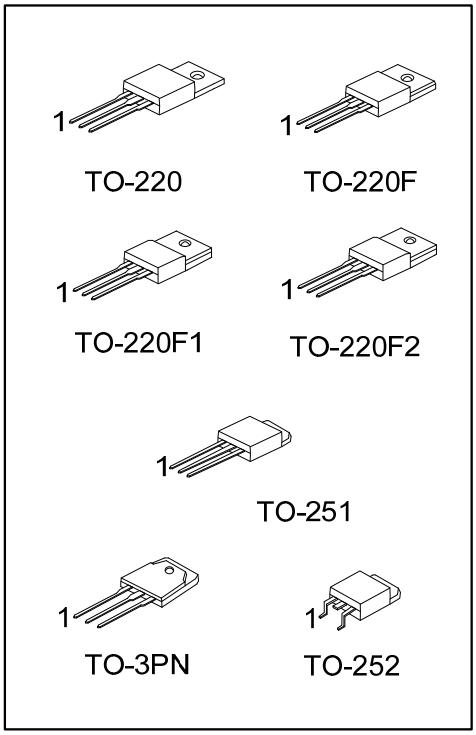
18N25-HC

Power MOSFET

18A, 250V N-CHANNEL POWER MOSFET



■ DESCRIPTION

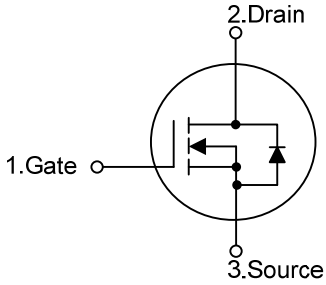
The UTC **18N25-HC** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **18N25-HC** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

■ FEATURES

* $R_{DS(ON)} \leq 0.24\ \Omega$ @ V_{GS}=10V, I_D=9.0A
* High Switching Speed

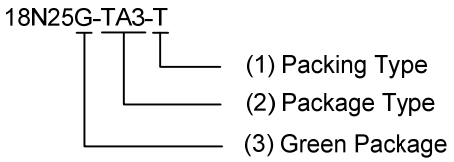
■ SYMBOL



■ ORDERING INFORMATION

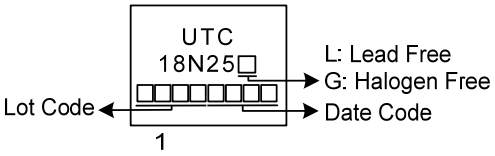
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18N25L-TA3-T	18N25G-TA3-T	TO-220	G	D	S	Tube
18N25L-TF1-T	18N25G-TF1-T	TO-220F1	G	D	S	Tube
18N25L-TF2-T	18N25G-TF2-T	TO-220F2	G	D	S	Tube
18N25L-TF3-T	18N25G-TF3-T	TO-220F	G	D	S	Tube
18N25L-TM3-T	18N25G-TM3-T	TO-251	G	D	S	Tube
18N25L-TN3-R	18N25G-TN3-R	TO-252	G	D	S	Tape Reel
18N25L-T3N-T	18N25G-T3N-T	TO-3PN	G	D	S	Tube

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



(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1
TF2: TO-220F2, TM3: TO-251, TN3: TO-252
T3N: TO-3PN
(3) G: Halogen Free and Lead Free, L: Lead Free

■ 2MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	250	V
Gate-Source Voltage			V_{GSS}	±30	V
Continuous Drain Current	Continuous	T_C=25°C	I_D	18	A
		T_C=100°C		10.8	A
	Pulsed		I_{DM}	36	A
Single Pulsed Avalanche Current			I_{AS}	3.6	A
Single Pulsed Avalanche Energy			E_{AS}	194	mJ
Power Dissipation	TO-220		P_D	98	W
	TO-220F/TO-220F1 TO-220F2			36	W
	TO-251/TO-252			54	W
	TO-3PN			140	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 = 30mH, I_{AS} = 3.6A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2	θ_{JA}	62.5	°C/W
	TO-251/TO-252		110	°C/W
	TO-3PN		40	°C/W
Junction to Case	TO-220	θ_{JC}	1.27	°C/W
	TO-220F/TO-220F1 TO-220F2		3.47	°C/W
	TO-251/TO-252		2.31 (Note)	°C/W
	TO-3PN		0.89	°C/W

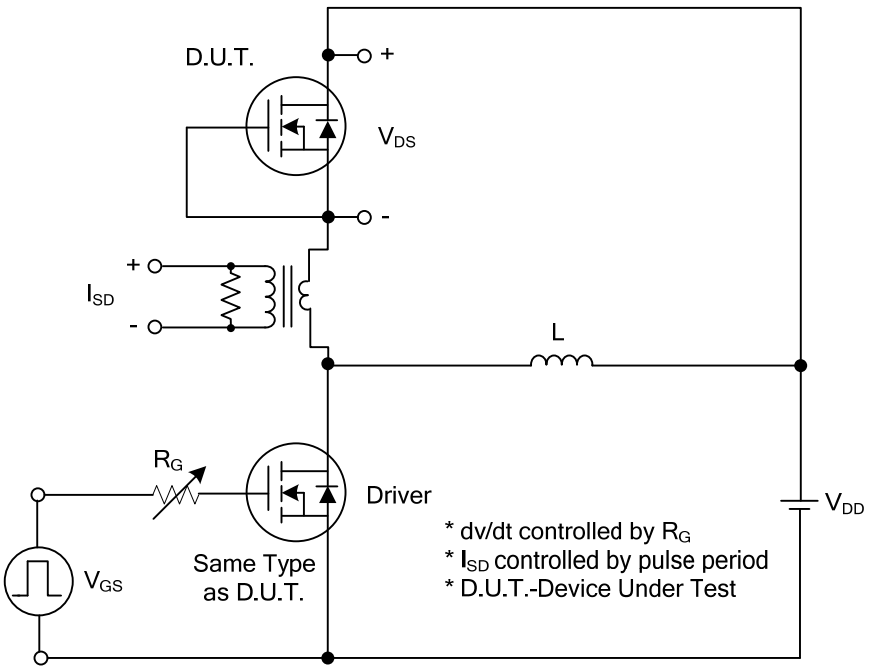
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS

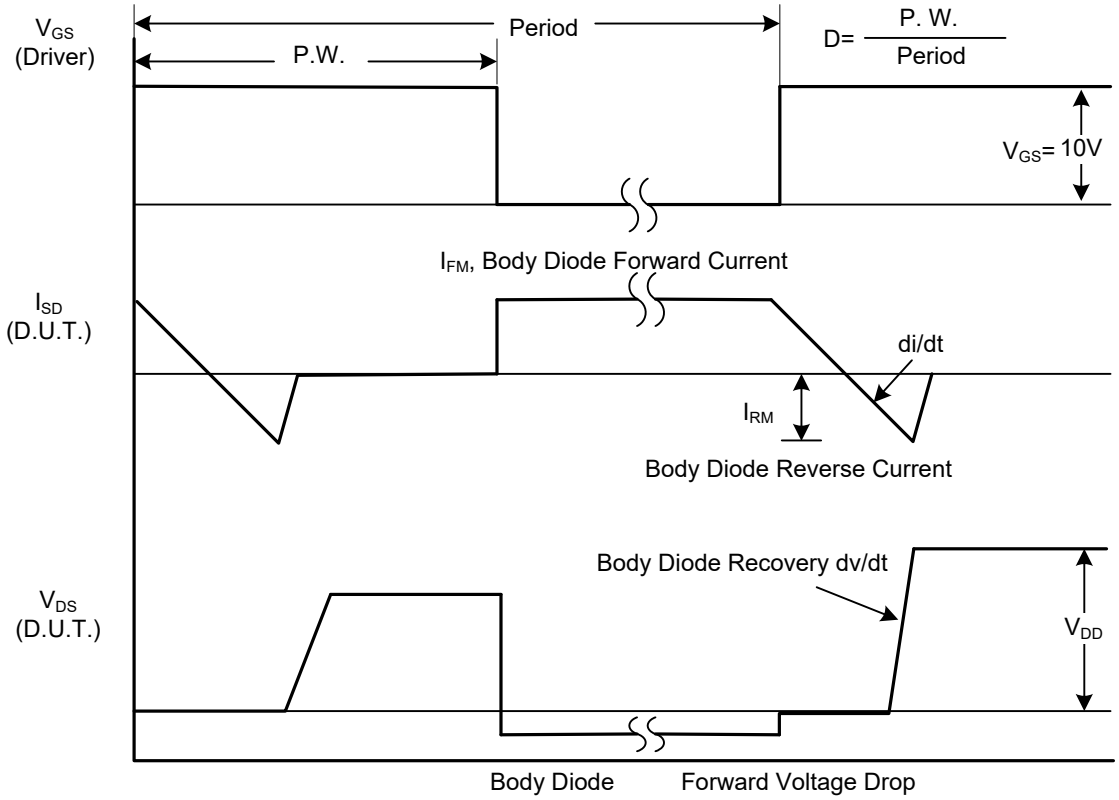
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	250			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=250V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=9.0A			0.24	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		870		pF
Output Capacitance		C_{OSS}			135		pF
Reverse Transfer Capacitance		C_{RSS}			8.8		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=200V, V_{GS}=10V, I_D=18A I_G=1mA (Note 1, 2)		25		nC
Gate to Source Charge		Q_{GS}			8.2		nC
Gate to Drain Charge		Q_{GD}			7		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DS}=100V, V_{GS}=10V, I_D=18A, R_G=25Ω (Note 1, 2)		9		ns
Rise Time		t_R			18		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			55		ns
Fall-Time		t_F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				18	A
Maximum Body-Diode Pulsed Current		I_{SM}				36	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=18A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=18A, V_{GS}=0V, dI_F/dt=100A/μs (Note 1)		160		ns
Reverse Recovery Charge		Q_{rr}			0.9		μC

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

■ TEST CIRCUITS AND WAVEFORMS

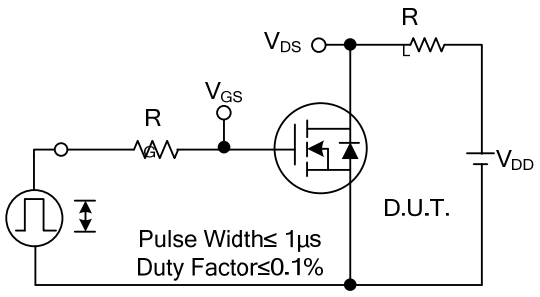


Peak Diode Recovery dv/dt Test Circuit

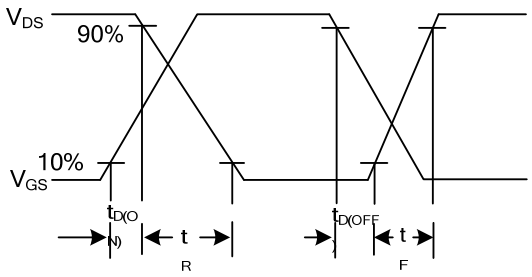


Peak Diode Recovery dv/dt Waveforms

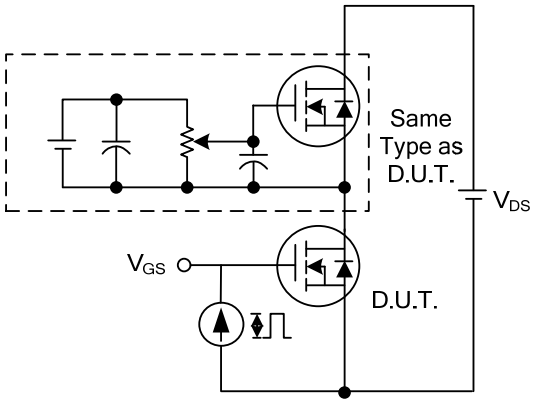
■ TEST CIRCUITS AND WAVEFORMS



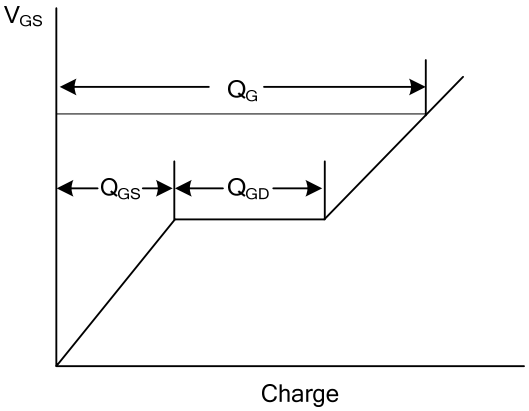
Switching Test Circuit



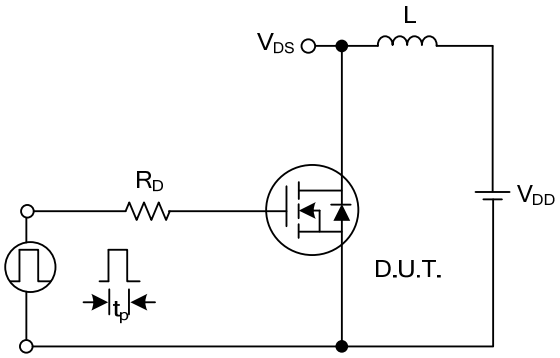
Switching Waveforms



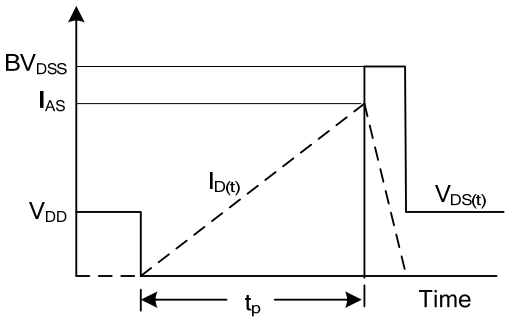
Gate Charge Test Circuit



Gate Charge Waveform

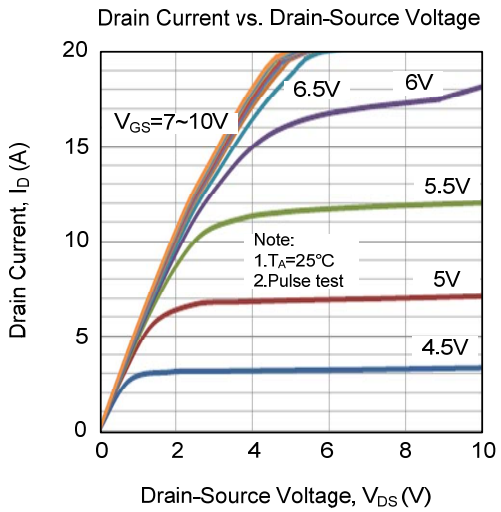


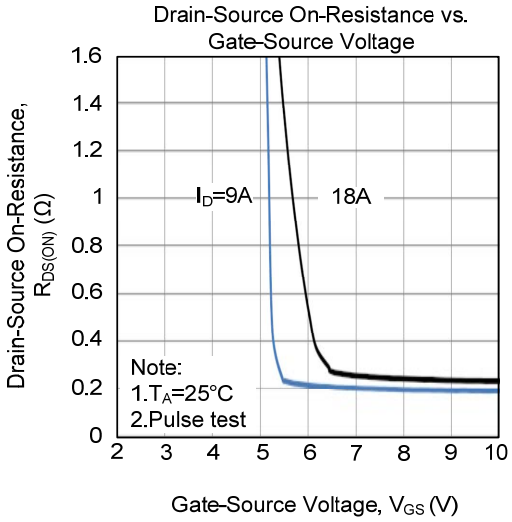
Unclamped Inductive Switching Test Circuit

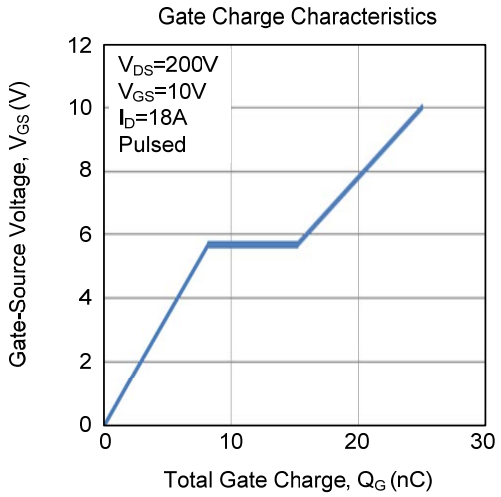


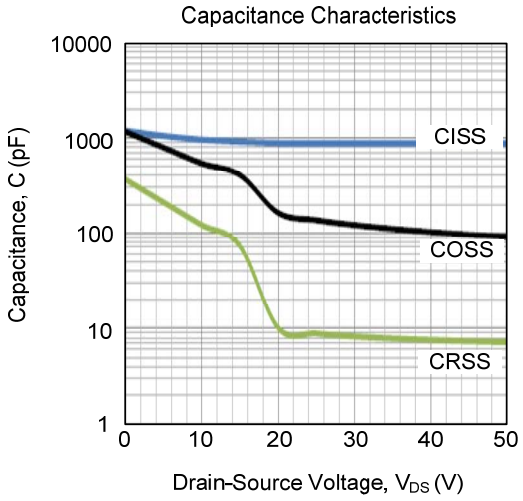
Unclamped Inductive Switching Waveforms

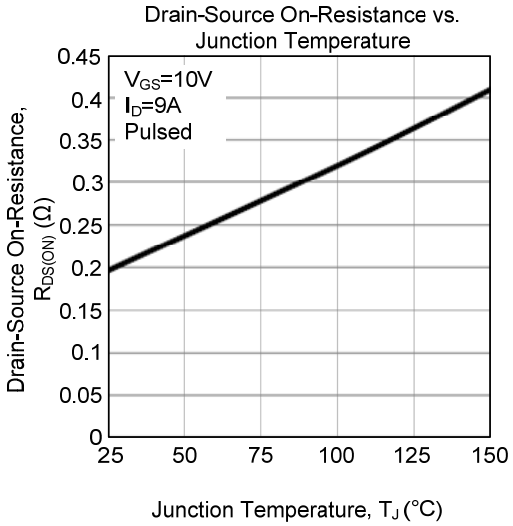
■ TYPICAL CHARACTERISTICS

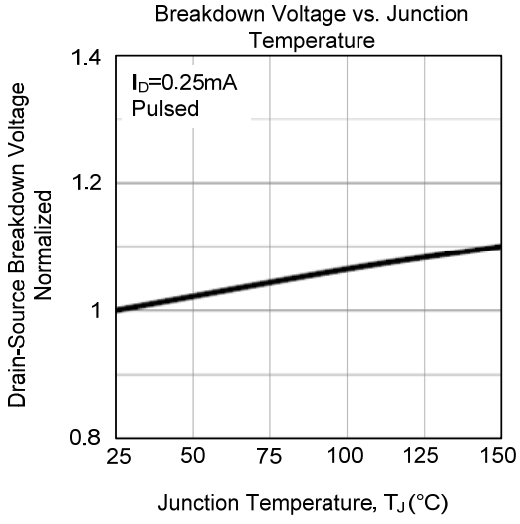






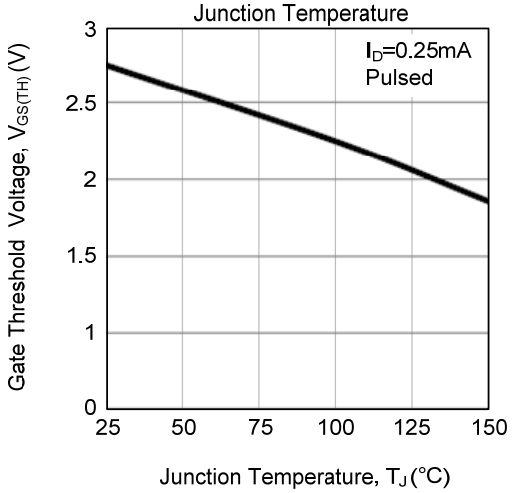




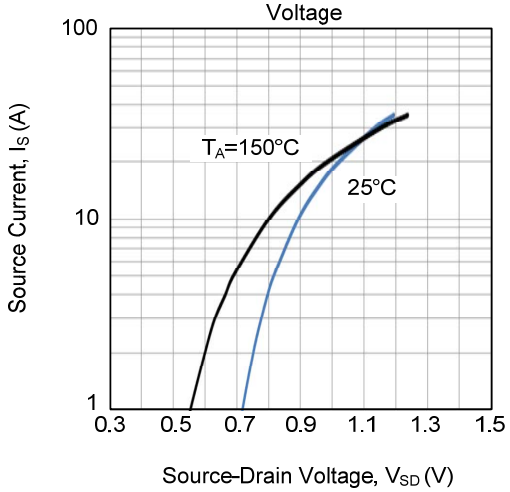


■ TYPICAL CHARACTERISTICS (Cont.)

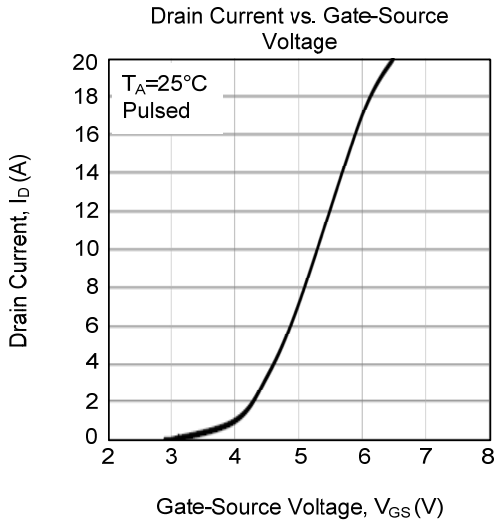
Gate Threshold Voltage vs. Junction Temperature



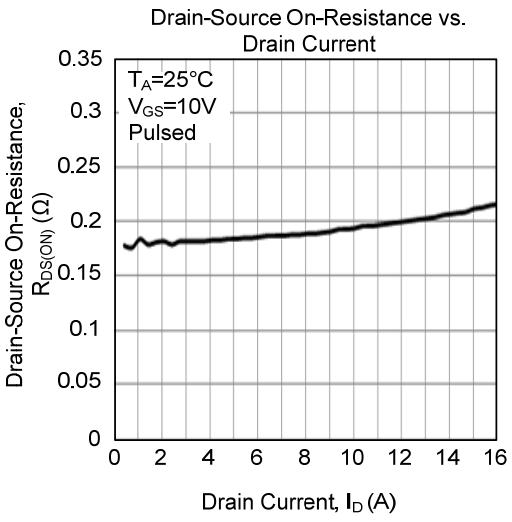
Source Current vs. Source-Drain Voltage



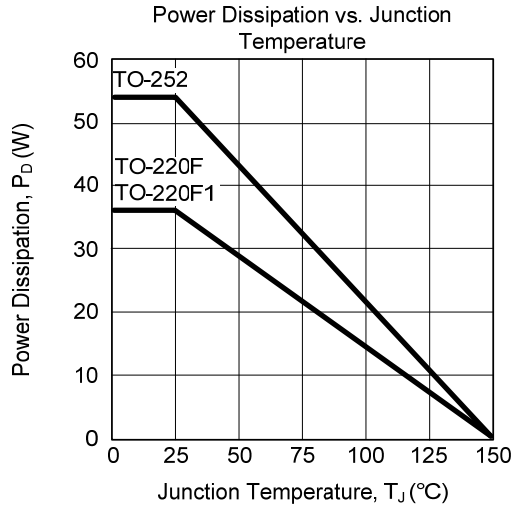
Drain Current vs. Gate-Source Voltage



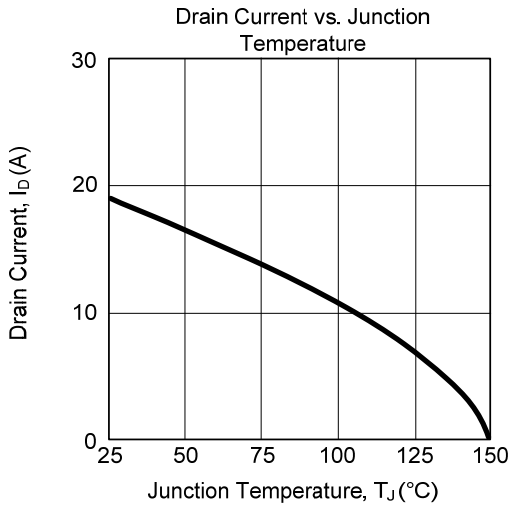
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)