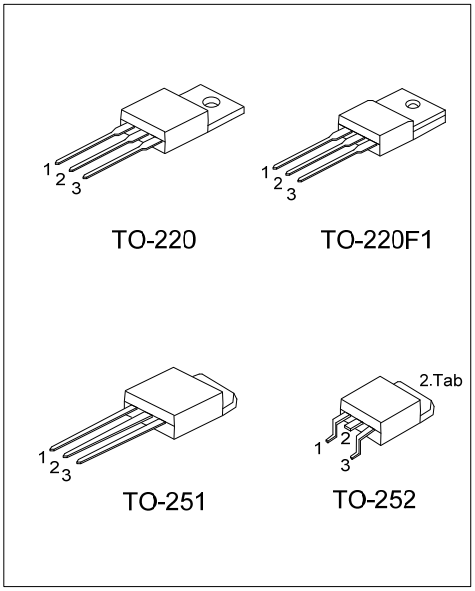
14.7A, 100V (D-S) N-CHANNEL POWER MOSFET



■ DESCRIPTION

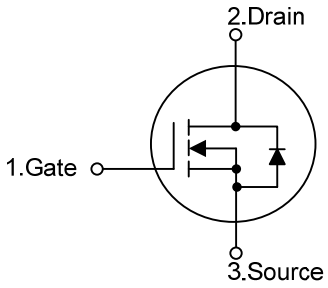
The UTC **15N10** is an N-Channel enhancement MOSFET, it uses UTC's advanced technology to provide customers with a minimum on-state resistance, high switching speed and low gate charge.

The UTC **15N10** is suitable for high efficiency switching DC/DC converter, LCD display inverter and load switch.

■ FEATURES

* $R_{DS(ON)}$ ≤ 100 mΩ @ V_{GS}=10V, I_D=8.0A
  $R_{DS(ON)}$ ≤ 110 mΩ @ V_{GS}=4.5V, I_D=8.0A
* High switching speed

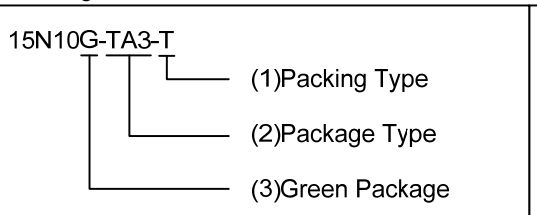
■ SYMBOL



■ ORDERING INFORMATION

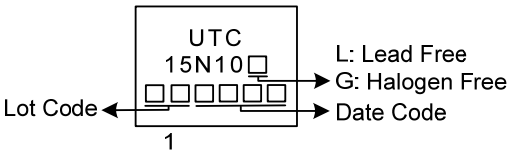
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
15N10L-TA3-T	15N10G-TA3-T	TO-220	G	D	S	Tube
15N10L-TF1-T	15N10G-TF1-T	TO-220F1	G	D	S	Tube
15N10L-TM3-T	15N10G-TM3-T	TO-251	G	D	S	Tube
15N10L-TN3-R	15N10G-TN3-R	TO-252	G	D	S	Tape Reel

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



(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF1: TO-220F1, TM3: TO-251
TN3: TO-252
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	100	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous	T_C=25°C	I_D	14.7	A
		T_C=70°C		13.6	A
	Pulsed		I_{DM}	30	A
Power Dissipation	T_C=25°C	TO-220	P_D	60	W
		TO-220F1		31	W
		TO-251 TO-252		34.7	W
Operating Junction Temperature			T_J	-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-220F1	θ_{JA}	62.5	°C/W
	TO-251/TO-252		110	°C/W
Junction to Case (Note)	TO-220	θ_{JC}	2.5	°C/W
	TO-220F1		4.03	°C/W
	TO-251/TO-252		3.6 (Note)	°C/W

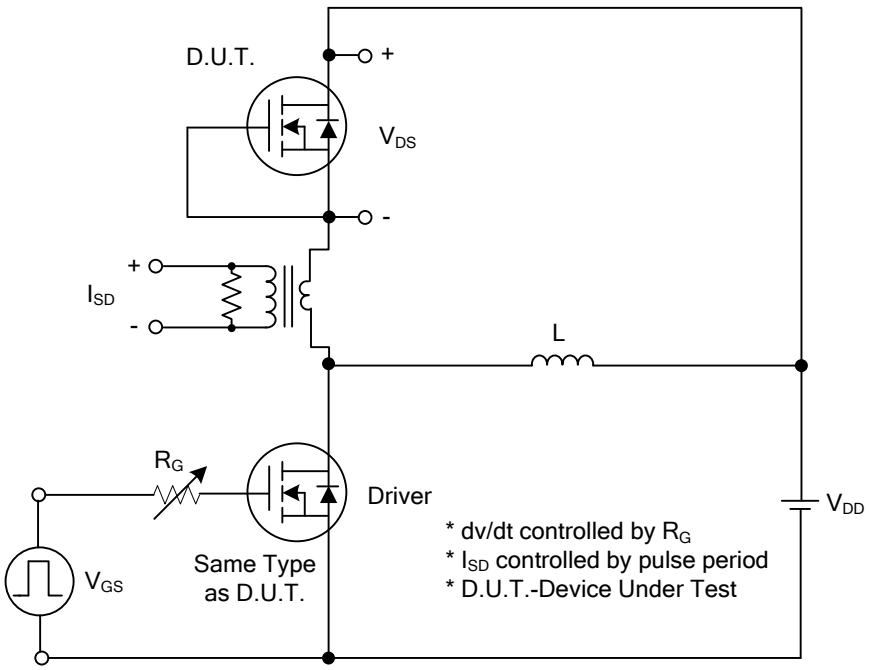
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

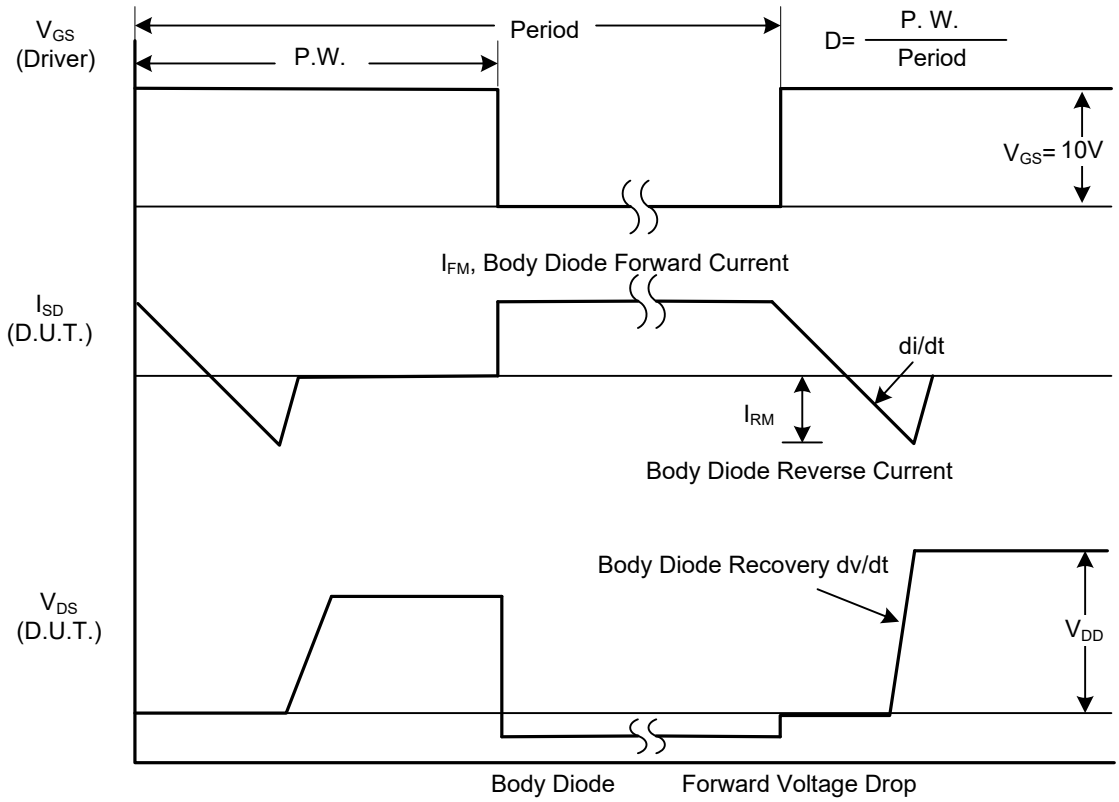
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	100			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=80V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Drain-Source On-State Resistance (Note)	$R_{DS(ON)}$	V_{GS}=10V, I_D=8.0A			100	mΩ
		V_{GS}=4.5V, I_D=8.0A			110	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1MHz		1411		pF
Output Capacitance	C_{OSS}			78		pF
Reverse Transfer Capacitance	C_{RSS}			65		pF
Gate-Resistance	R_G	V_{DS}=0V, V_{GS}=0V, f=1MHz		0.81		Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{GS}=10V, V_{DS}=80V, I_D=15A		34		nC
Total Gate Charge	Q_G	V_{GS}=4.5V, V_{DS}=80V, I_D=15A		18.4		nC
Gate to Source Charge	Q_{GS}			5.5		nC
Gate to Drain Charge	Q_{GD}			8		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DS}=50V, V_{GS}=10V, I_D=15A, R_G=25Ω		13		ns
Rise Time	t_R			22		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			100		ns
Fall-Time	t_F			43		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	I_S=8A, V_{GS}=0V		0.9	1.2	V

Note: Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%, Guaranteed by design, not subject to production testing.

■ TEST CIRCUITS AND WAVEFORMS

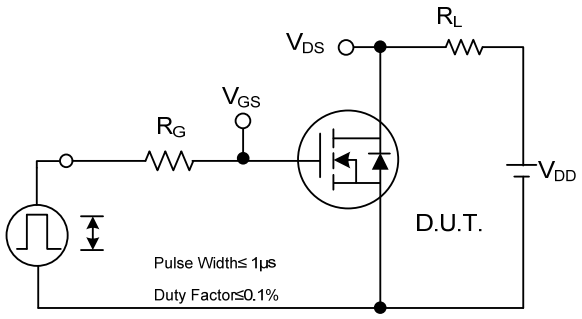


Peak Diode Recovery dv/dt Test Circuit

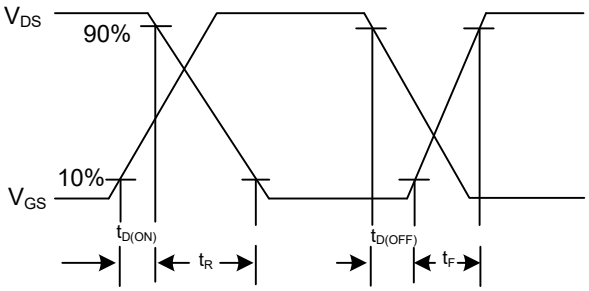


Peak Diode Recovery dv/dt Waveforms

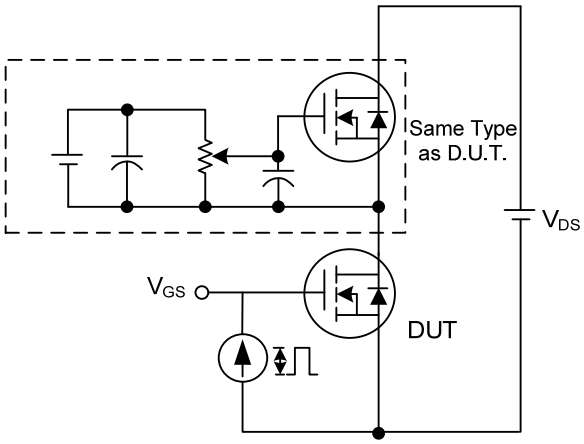
■ TEST CIRCUITS AND WAVEFORMS



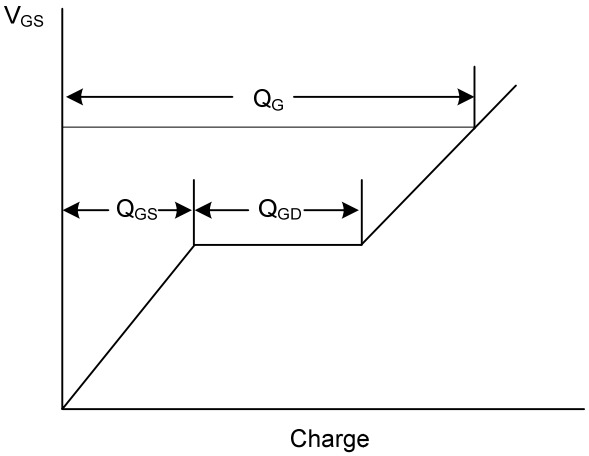
Switching Test Circuit



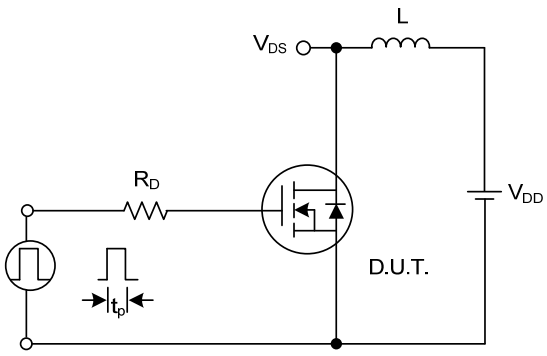
Switching Waveforms



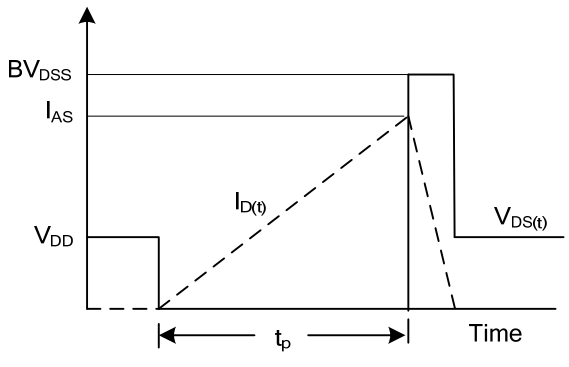
Gate Charge Test Circuit



Gate Charge Waveform



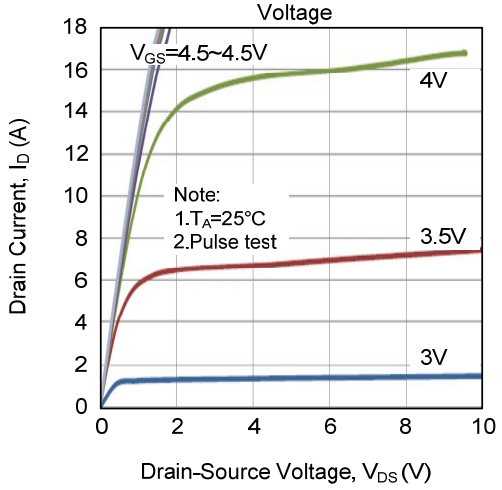
Unclamped Inductive Switching Test Circuit



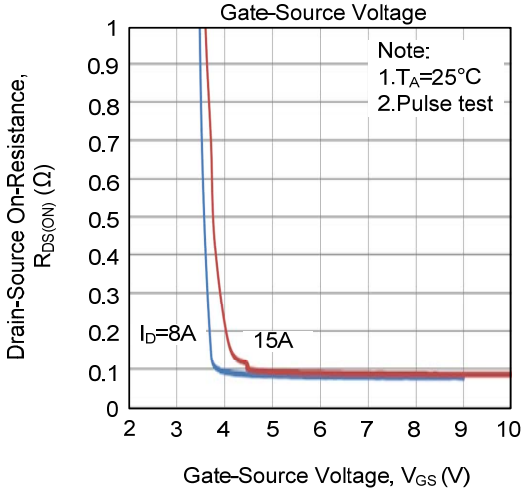
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

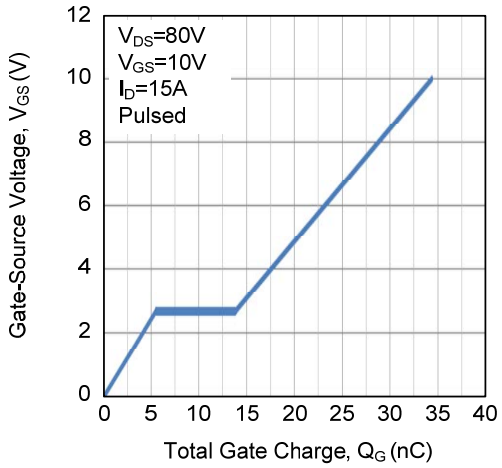
Drain Current vs. Drain-Source Voltage



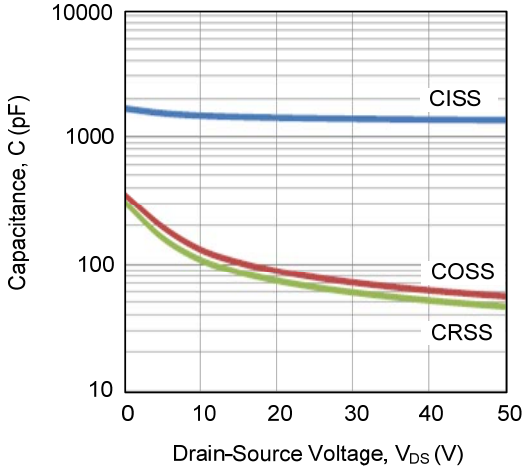
Drain-Source On-Resistance vs. Gate-Source Voltage



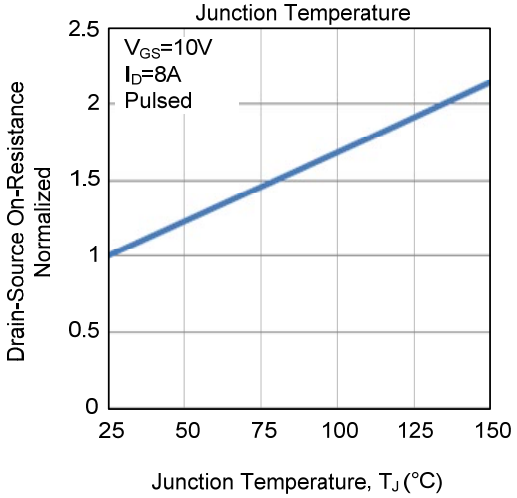
Gate Charge Characteristics



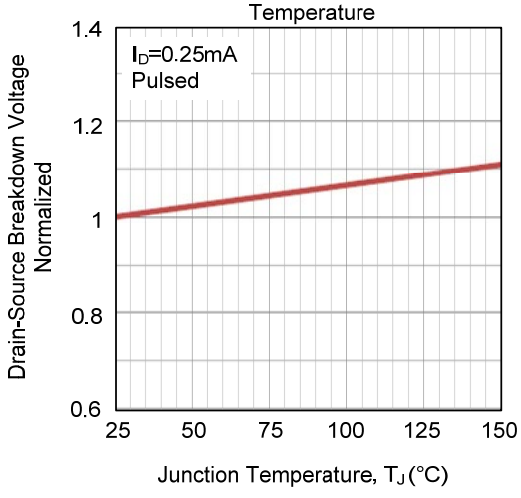
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

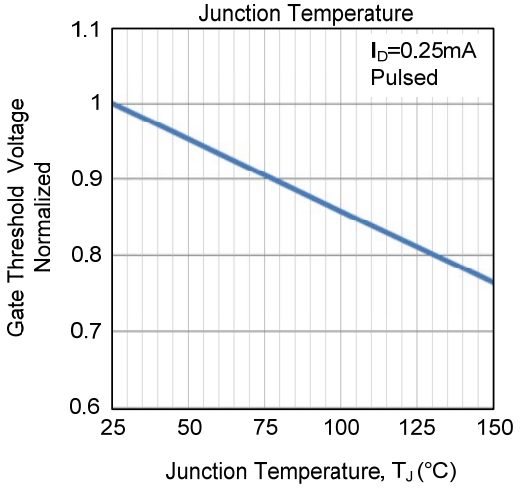


Breakdown Voltage vs. Junction Temperature

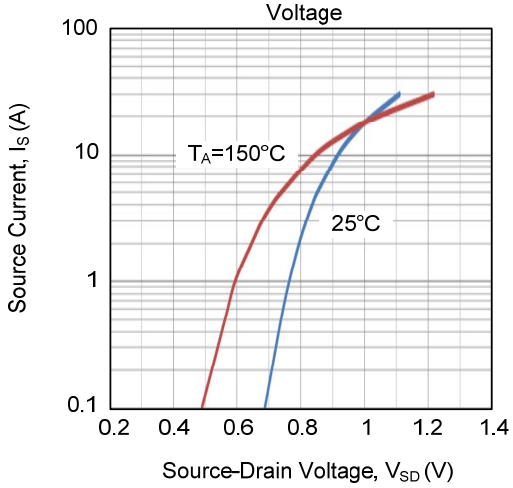


■ TYPICAL CHARACTERISTICS (Cont.)

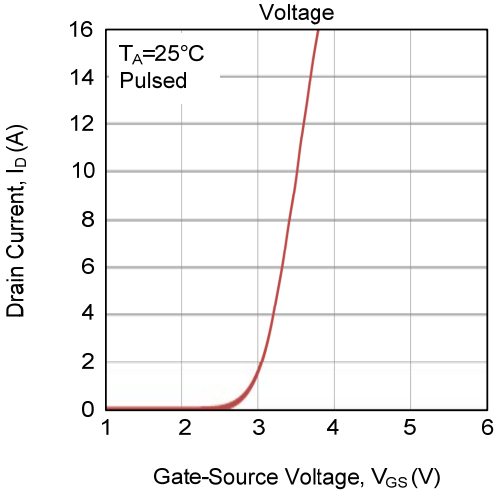
Gate Threshold Voltage vs. Junction Temperature



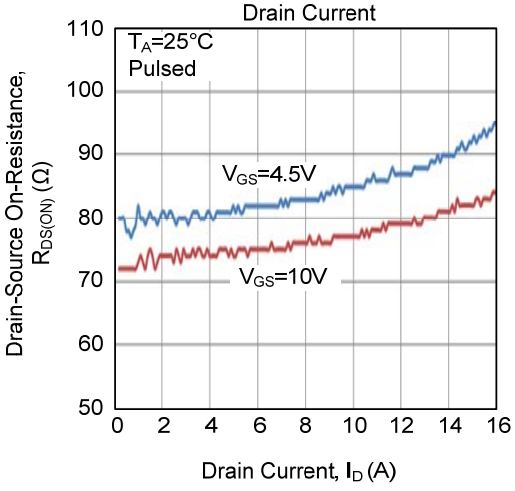
Source Current vs. Source-Drain Voltage



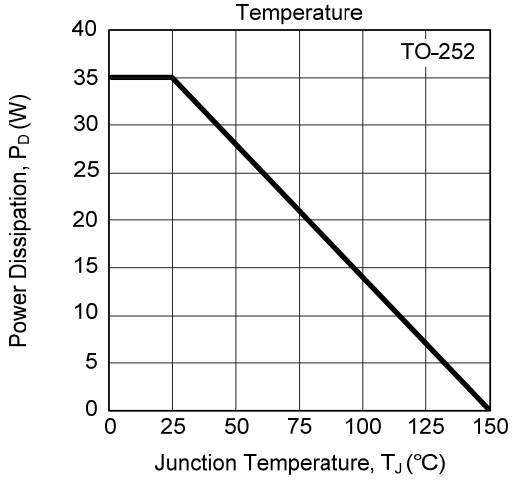
Drain Current vs. Gate-Source Voltage



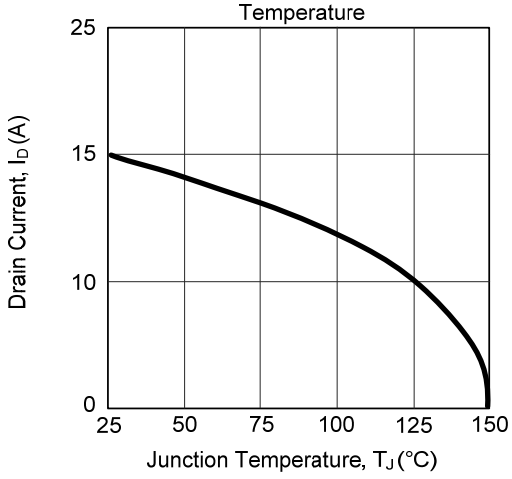
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)