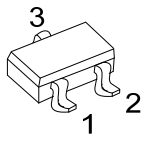
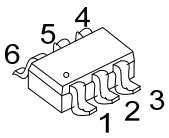
UT3401

Power MOSFET

P-CHANNEL ENHANCEMENT MODE POWER MOSFET



SOT-23
(EIAJ SC-59)



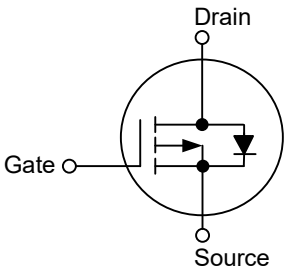
SOT-26

■ DESCRIPTION

The UTC **UT3401** is P-channel enhancement mode Power MOSFET, designed with high density cell, with fast switching speed, low on-resistance, excellent thermal and electrical capabilities and operation with low gate voltages.

This device is suitable for use as a load switch or in PWM applications.

■ SYMBOL



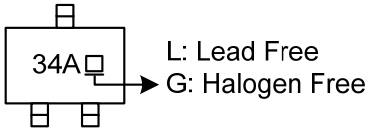
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT3401L-AE3-R	UT3401G-AE3-R	SOT-23	G	S	D	-	-	-	Tape Reel
UT3401L-AG6-R	UT3401G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel

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

UT3401G-AE3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE3: SOT-23, AG6: SOT-26 (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 1)	I_D	-4.2	A
Pulsed Drain Current (Note 2)	I_{DM}	-30	A
Power Dissipation (Note 1)	P_D	1.25	W
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-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	θ_{JA}	100	°C/W

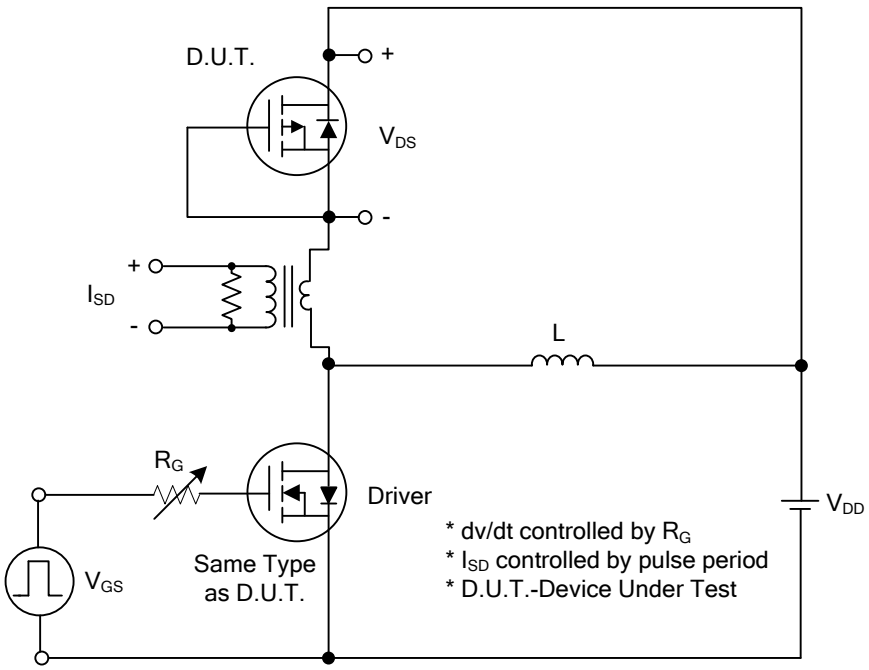
Notes: Surface mounted on 1 in^2 copper pad of FR4 board with 2oz. Copper, in a still air environment with T_A=25°C.

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

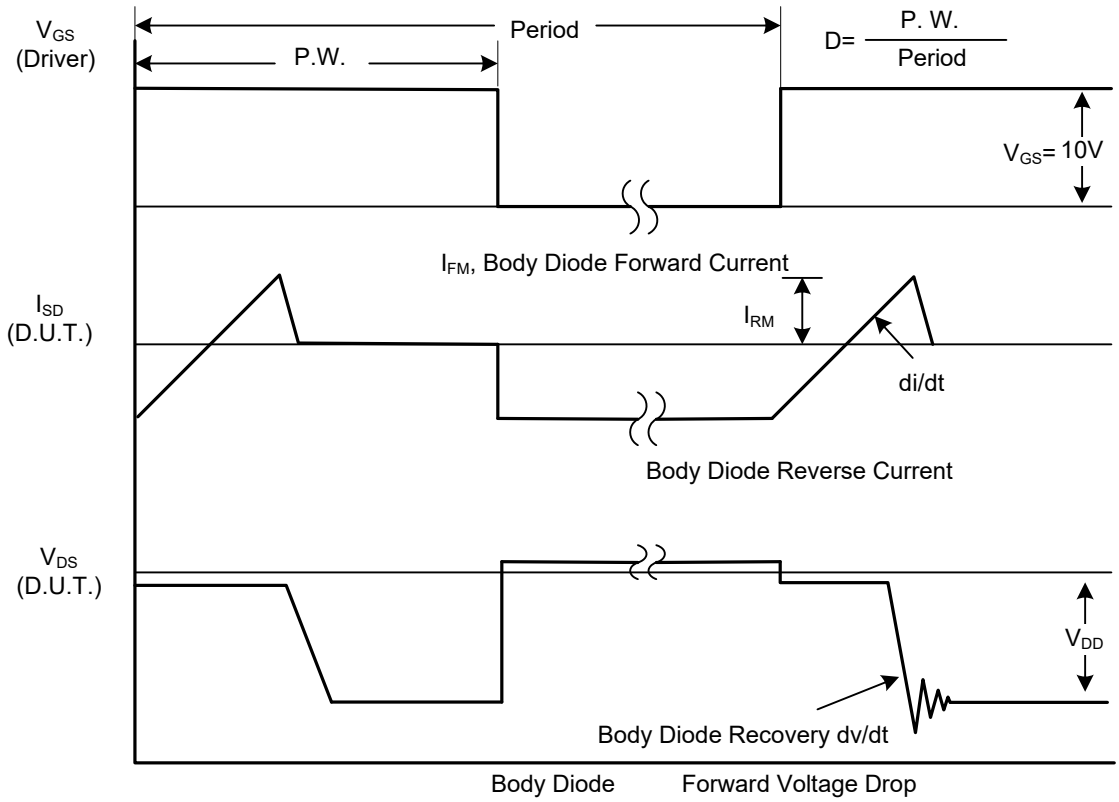
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=-250μA, V_{GS}=0V	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.7	-1.0	-1.3	V
Drain-Source On-State Resistance (Note 2)	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.2A		42	50	mΩ
		V_{GS}=-4.5V, I_D=-4.0A		53	65	mΩ
		V_{GS}=-2.5V, I_D=-1.0A		80	120	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS} =0V, V_{DS} =-15V, f=1MHz		925		pF
Output Capacitance	C_{OSS}			125		pF
Reverse Transfer Capacitance	C_{RSS}			110		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 2)	Q_G	V_{DS}=-15V, V_{GS}=-4.5V, I_D=-4.0A		14.2		nC
Gate-Source Charge	Q_{GS}			3.5		nC
Gate-Drain Charge	Q_{GD}			3		nC
Turn-ON Delay Time (Note 2)	$t_{D(ON)}$	V_{DS}=-15V, V_{GS}=-10V, I_D=-4.0A, R_G =6Ω		7		ns
Turn-ON Rise Time	t_R			15		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			55		ns
Turn-OFF Fall Time	t_F			24		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-2.2	A
Drain-Source Diode Forward Voltage (Note2)	V_{SD}	V_{DS}=0V, I_S=-1.0A		-0.75	-1.0	V
Reverse Recovery Time	t_{rr}	I_F=-4.0A, dI/dt=100A/μs		200		ns
Reverse Recovery Charge	Q_{rr}			400		nC

Notes: 1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Pulse width ≤300μs, duty cycle ≤2%.
3. Surface mounted on 1 in^2 copper pad of FR4 board with 2oz. Copper, in a still air environment with T_A=25°C.

■ TEST CIRCUITS AND WAVEFORMS

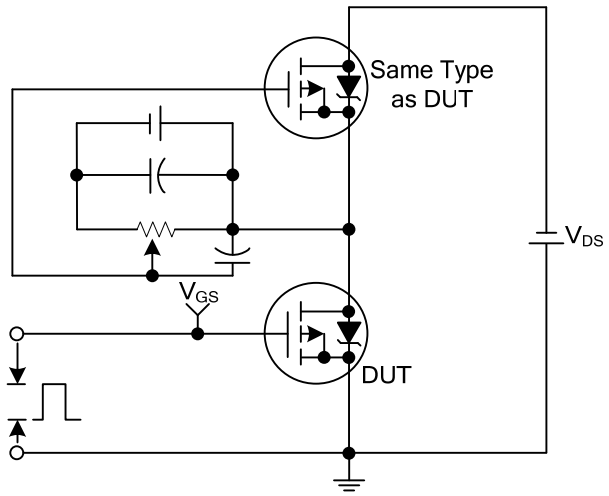


Peak Diode Recovery dv/dt Test Circuit

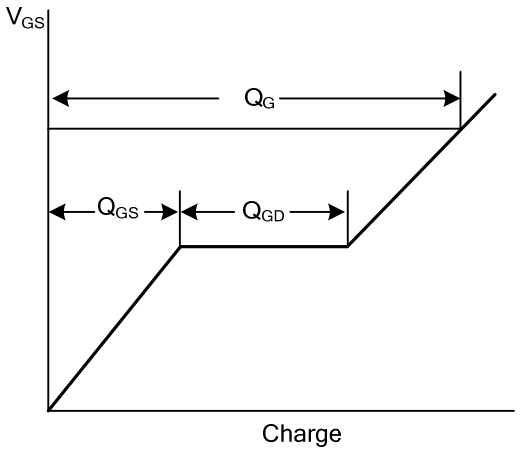


Peak Diode Recovery dv/dt Waveforms

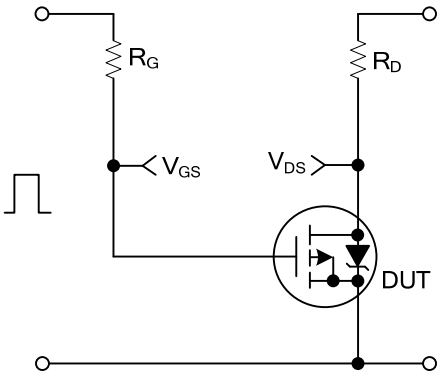
■ TEST CIRCUITS AND WAVEFORMS



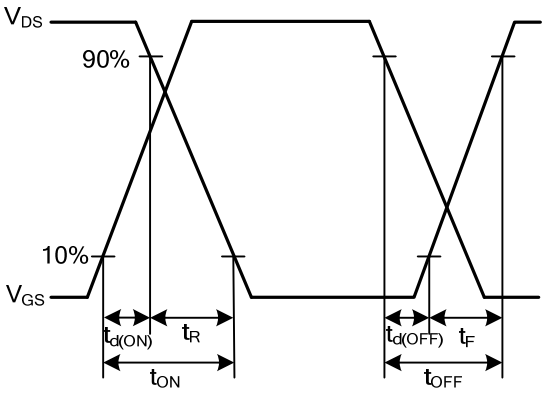
Gate Charge Test Circuit



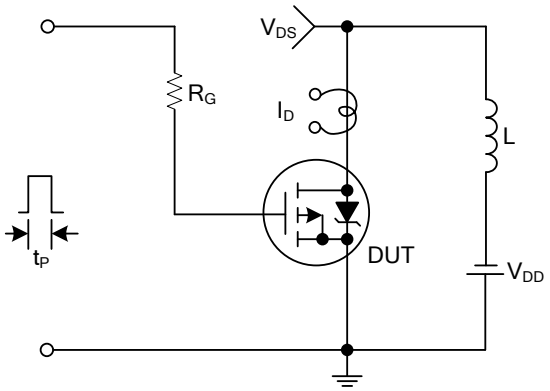
Gate Charge Waveforms



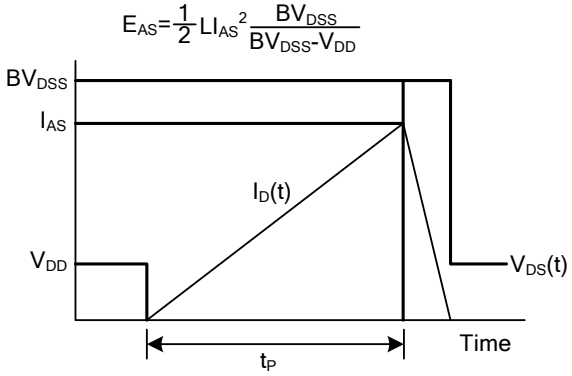
Resistive Switching Test Circuit



Resistive Switching Waveforms



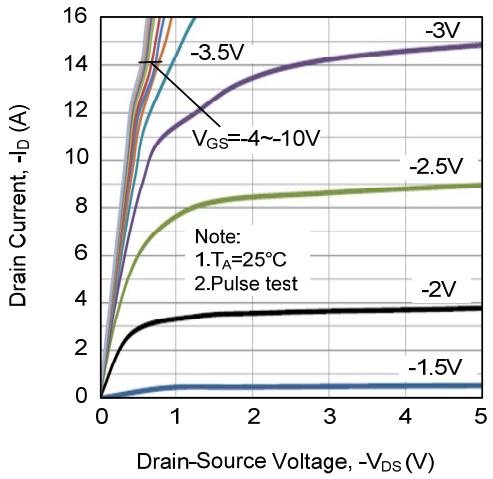
Unclamped Inductive Switching Test Circuit



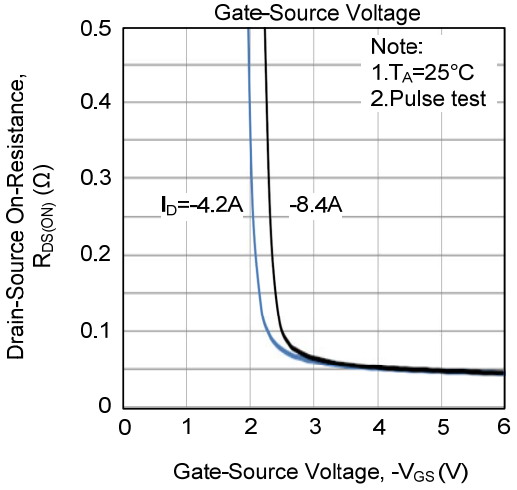
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

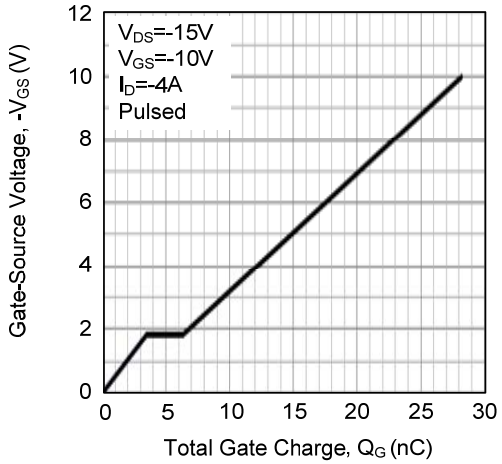
Drain Current vs. Drain-Source Voltage



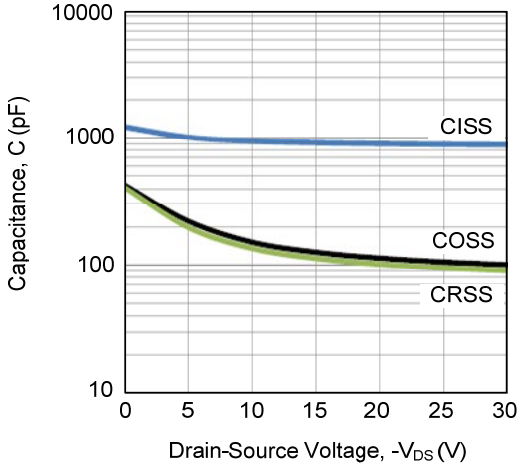
Drain-Source On-Resistance vs. Gate-Source Voltage



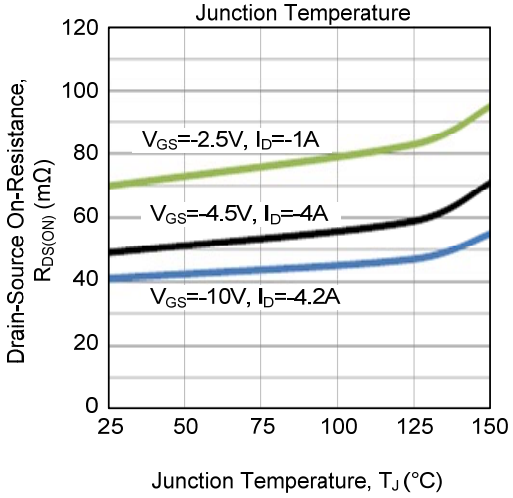
Gate Charge Characteristics



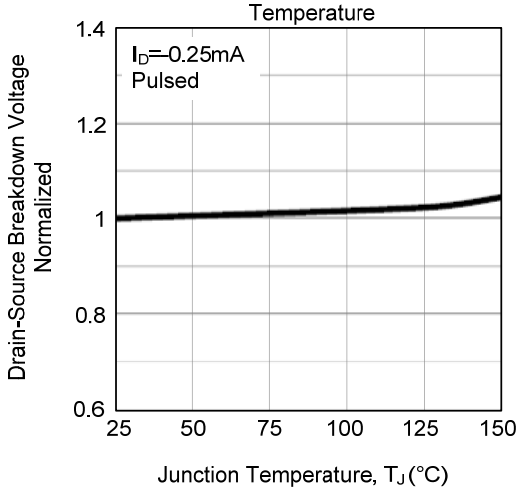
Capacitance Characteristics



Drain-Source On-Resistance vs. Junction Temperature

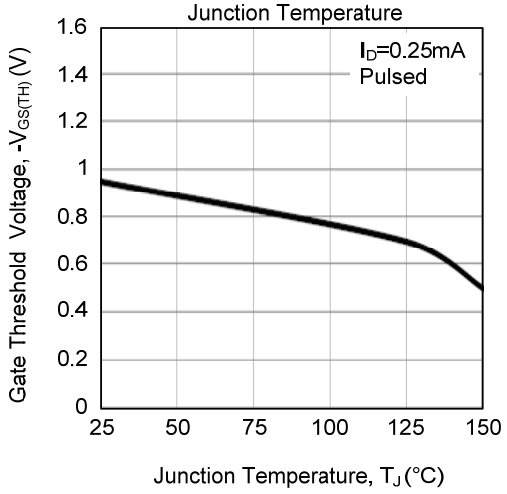


Breakdown Voltage vs. Junction Temperature

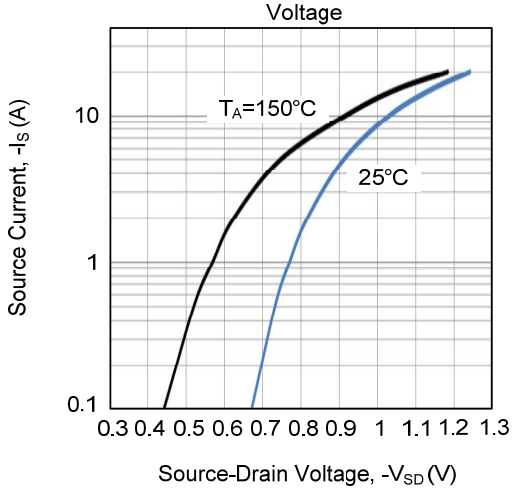


■ TYPICAL CHARACTERISTICS (Cont.)

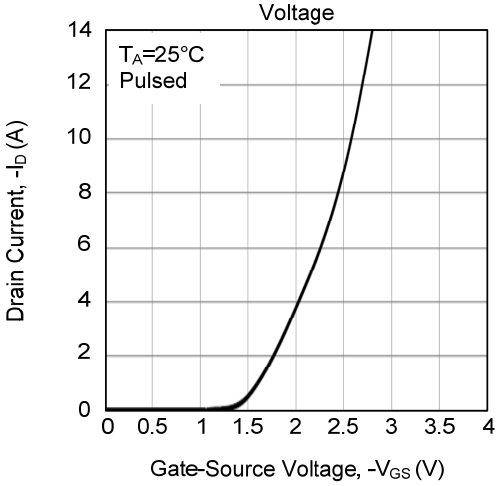
Gate Threshold Voltage vs. Junction Temperature



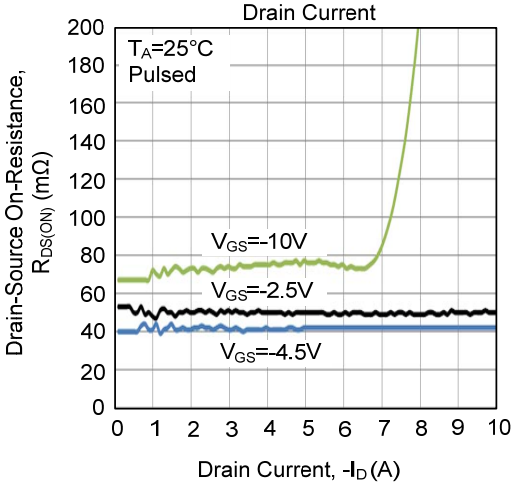
Source Current vs. Source-Drain Voltage



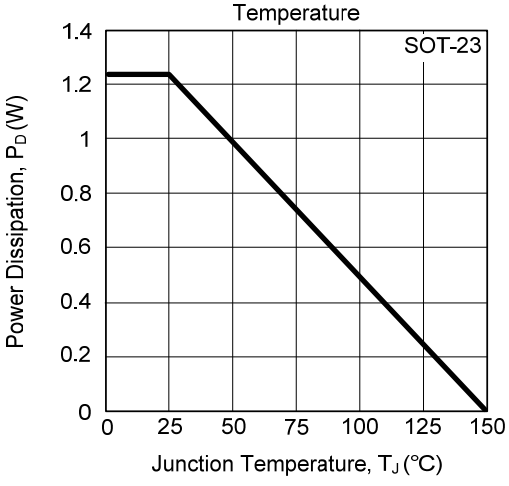
Drain Current vs. Gate-Source Voltage



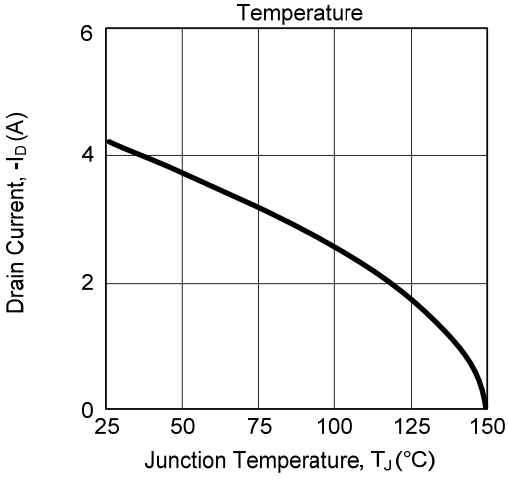
Drain-Source On-Resistance vs. Drain Current



Power Dissipation vs. Junction Temperature

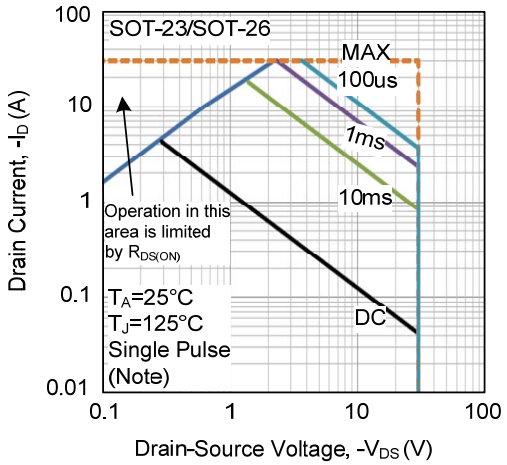


Drain Current vs. Junction Temperature



■ TYPICAL CHARACTERISTICS (Cont.)

Safe Operating Area



Note: Surface mounted on 1 in2 copper pad of FR4 board with 2oz.

Maximum Effective Transient Thermal Impedance, Junction to Ambient