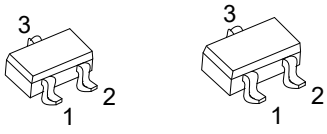
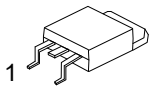
1.0A, 100V N-CHANNEL ENHANCEMENT MODE POWER MOSFET



SOT-23-3
(JEDEC TO-236)

SOT-23
(EIAJ SC-59)



TO-252

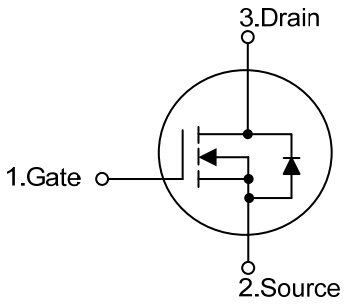
■ DESCRIPTION

The UTC **UT1N10** is a N-channel power MOSFET providing very low on-resistance. It has high efficiency and perfect cost-effectiveness. It can be generally applied in the commercial and industrial fields.

■ FEATURES

* $R_{DS(ON)} \leq 0.5\ \Omega$ @ V_{GS}=10V, I_D=0.5A
  $R_{DS(ON)} \leq 0.55\ \Omega$ @ V_{GS}=4.5V, I_D=0.5A
* Simple drive requirement

■ SYMBOL



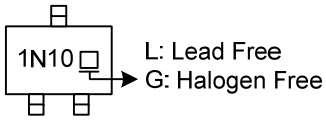
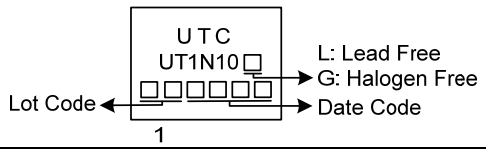
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT1N10L-AE2-R	UT1N10G-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT1N10L-AE3-R	UT1N10G-AE3-R	SOT-23	G	S	D	Tape Reel
UT1N10L-TN3-R	UT1N10G-TN3-R	TO-252	G	D	S	Tape Reel

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

UT1N10G-AE2-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE2: SOT-23-3, AE3: SOT-23, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-23 / SOT-23-3	TO-252
	

■ ABSOLUTE MAXIMUM RATING (T_C=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	I_D	1	A
	Pulsed (Note 2)	I_{DM}	2	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	1.9	V/ns
Power Dissipation (T_A=25°C)	SOT-23-3/SOT-23	P_D	0.3	W
	TO-252		1.5	W
Junction Temperature		T_J	+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. I_{SD} ≤ 1.0A, di/dt ≤ 100 A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-3/SOT-23	θ_{JA}	416 (Note)	°C/W
	TO-252		83.3 (Note)	°C/W

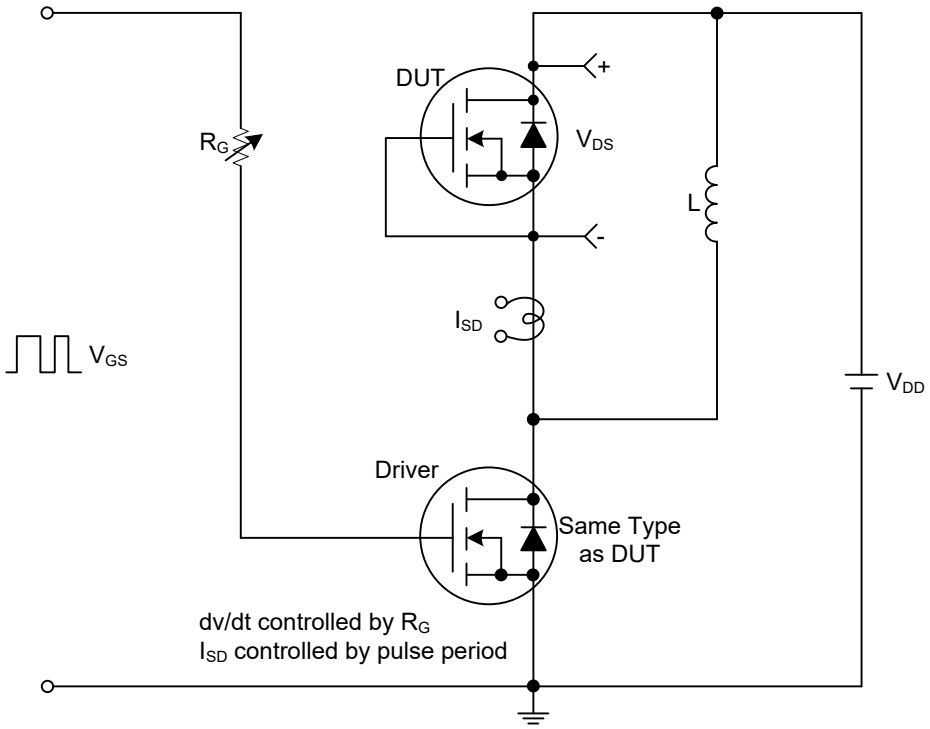
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

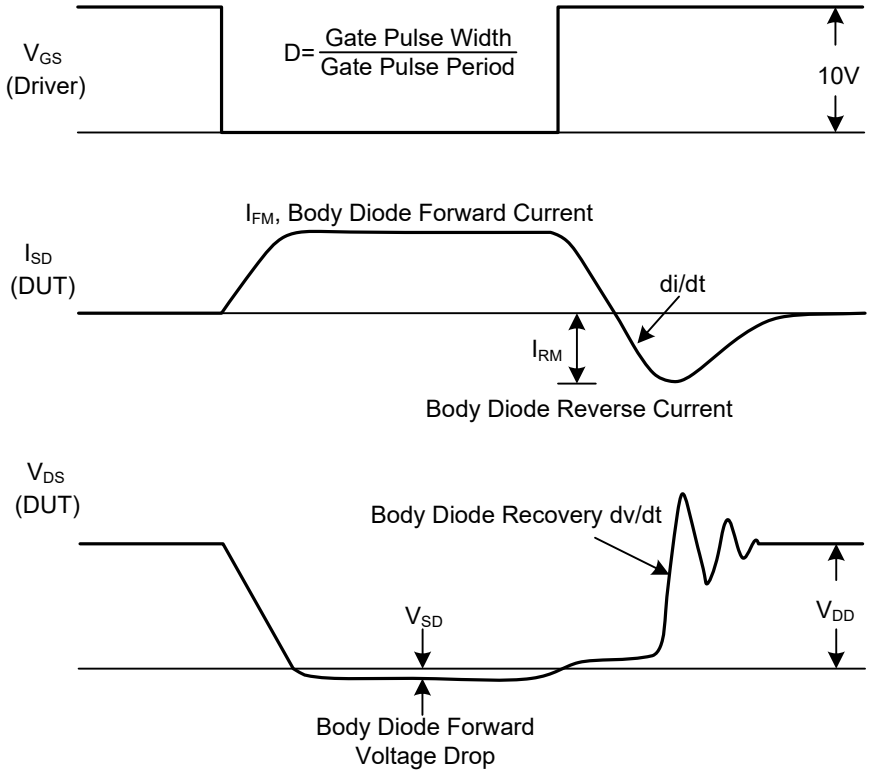
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250μA	100			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =100V,V_{GS} =0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} =V_{GS}, I_D =250μA	1.0		3.0	V
Drain to Source On-state Resistance	$R_{DS(ON)}$	V_{GS} =10V, I_D =0.5A			0.5	Ω
		V_{GS}=4.5V, I_D=0.5A			0.55	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz		150		pF
Output Capacitance	C_{OSS}			18		pF
Reverse Transfer Capacitance	C_{RSS}			12		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=80V, V_{GS}=10V, I_D=1A, I_G=1mA (Note 1, 2)		10		nC
Gate Source Charge	Q_{GS}			2		nC
Gate Drain Charge	Q_{GD}			1.6		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DD}=50V, V_{GS}=10V, I_D=1A, R_G =25Ω (Note 1, 2)		4		ns
Turn-ON Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			14		ns
Turn-OFF Fall-Time	t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	I_S =1A, V_{GS} =0V			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	I_S=1A,V_{GS}=0V, dI/dt=100A/μs		32		ns
Reverse Recovery Charge	Q_{rr}			14		nC

Notes: 1. Pulse Test : Pulse width ≤ 1000μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



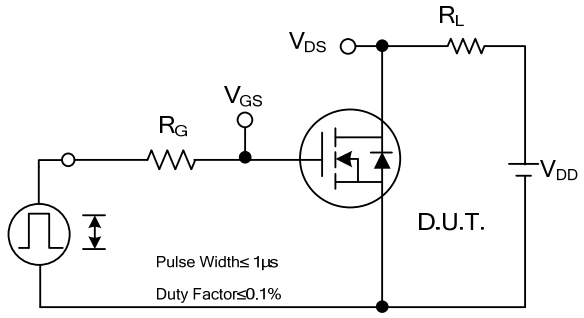
Peak Diode Recovery dv/dt Test Circuit



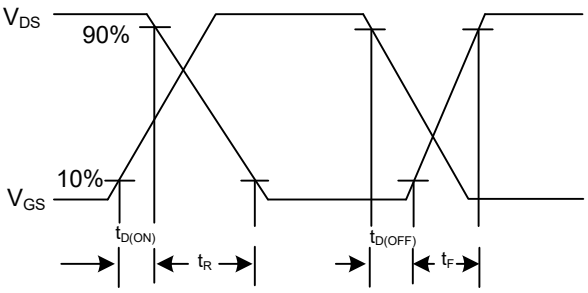
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

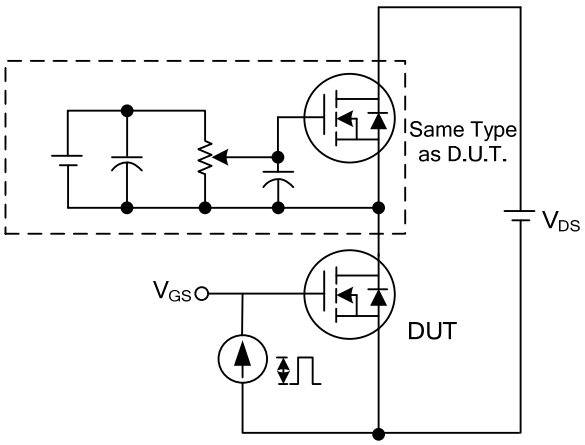
■ TEST CIRCUITS AND WAVEFORMS



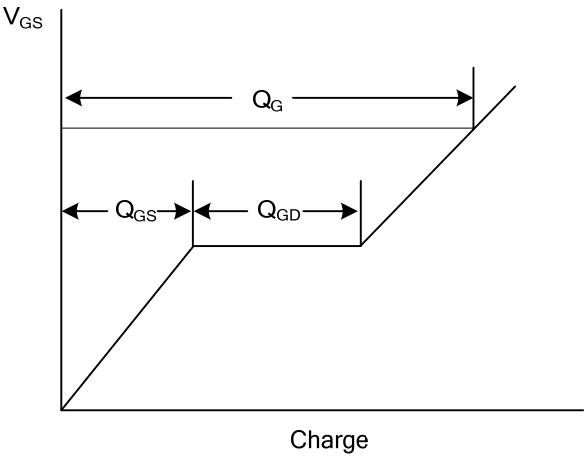
Switching Test Circuit



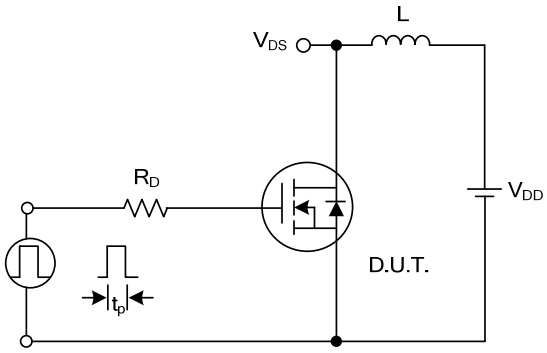
Switching Waveforms



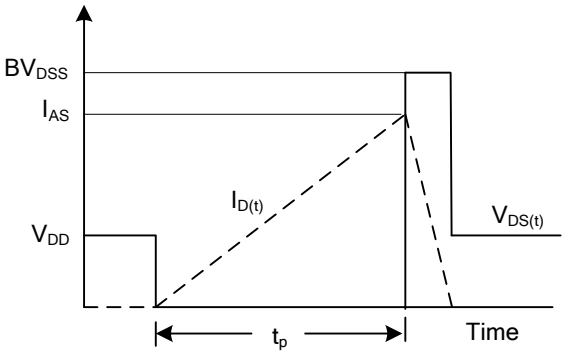
Gate Charge Test Circuit



Gate Charge Waveform

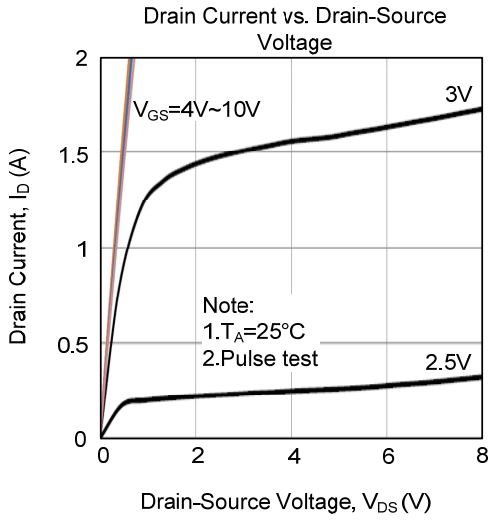


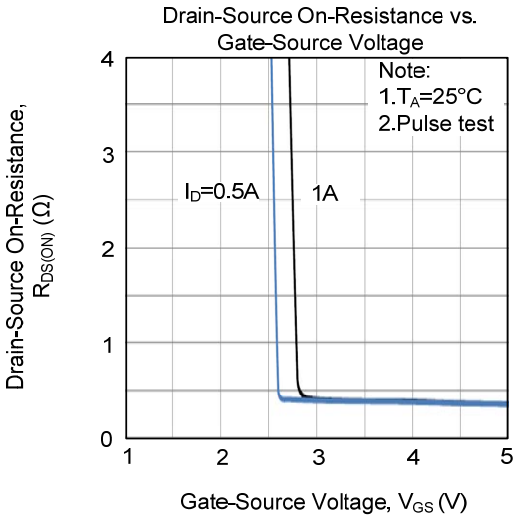
Unclamped Inductive Switching Test Circuit

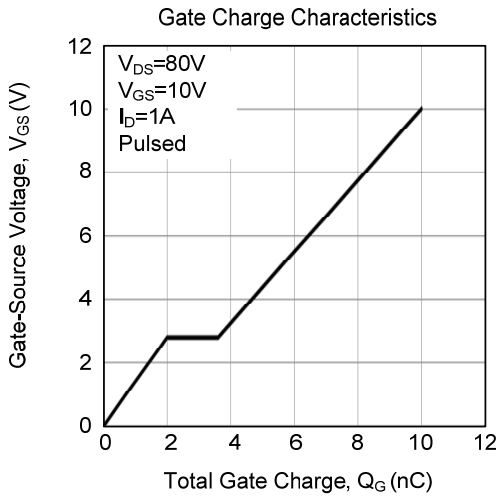


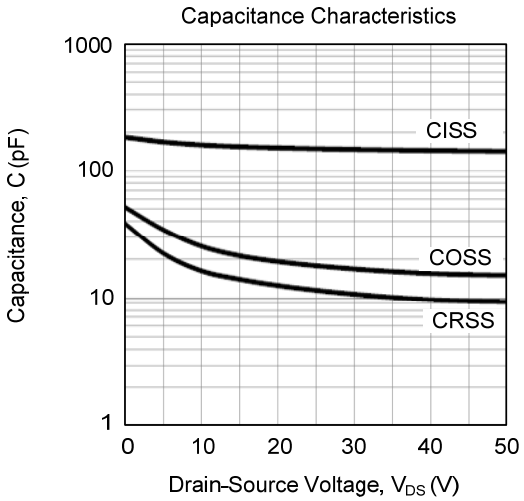
Unclamped Inductive Switching Waveforms

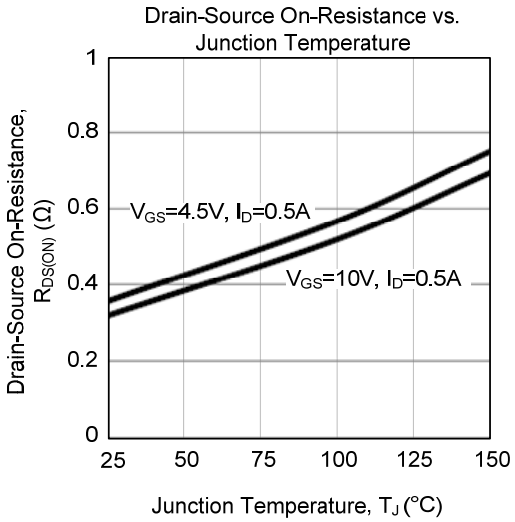
■ TYPICAL CHARACTERISTICS

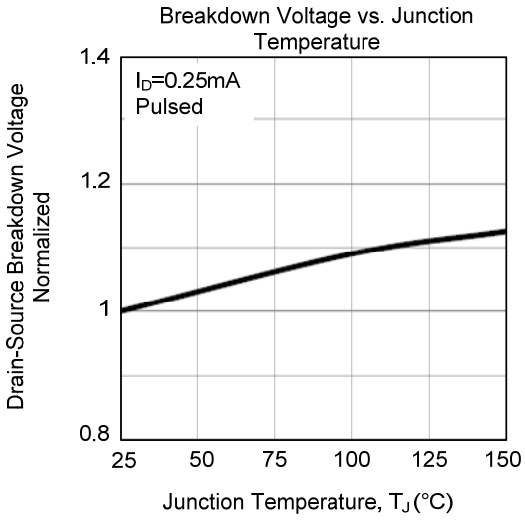






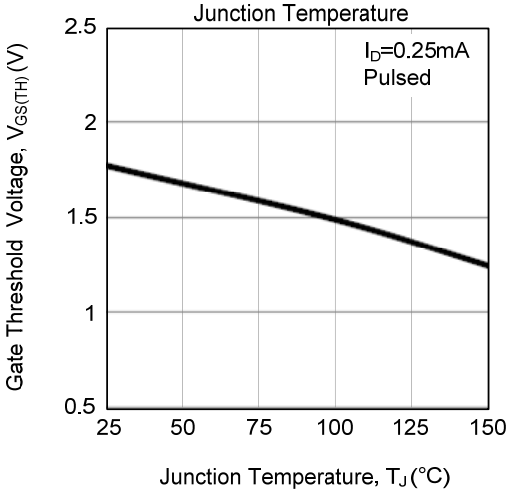




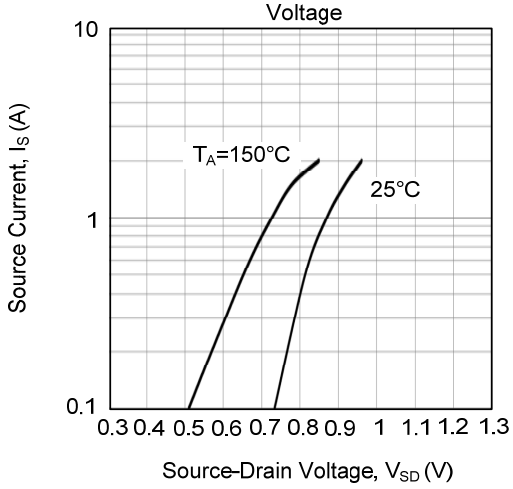


■ TYPICAL CHARACTERISTICS (Cont.)

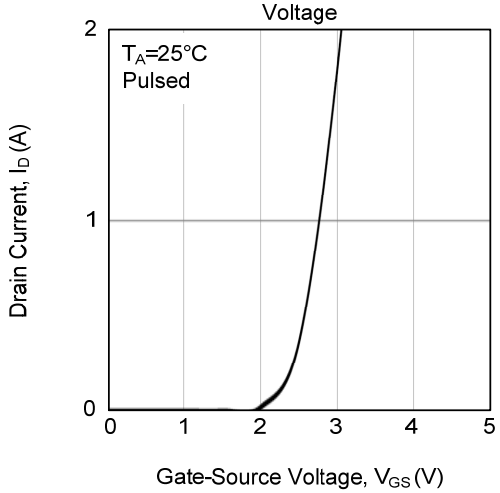
Gate Threshold Voltage vs. Junction Temperature



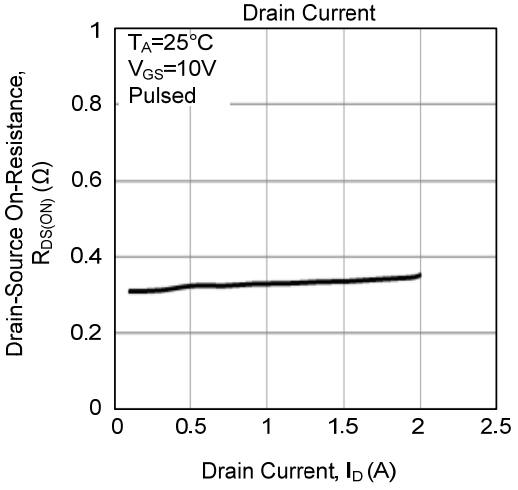
Source Current vs. Source-Drain Voltage



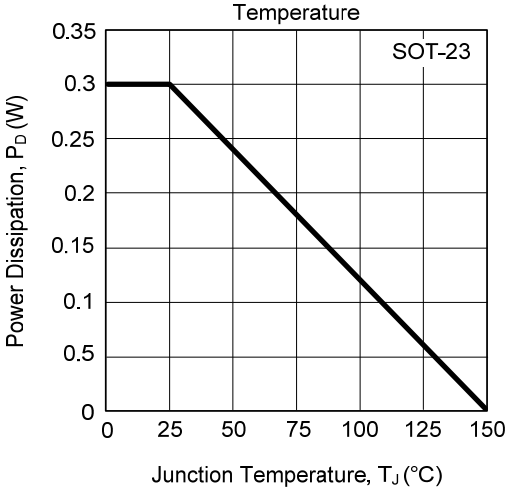
Drain Current vs. Gate-Source Voltage



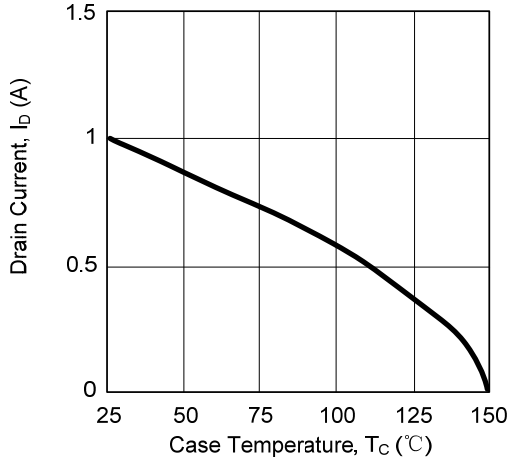
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature



Max. Drain Current vs. Case Temperature



■ TYPICAL CHARACTERISTICS (Cont.)