UNISONIC TECHNOLOGIES CO., LTD

UF07P15

Power MOSFET

-0.7A, -150V   P-CHANNEL POWER MOSFET

SOT-23
(EIAJ SC-59)

■ DESCRIPTION

The UTC **UF07P15** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed, cost-effectiveness and a minimum on-state resistance. It can also withstand high energy in the avalanche.

■ FEATURES

* $R_{DS(ON)}$ ≤ 3.1 Ω @ V_{GS}=-10V, I_D=-0.5A
* Low capacitance
* Low gate charge
* Fast switching capability
* Avalanche energy specified

■ SYMBOL

3.Drain
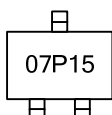
1.Gate
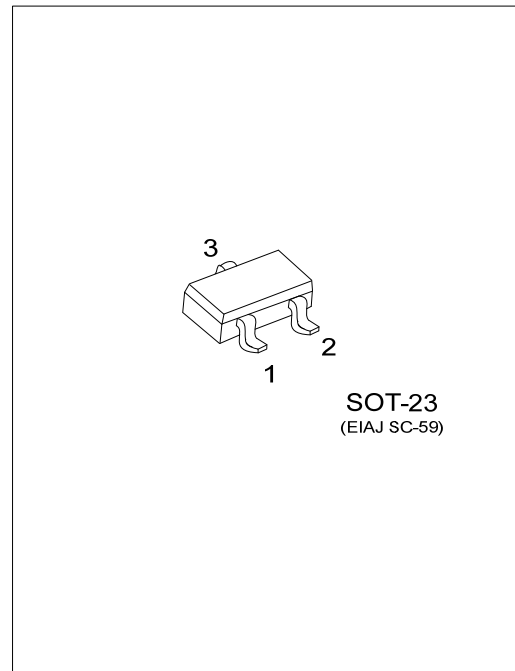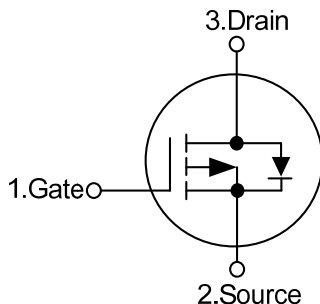
2.Source

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UF07P15L-AE3-R	UF07P15G-AE3-R	SOT-23	G	S	D	Tape Reel

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

UF07P15G-AE3-R

(1)Packing Type   (1) R: Tape Reel

(2)Package Type   (2) AE3: SOT-23

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

■ MARKING

07P15

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-150	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-0.7	A
	Pulsed (Note 2)	I_{DM}	-2.8	A
Power Dissipation		P_D	0.6	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.

■ **THERMAL DATA**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	325	°C/W
Junction to Case	θ_{JC}	208	°C/W

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

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

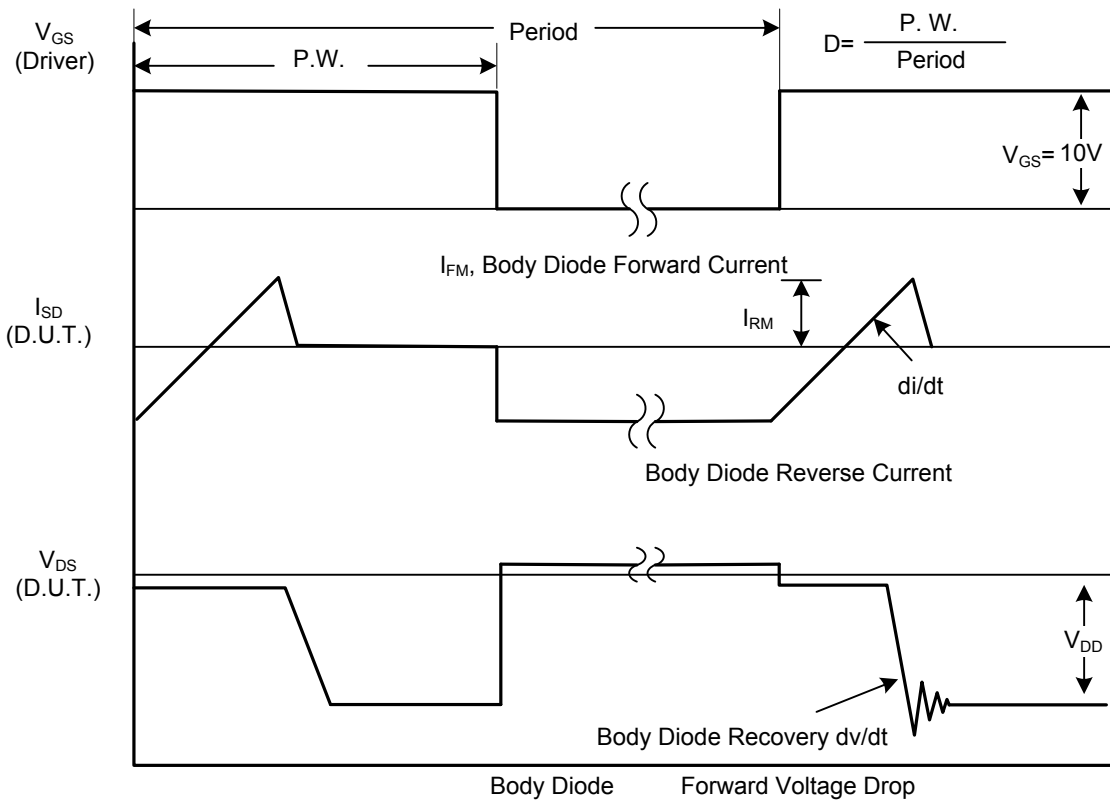| PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0 V, I_D=-250μA	-150			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-150V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-0.5A			3.1	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1.0MHz		175		pF
Output Capacitance	C_{OSS}			26		pF
Reverse Transfer Capacitance	C_{RSS}			8.5		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	V_{DS}=-120V, V_{GS}=-10V, I_D=-0.7A I_G=-1mA (Note 1, 2)		8.2		nC
Gate Source Charge	Q_{GS}			3.5		nC
Gate Drain Charge	Q_{GD}			2.4		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	V_{DD}=-100V, V_{GS}=-10V, I_D=-0.7A, R_G=25Ω (Note 1, 2)		4		ns
Turn-ON Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			11		ns
Turn-OFF Fall-Time	t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				-0.7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				-2.8	A
Diode Forward Voltage (Note 1)	V_{SD}	I_S=-0.1A, V_{GS}=0V			-1.2	V

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

■ **TEST CIRCUITS AND WAVEFORMS**
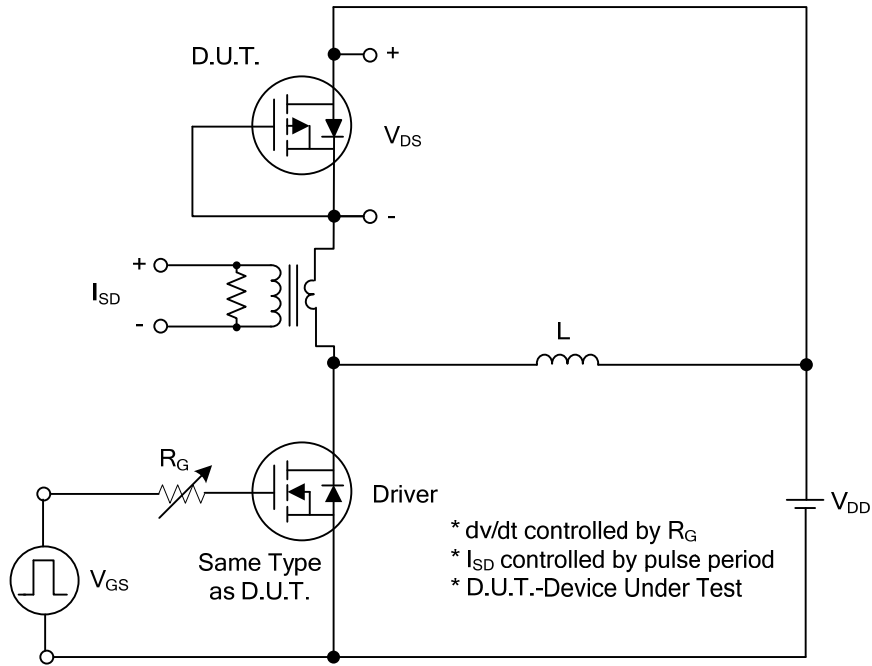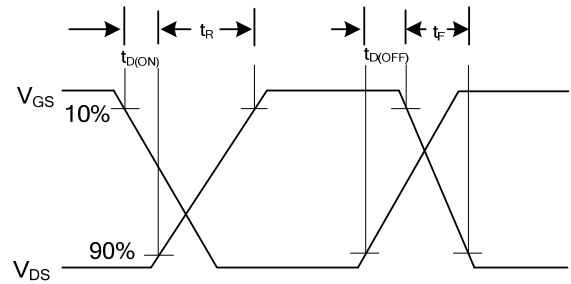

Peak Diode Recovery dv/dt Test Circuit

* dv/dt controlled by R_G
* I_{SD} controlled by pulse period
* D.U.T.-Device Under Test

$$D = \frac{P.W.}{Period}$$

$V_{GS} = 10V$

I_{FM}, Body Diode Forward Current

I_{RM}

di/dt

Body Diode Reverse Current

V_{DD}

Body Diode Recovery dv/dt

Body Diode   Forward Voltage Drop

Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS
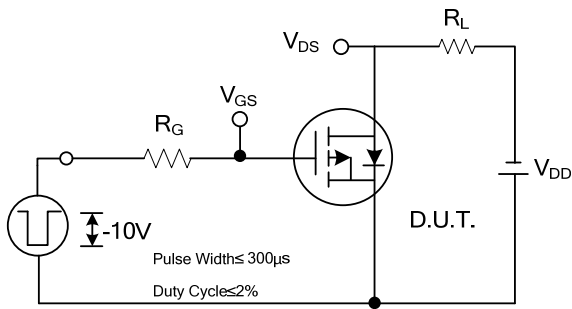
Switching Test Circuit

Switching Waveforms
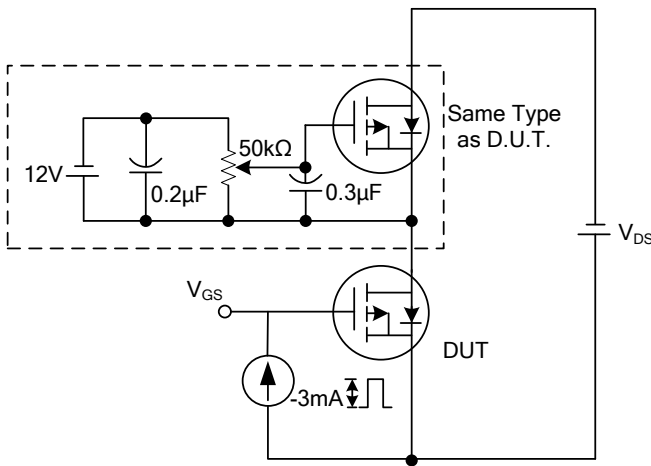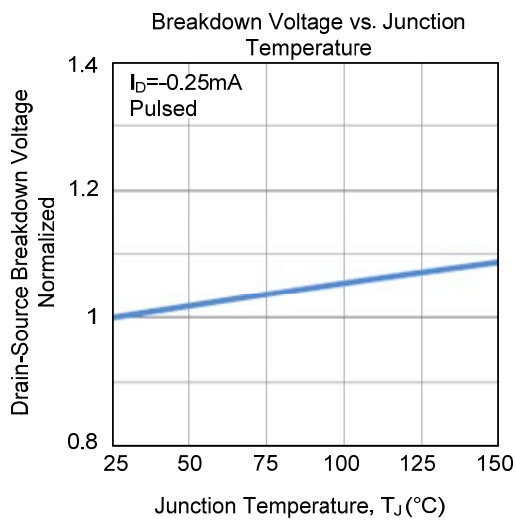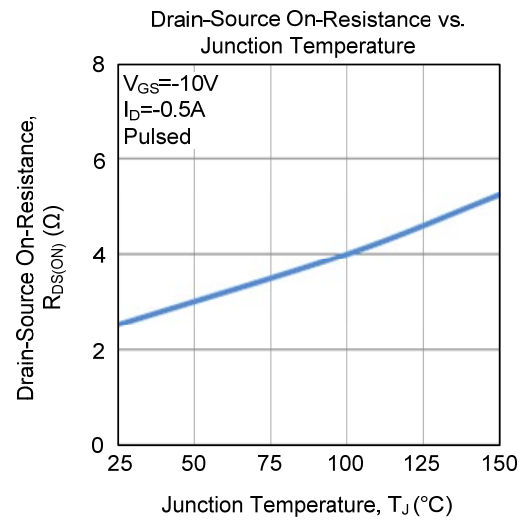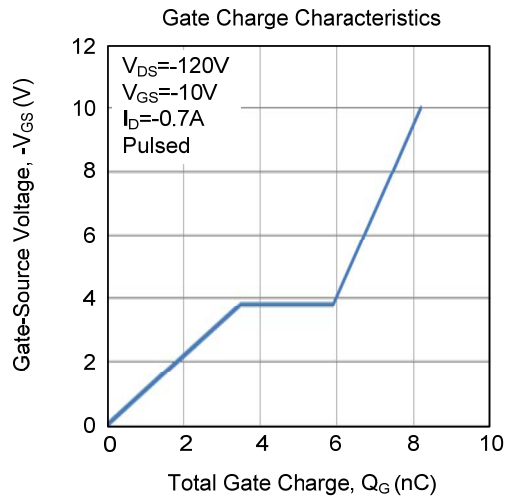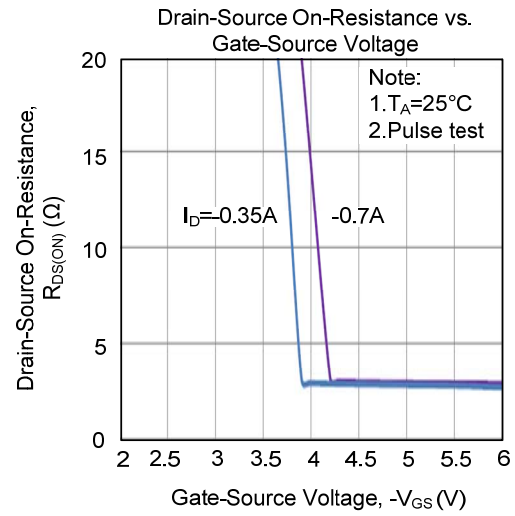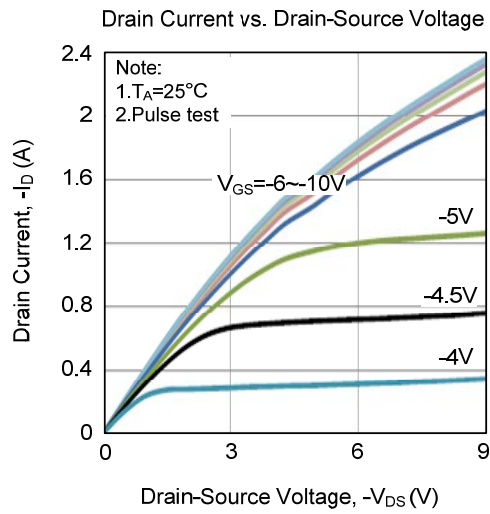
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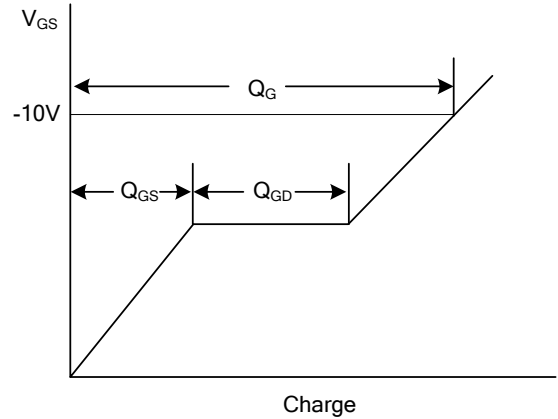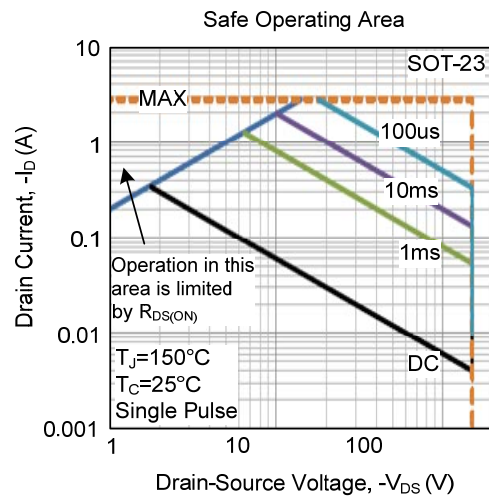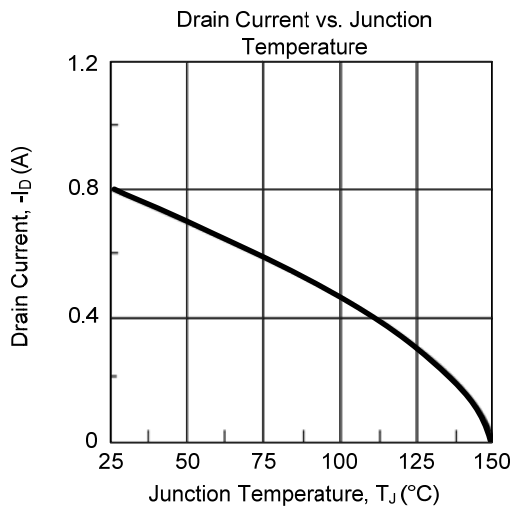
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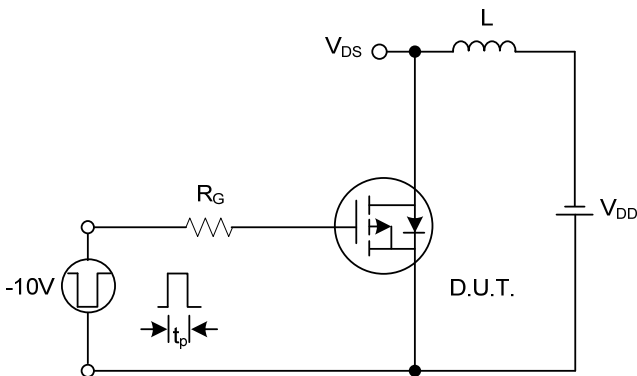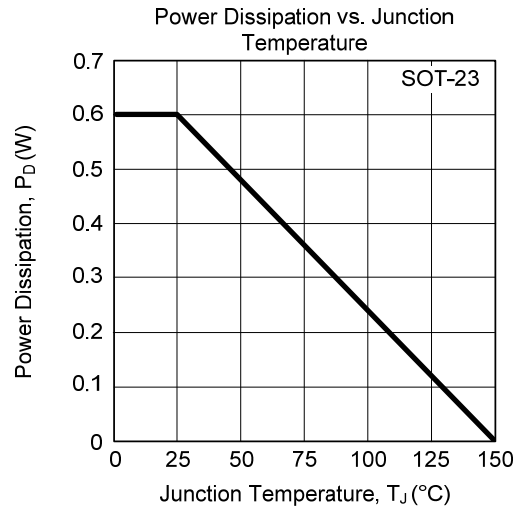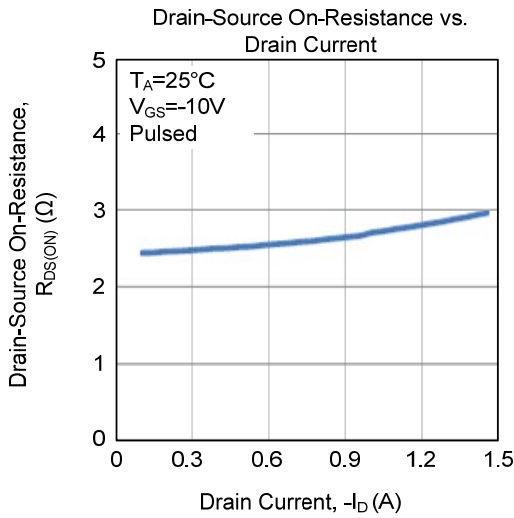
Unclamped Inductive Switching Test Circuit
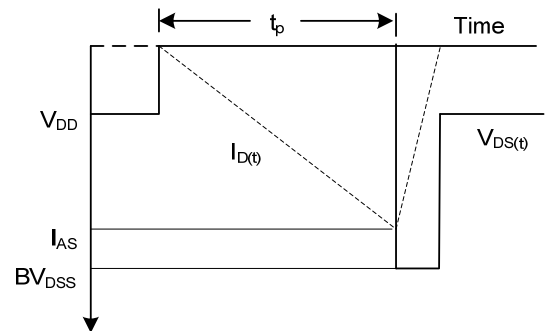
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

Drain Current vs. Drain-Source Voltage

Note:
1. T_A=25°C
2. Pulse test

V_{GS}=-6~-10V

-5V

-4.5V

-4V

Drain Current, $-I_D$ (A)

Drain-Source Voltage, $-V_{DS}$ (V)

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

Note:
1. T_A=25°C
2. Pulse test

I_D=-0.35A   -0.7A

Drain-Source On-Resistance, $R_{DS(ON)}$ (Ω)

Gate-Source Voltage, $-V_{GS}$ (V)

Gate Charge Characteristics

V_{DS}=-120V
V_{GS}=-10V
I_D=-0.7A
Pulsed

Gate-Source Voltage, $-V_{GS}$ (V)

Total Gate Charge, Q_G (nC)

Drain-Source On-Resistance vs. Junction Temperature

V_{GS}=-10V
I_D=-0.5A
Pulsed

Drain-Source On-Resistance, $R_{DS(ON)}$ (Ω)

Junction Temperature, T_J (°C)

Breakdown Voltage vs. Junction Temperature

I_D=-0.25mA
Pulsed

Drain-Source Breakdown Voltage Normalized

Junction Temperature, T_J (°C)

Gate Threshold Voltage vs. Junction Temperature

I_D=-0.25mA
Pulsed

Gate Threshold Voltage, $-V_{GS(TH)}$ (V)

Junction Temperature, T_J (°C)

■ **TYPICAL CHARACTERISTICS (Cont.)**

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

Safe Operating Area

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