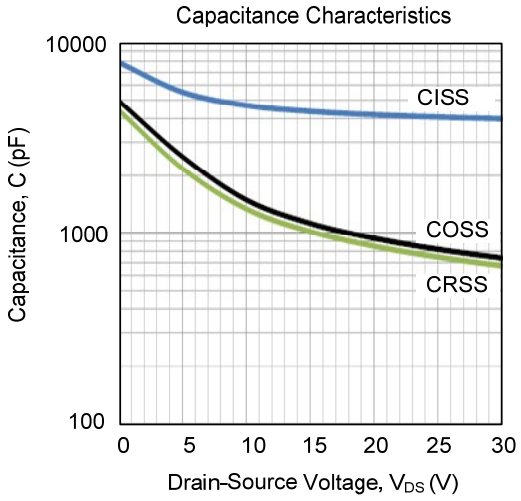
Unclamped Inductive Switching Waveforms

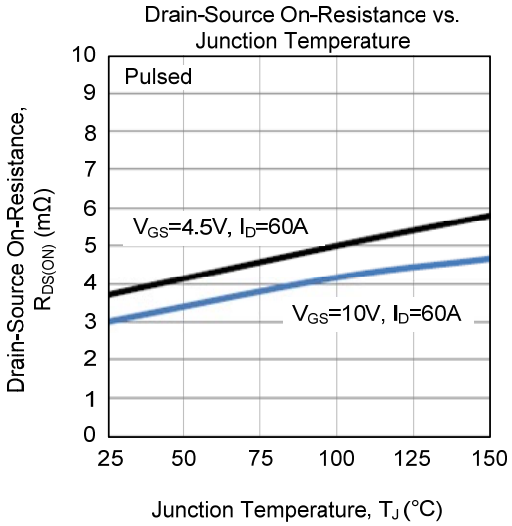
■ TYPICAL CHARACTERISTICS

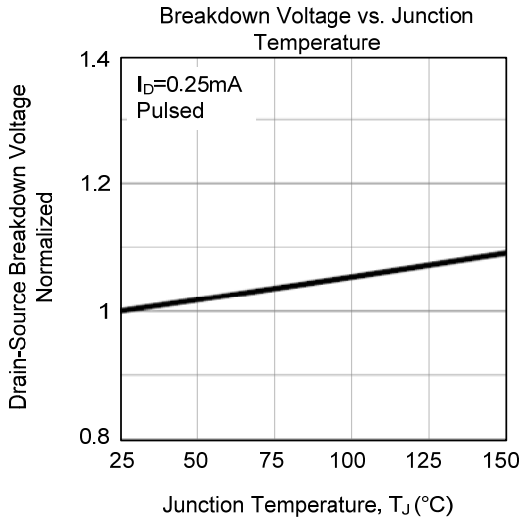






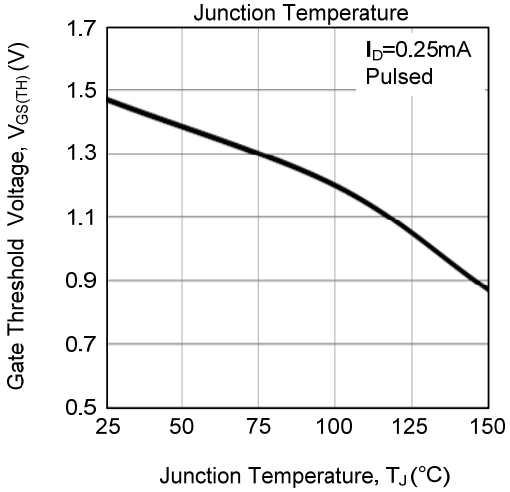




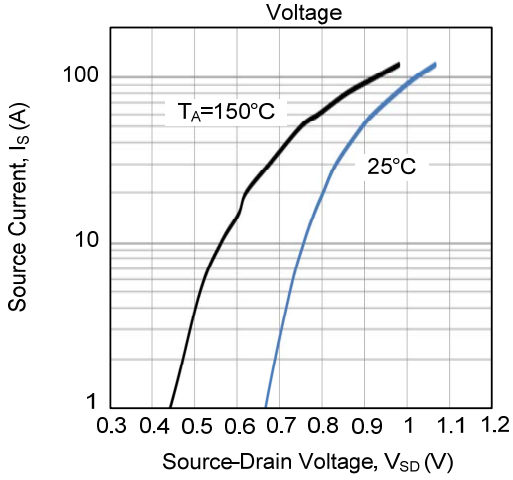


■ TYPICAL CHARACTERISTICS (Cont.)

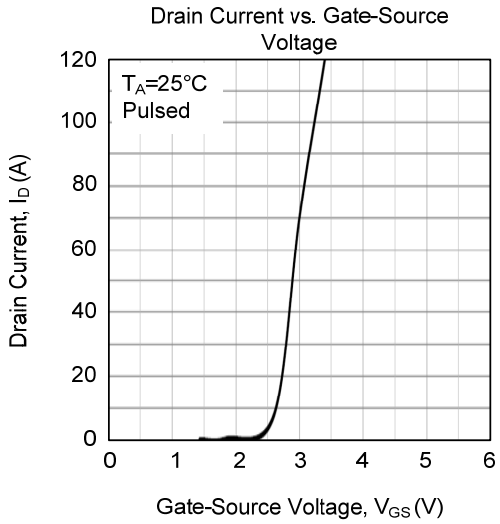
Gate Threshold Voltage vs. Junction Temperature



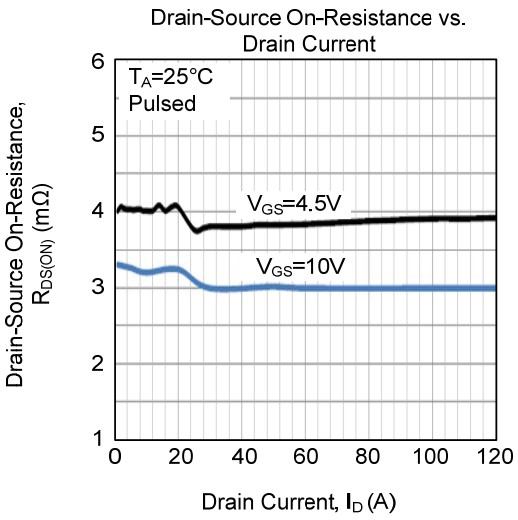
Source Current vs. Source-Drain Voltage



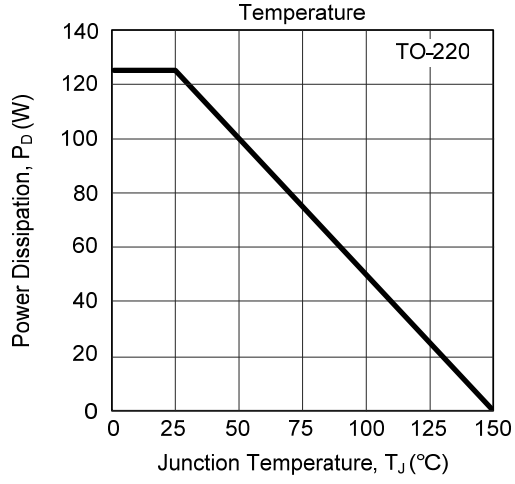
Drain Current vs. Gate-Source Voltage



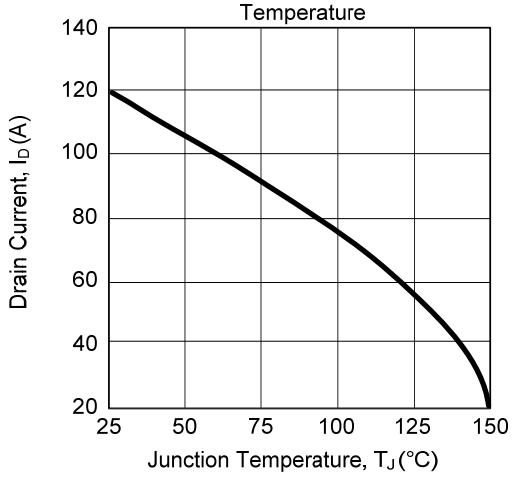
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)