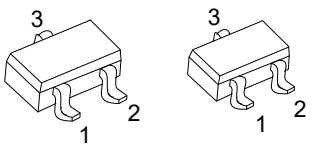
UT7401

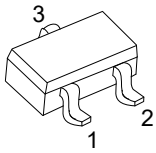
Power MOSFET

-1.2A, -30V P-CHANNEL ENHANCEMENT MODE POWER MOSFET



SOT-23-3
(JEDEC TO-236)

SOT-323



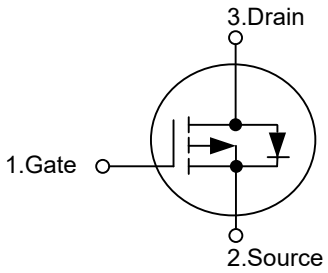
SOT-23
(EIAJ SC-59)

■ DESCRIPTION

The UTC **UT7401** is P-channel enhancement mode power MOSFET, designed in serried ranks. With fast switching speed, low on-resistance, favorable stabilization.

Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

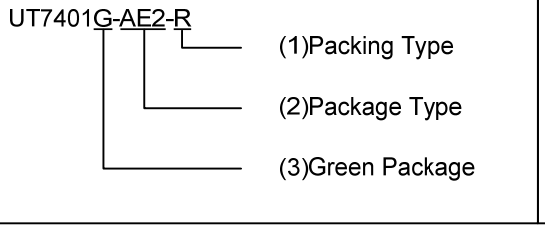
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT7401L-AE2-R	UT7401G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT7401L-AE3-R	UT7401G-AE3-R	SOT-23	G	S	D	Tape Reel
UT7401L-AL3-R	UT7401G-AL3-R	SOT-323	G	S	D	Tape Reel

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

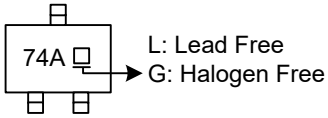


(1) R: Tape Reel

(2) AE2: SOT-23-3, AE3: SOT-23, AL3: SOT-323

(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}	-30	V
Gate-Source Voltage		V_{GSS}	±12	V
Continuous Drain Current (Note 2)	T_A=25°C	I_D	-1.2	A
	T_A=70°C		-1.0	A
Pulsed Drain Current (Note 3)		I_{DM}	-10	A
Avalanche Energy	Single Pulsed (Note 4)	E_{AS}	42	mJ
Power Dissipation (Note 2)	T_A=25°C	P_D	350	mW
	T_A=70°C		220	mW
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. Pulse width ≤ 300us, duty cycle ≤ 2%.
4. L=100mH, I_{AS} = -0.9A, V_{DD} = -25V, R_G = 25 Ω, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	357	°C/W

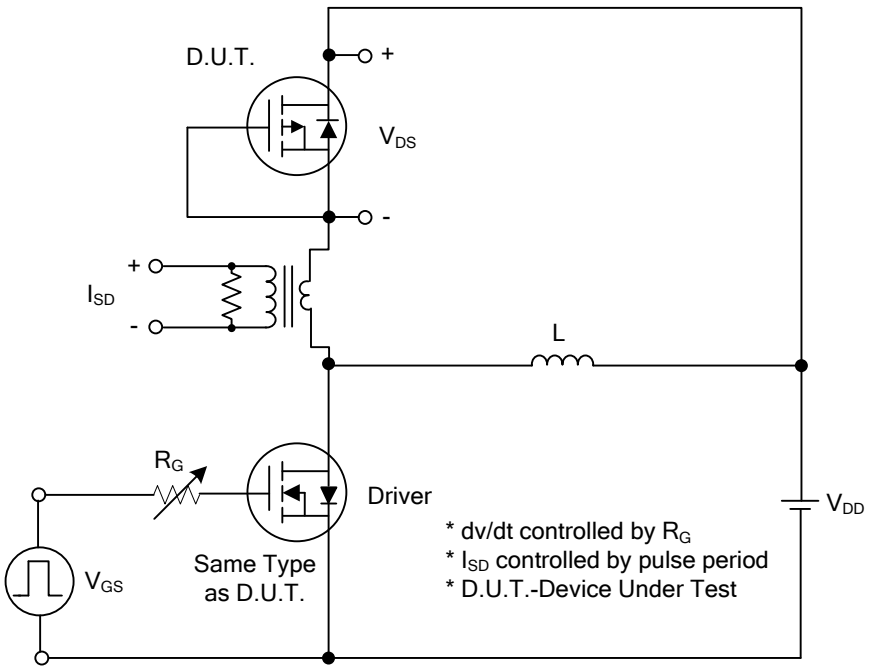
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

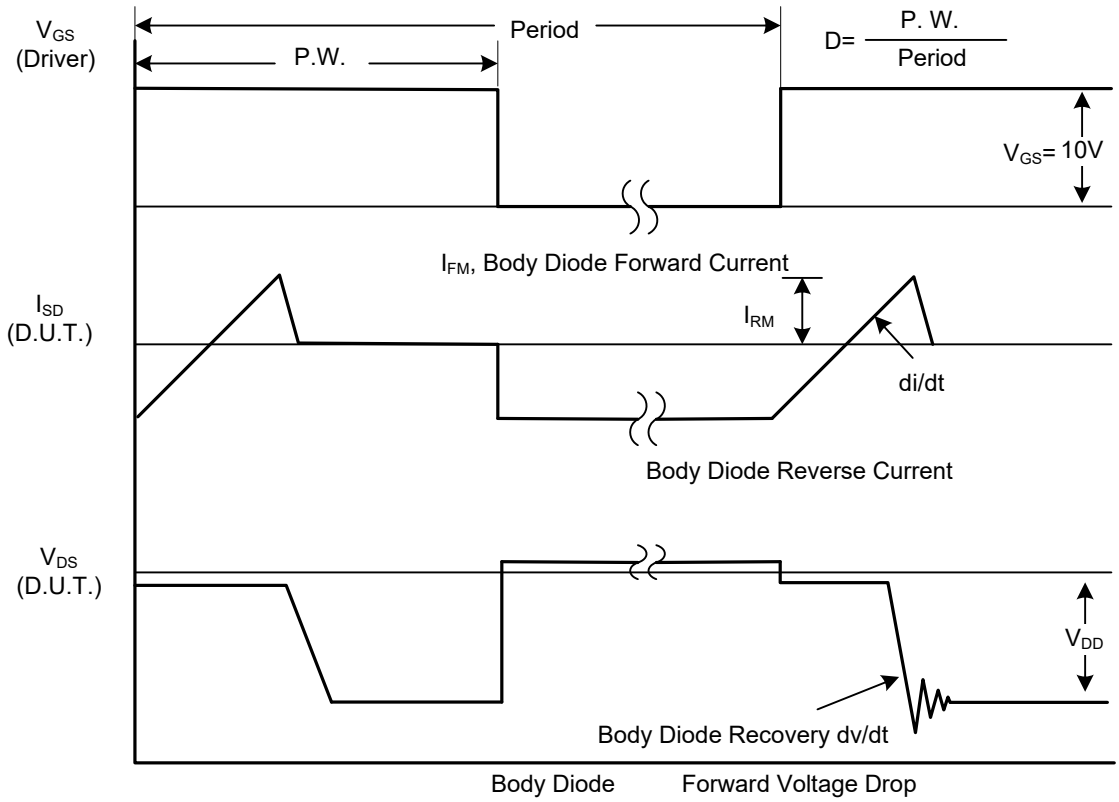
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	uA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250uA	-0.6	-0.8	-1.4	V
Drain-Source On-State Resistance (Note 1)	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-1.2A		122	150	mΩ
		V_{GS}=-4.5V, I_D=-1.2A		147	200	mΩ
		V_{GS}=-2.5V, I_D=-1.0A		207	280	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=-15V, f=1MHz		260		pF
Output Capacitance	C_{OSS}			40		pF
Reverse Transfer Capacitance	C_{RSS}			27		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=-15V, V_{GS}=-4.5V, I_D=-1.0A		2.4		nC
Gate-Source Charge	Q_{GS}			0.52		nC
Gate-Drain Charge	Q_{GD}			0.45		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DS}=-15V, V_{GS}=-10V, R_G=3Ω, I_D=-1.0A		2		ns
Turn-ON Rise Time	t_R			16		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			14		ns
Turn-OFF Fall Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-1.2	A
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V, I_S=-1.0A		-0.85	-1.2	V

Notes: 1. Pulse width ≤ 300us, duty cycle ≤ 2%.
2. Surface mounted on 1 in^2 copper pad of FR4 board.

■ TEST CIRCUITS AND WAVEFORMS

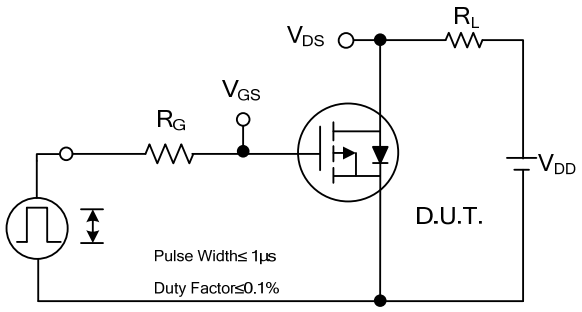


Peak Diode Recovery dv/dt Test Circuit

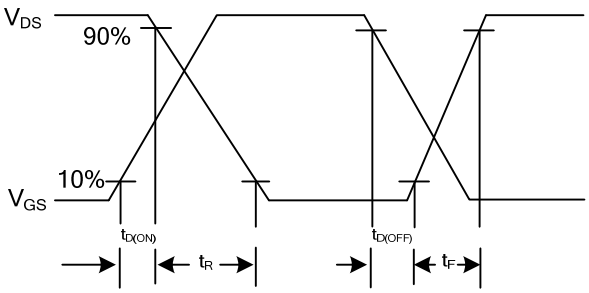


Peak Diode Recovery dv/dt Waveforms

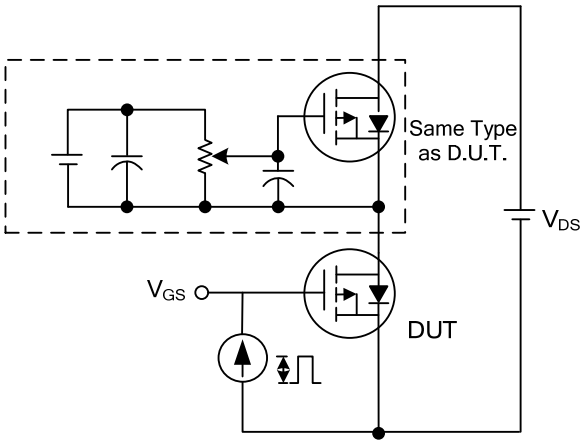
■ TEST CIRCUITS AND WAVEFORMS



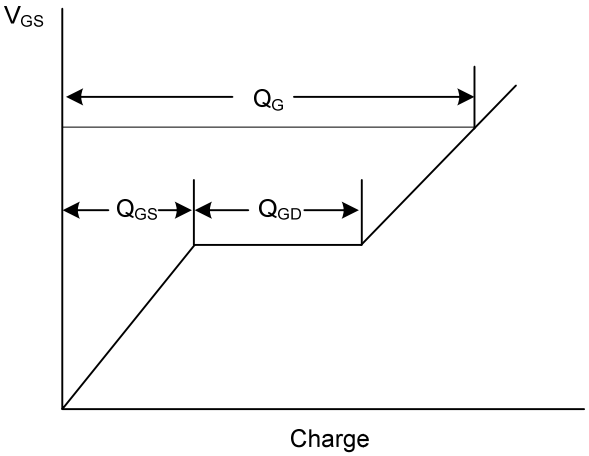
Switching Test Circuit



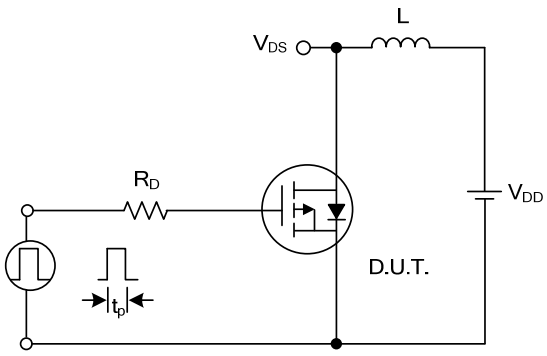
Switching Waveforms



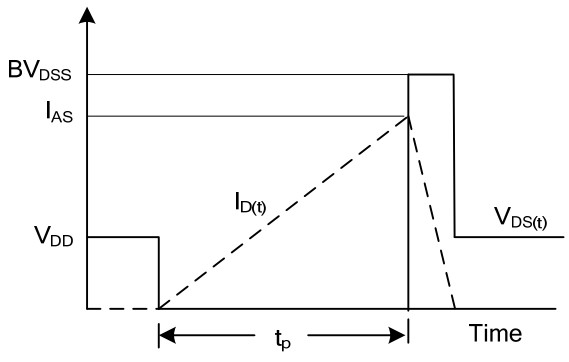
Gate Charge Test Circuit



Gate Charge Waveform

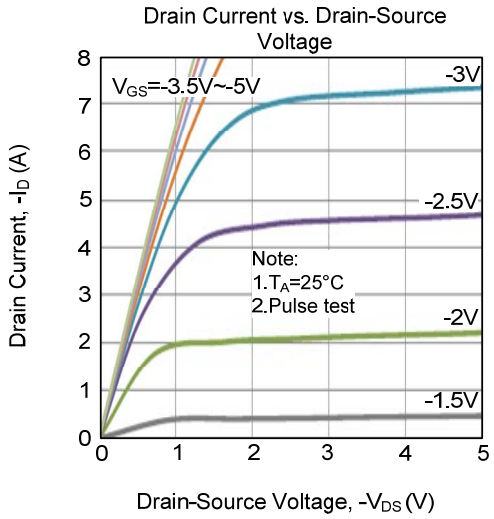


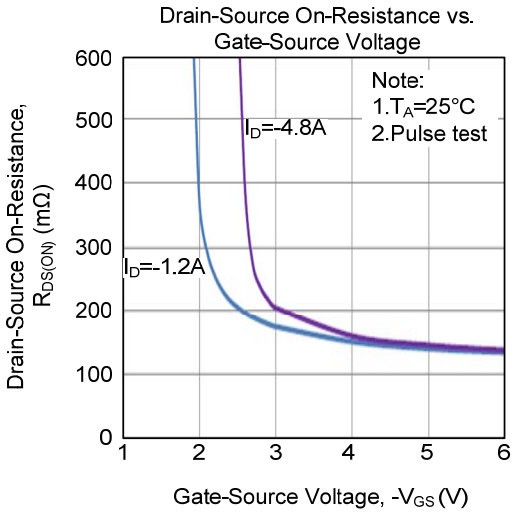
Unclamped Inductive Switching Test Circuit

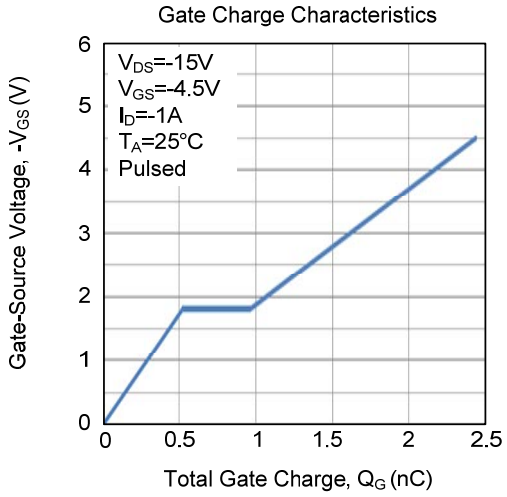


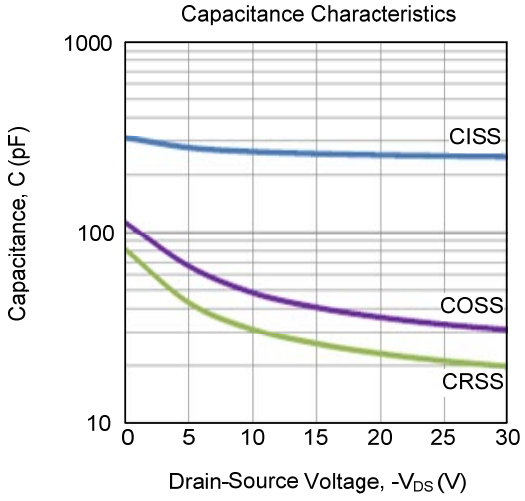
Unclamped Inductive Switching Waveforms

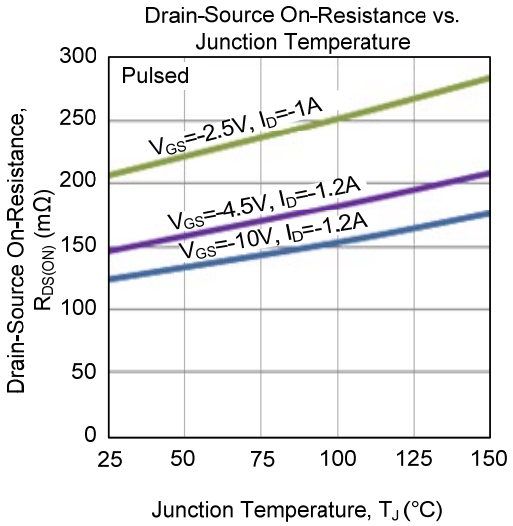
■ TYPICAL CHARACTERISTICS

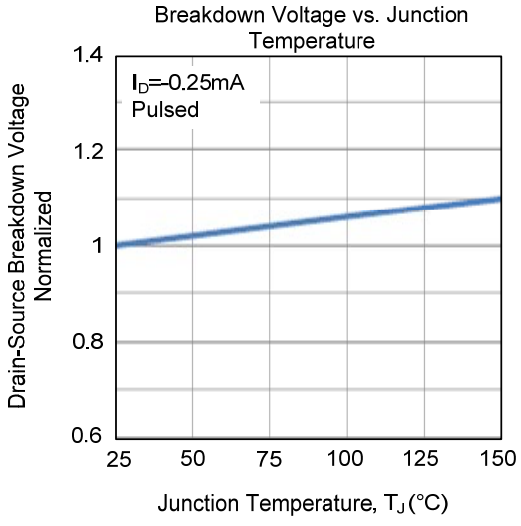






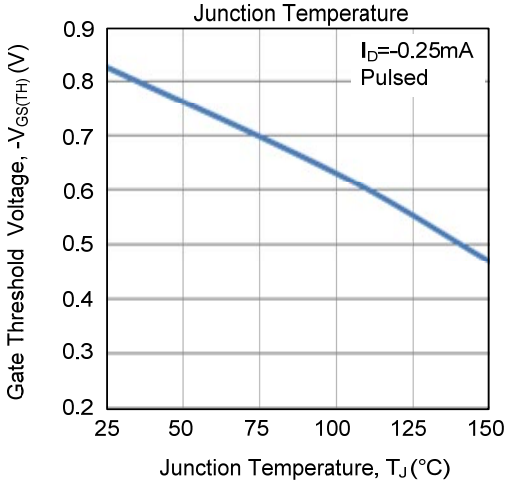




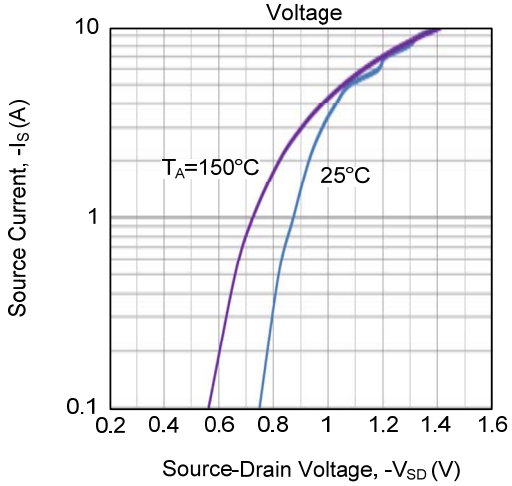


■ TYPICAL CHARACTERISTICS (Cont.)

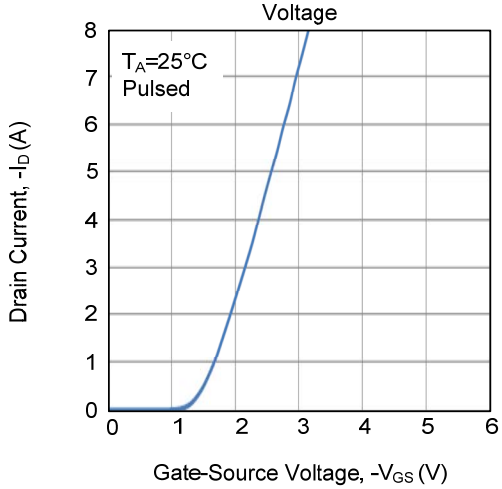
Gate Threshold Voltage vs. Junction Temperature



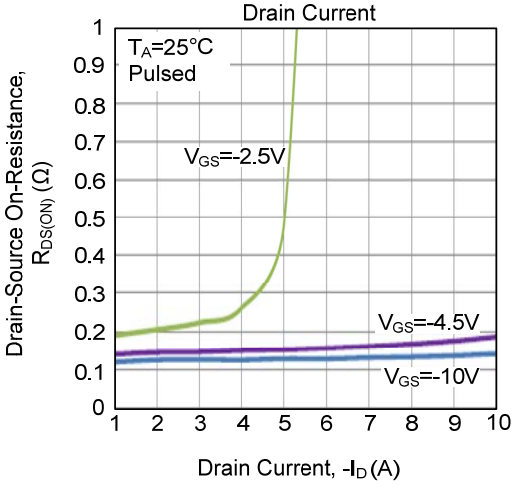
Source Current vs. Source-Drain Voltage



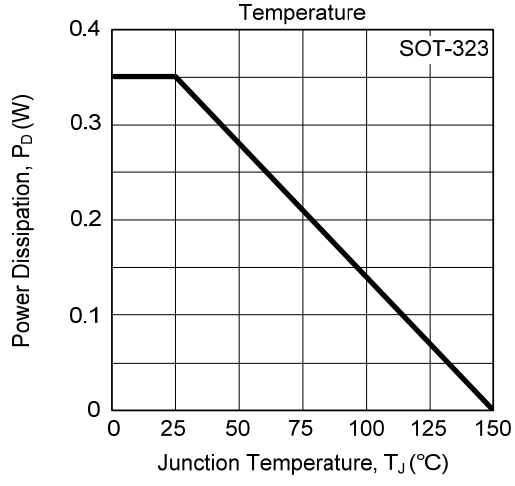
Drain Current vs. Gate-Source Voltage



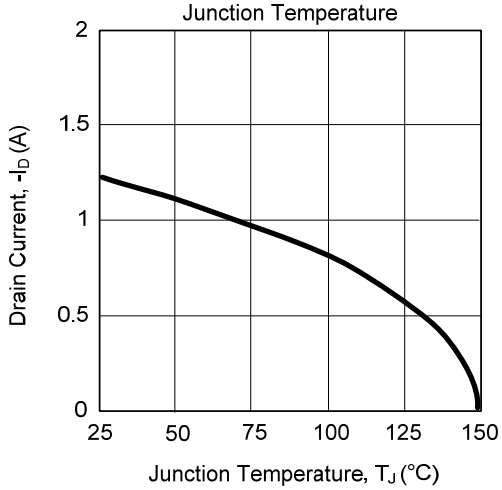
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)