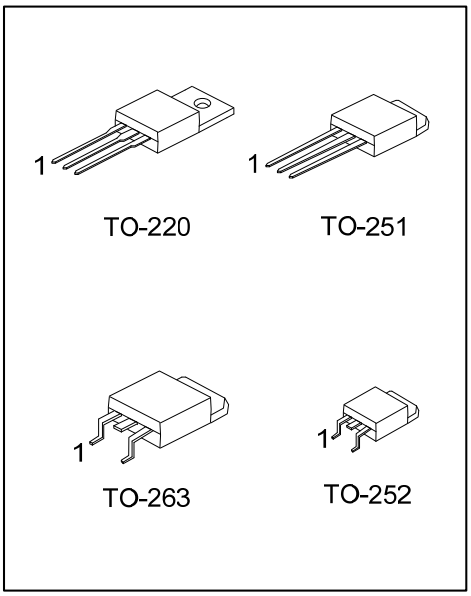
UF5305

POWER MOSFET

-31A, -55V P-CHANNEL POWER MOSFET



■ DESCRIPTION

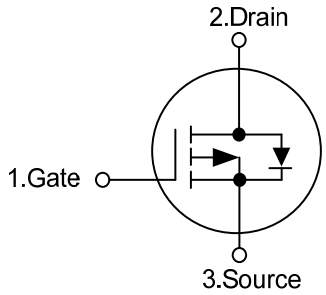
The UTC **UF5305** is a P-channel Power MOSFET, it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **UF5305** is suitable for all commercial-industrial applications, etc.

■ FEATURES

* $R_{DS(ON)} \leq 0.06\ \Omega$ @ V_{GS}=-10V, I_D=-16A
* High Switching Speed
* Dynamic dv/dt Rating

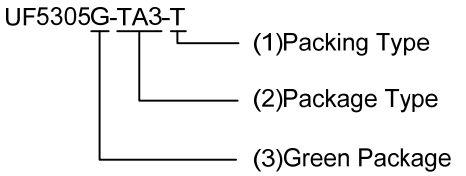
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF5305L-TA3-T	UF5305G-TA3-T	TO-220	G	D	S	Tube
UF5305L-TM3-T	UF5305G-TM3-T	TO-251	G	D	S	Tube
UF5305L-TN3-T	UF5305G-TN3-T	TO-252	G	D	S	Tube
UF5305L-TN3-R	UF5305G-TN3-R	TO-252	G	D	S	Tape Reel
UF5305L-TQ2-T	UF5305G-TQ2-T	TO-263	G	D	S	Tube
UF5305L-TQ2-R	UF5305G-TQ2-R	TO-263	G	D	S	Tape Reel

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

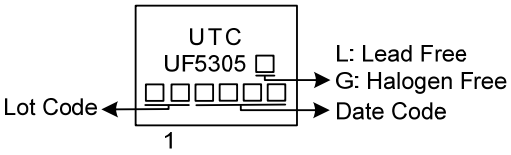


(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TM3: TO-251, TN3: TO-252
TQ2: TO-263

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	-55	V
Gate-Source Voltage			V_{GSS}	±20	V
Drain Current	Continuous	V_{GS}=-10V, T_C=25°C	I_D	-31	A
		V_{GS}=-10V, T_C=100°C		-22	A
	Pulsed (Note 2)		I_{DM}	-110	A
Avalanche Energy	Single Pulse (Note 3)		E_{AS}	180	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	-8.2	V/ns
Power Dissipation (T_C=25°C)		TO-220/TO-263	P_D	110	W
		TO-251/TO-252		42	W
Junction Temperature			T_J	-55 ~ +150	°C
Storage Temperature Range			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} = -60A V_{DD} = -25V, R_G = 25Ω, Starting T_J = 25°C
4. I_{SD} ≤ -16A, di/dt ≤ -280A/μs, V_{DD} ≤ BV_{DSS}, T_J ≤ 150°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-263	θ_{JA}	62	°C/W
	TO-251/TO-252		90	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	1.1	°C/W
	TO-251/TO-252		2.97 (Note)	°C/W

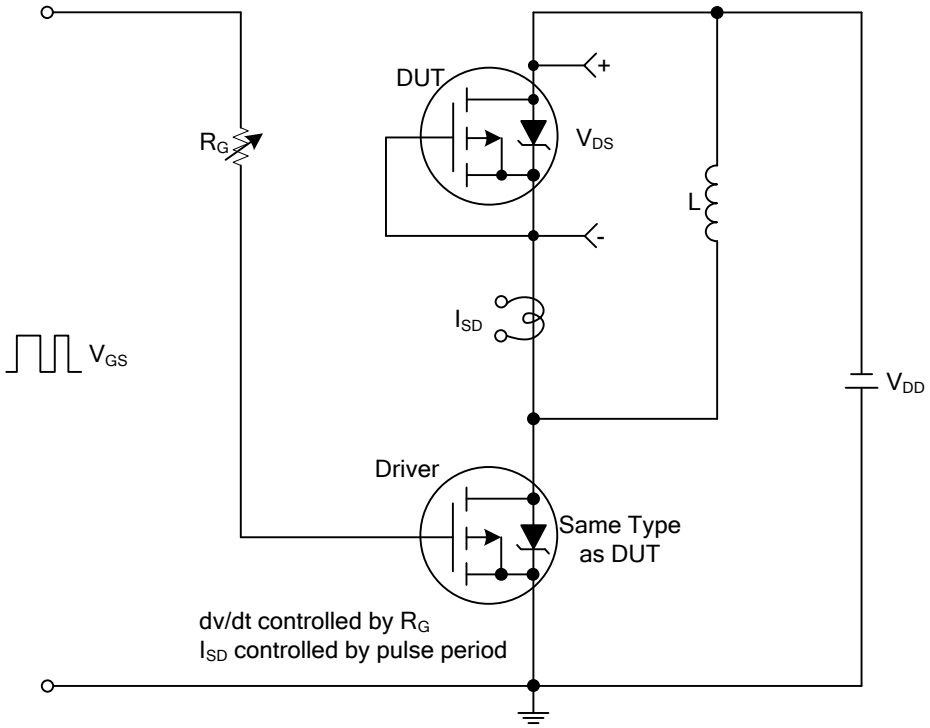
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

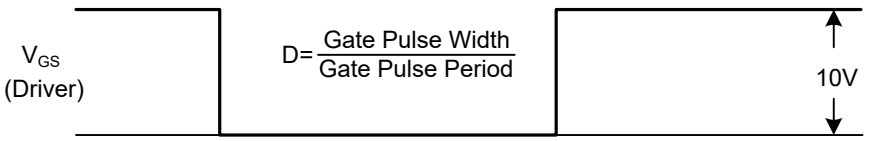
■ ELECTRICAL CHARACTERISTICS (T_J = 25°C, unless otherwise specified)

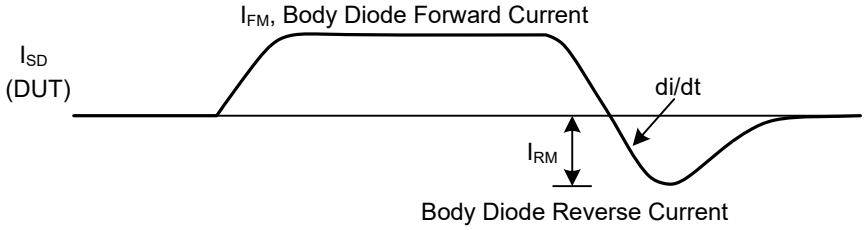
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250μA	-55			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-55V, V_{GS}=0V			-25	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=20V, V_{DS}=0V			100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-16A (Note 2)			0.06	Ω
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.0	V
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		1497		pF
Output Capacitance		C_{OSS}			411		pF
Reverse Transfer Capacitance		C_{RSS}			90		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	I_D=-16A, V_{DS}=-44V, V_{GS}=-10V (Note 2)		37		nC
Gate-to-Source Charge		Q_{GS}			10.4		nC
Gate-to-Drain ("Miller") Charge		Q_{GD}			7.2		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-28V, I_D=-16A, R_G=6.8Ω R_D=1.6Ω (Note 2)		10		ns
Rise Time		t_R			18		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			44		ns
Fall Time		t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body Diode Continuous Source Current		I_S				-31	A
Maximum Body-Diode Pulsed Current (Note 1)		I_{SM}				-110	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=-16A, V_{GS}=0V, T_J=25°C (Note 2)			-1.4	V
Body Diode Reverse Recovery Time		t_{RR}	I_F=-16A, di/dt=-100A/μs T_J=25°C (Note 2)		71		ns
Body Diode Reverse Recovery Charge		Q_{RR}			170		nC

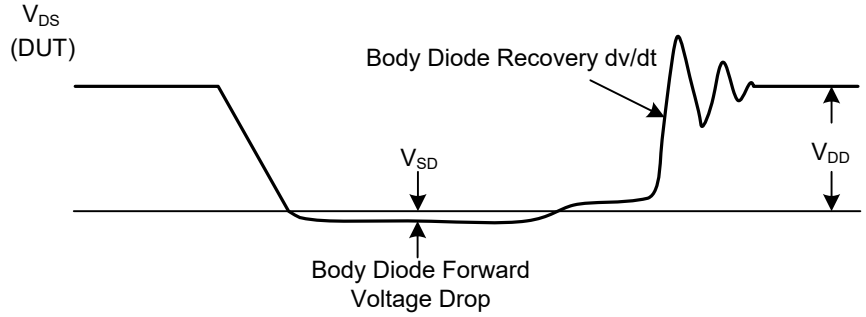
Notes: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

■ TEST CIRCUITS AND WAVEFORMS



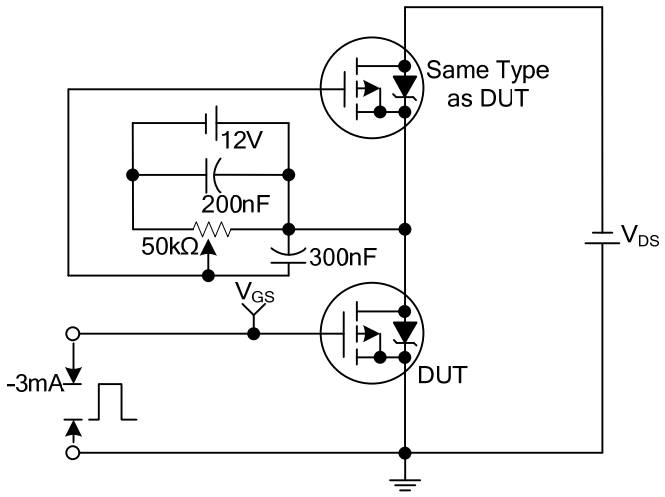




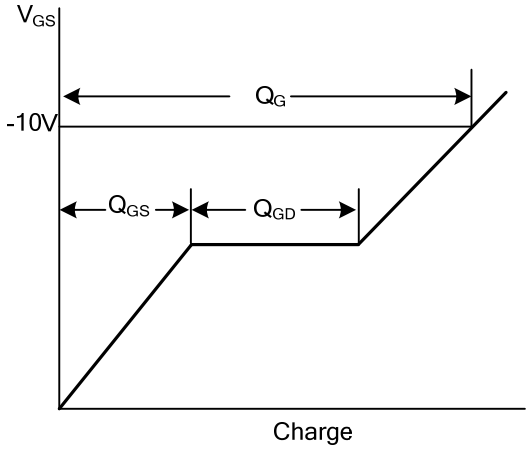


Peak Diode Recovery dv/dt Test Circuit and Waveforms

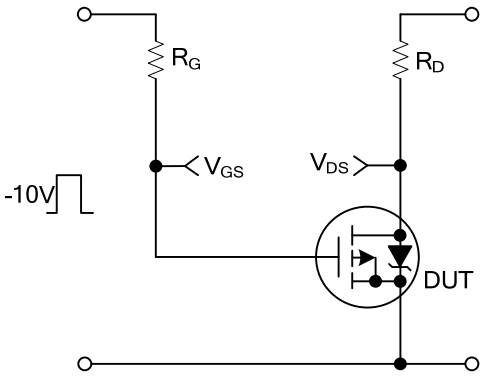
■ TEST CIRCUITS AND WAVEFORMS



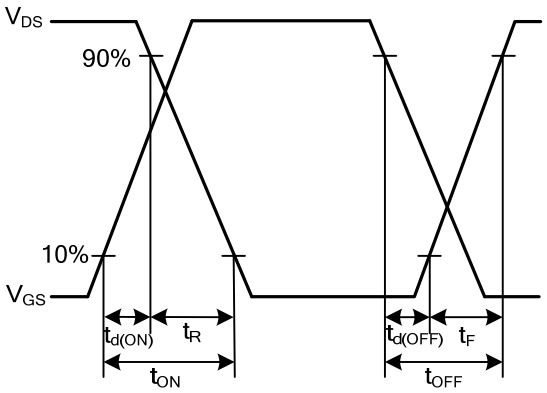
Gate Charge Test Circuit



Gate Charge Waveforms



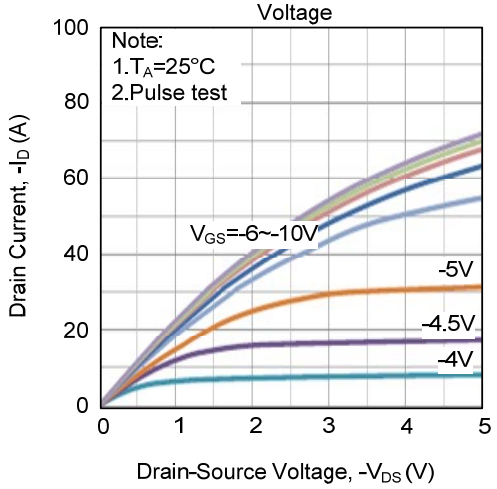
Resistive Switching Test Circuit



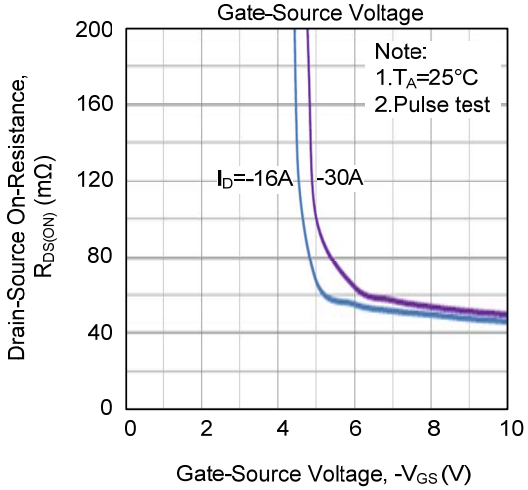
Resistive Switching Waveforms

■ TYPICAL CHARACTERISTICS

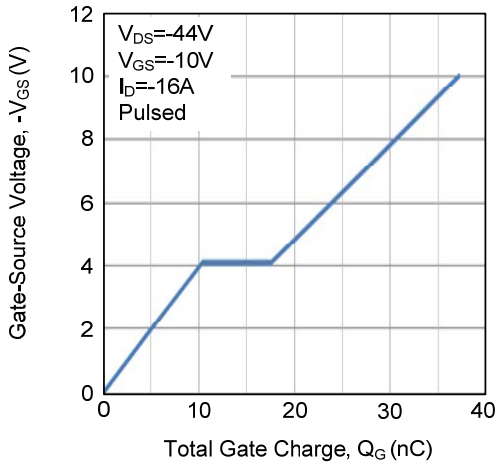
Drain Current vs. Drain-Source Voltage



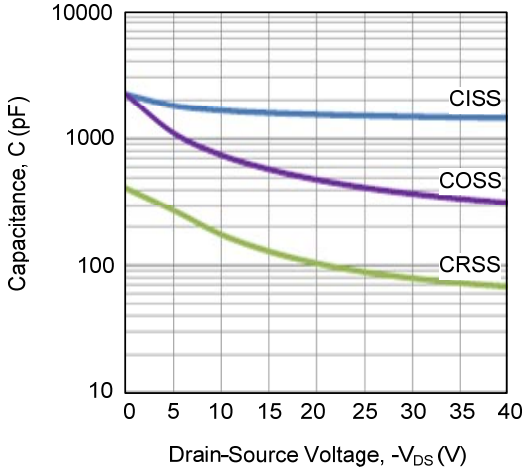
Drain-Source On-Resistance vs. Gate-Source Voltage



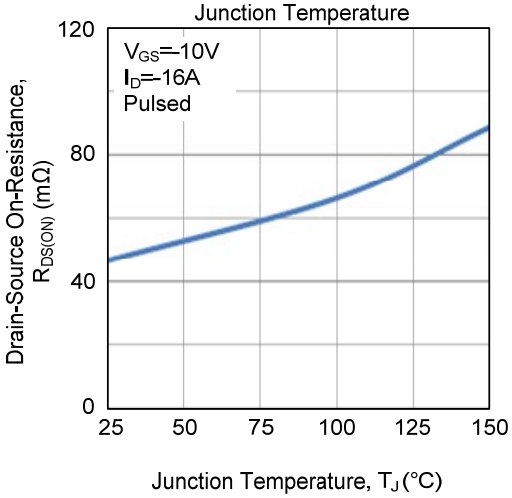
Gate Charge Characteristics



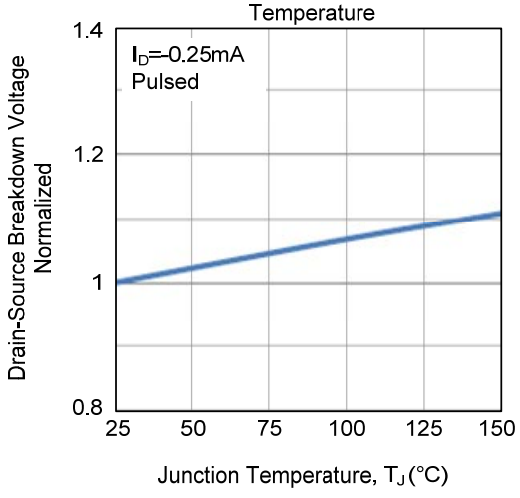
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

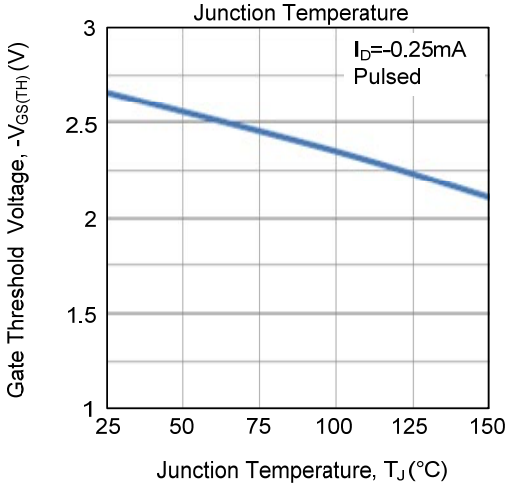


Breakdown Voltage vs. Junction Temperature

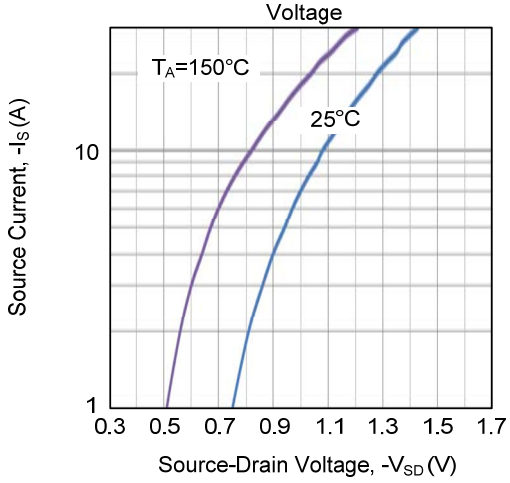


■ TYPICAL CHARACTERISTICS (Cont.)

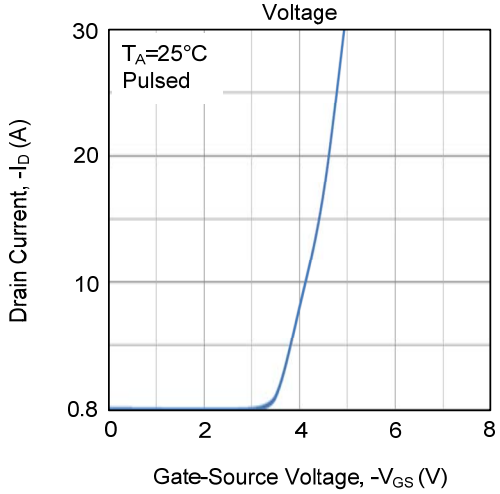
Gate Threshold Voltage vs. Junction Temperature



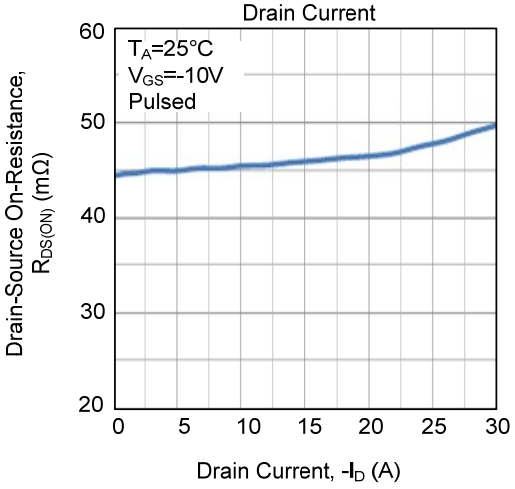
Source Current vs. Source-Drain Voltage



Drain Current vs. Gate-Source Voltage

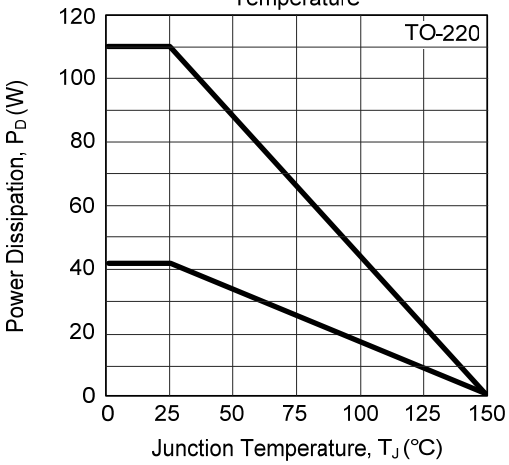


Drain-Source On-Resistance vs. Drain Current

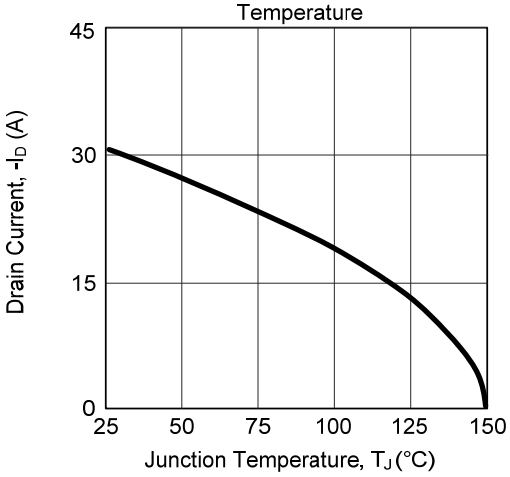


Power Dissipation vs. Junction Temperature

TO-251
TO-252



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)