

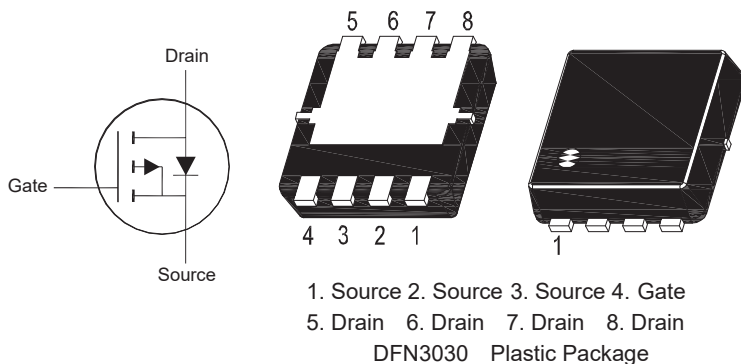
P-Channel Enhancement Mode MOSFET

Features

- Surface-mounted package
- Low Gate-Source Threshold Voltage
- Halogen and Antimony Free(HAF), RoHS compliant

Applications

- Load Switches
- Battery Switch



Key Parameters

Parameter	Value	Unit
$-BV_{DS}$	30	V
$R_{DS(ON)}$ Max	26 @ $-V_{GS} = 10V$	m Ω
	42 @ $-V_{GS} = 4.5V$	
$-V_{GS(th)}$ typ	1.5	V
Qg typ	22 @ $-V_{GS} = 10 V$	nC

Absolute Maximum Ratings (at $T_a = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current ($T_j = 150^\circ C$)	$-I_D$	11.4 9.1 $8.1^{1) 2)}$ $6.5^{1) 2)}$	A
Peak Drain Current, Pulsed	$-I_{DM}$	60	A
Single-Pulse Avalanche Current ($L = 0.1$ mH)	$-I_{AS}$	20	A
Single-Pulse Avalanche Energy ($L = 0.1$ mH)	E_{AS}	20	mJ
Power Dissipation	P_D	5 3.2 $2.5^{1) 2)}$ $1.6^{1) 2)}$	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ C$

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ^{1) 3)}	$R_{\theta JA}$	50	$^\circ C/W$

¹⁾ Surface mount on 1" x 1" FR4 board .

²⁾ $t = 10$ s .

³⁾ Maximum under Steady State Conditions is 85 $^\circ C/W$.

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $-I_D = 250\ \mu\text{A}$	$-BV_{DS}$	30	-	-	V
Drain-Source Leakage Current at $-V_{DS} = 30\ \text{V}$	$-I_{DSS}$	-	0.02	1	μA
Gate Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $-V_{DS} = -V_{GS}$, $-I_D = 250\ \mu\text{A}$	$-V_{GS(th)}$	1	1.5	2.5	V
Drain-Source On-State Resistance at $-V_{GS} = 10\ \text{V}$, $-I_D = 9.1\ \text{A}$ at $-V_{GS} = 4.5\ \text{V}$, $-I_D = 6.9\ \text{A}$	$R_{DS(on)}$	- -	22 38	26 42	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $-V_{DS} = 10\ \text{V}$, $-I_D = 9.1\ \text{A}$	g_{FS}	-	10	-	S
Gate Resistance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g	-	5	-	Ω
Input Capacitance at $-V_{DS} = 15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	1306	-	pF
Output Capacitance at $-V_{DS} = 15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	139	-	pF
Reverse Transfer Capacitance at $-V_{DS} = 15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	109	-	pF
Total Gate Charge at $-V_{DS} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 10\ \text{A}$ at $-V_{GS} = 4.5\ \text{V}$, $-V_{DS} = 15\ \text{V}$, $-I_D = 10\ \text{A}$	Q_g	- -	22 11	- -	nC
Gate-Source Charge at $-V_{DS} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 10\ \text{A}$	Q_{gs}	-	3.9	-	nC
Gate-Drain Charge at $-V_{DS} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 10\ \text{A}$	Q_{gd}	-	3.9	-	nC
Turn-On Delay Time at $-V_{DD} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 6\ \text{A}$, $R_G = 3.3\ \Omega$, $R_L = 2.5\ \Omega$	$t_{d(on)}$	-	4	-	ns
Turn-On Rise Time at $-V_{DD} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 6\ \text{A}$, $R_G = 3.3\ \Omega$, $R_L = 2.5\ \Omega$	t_r	-	13	-	ns
Turn-Off Delay Time at $-V_{DD} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 6\ \text{A}$, $R_G = 3.3\ \Omega$, $R_L = 2.5\ \Omega$	$t_{d(off)}$	-	71	-	ns
Turn-Off Fall Time at $-V_{DD} = 15\ \text{V}$, $-V_{GS} = 10\ \text{V}$, $-I_D = 6\ \text{A}$, $R_G = 3.3\ \Omega$, $R_L = 2.5\ \Omega$	t_f	-	9	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $-I_S = 2\ \text{A}$, $V_{GS} = 0\ \text{V}$	$-V_{SD}$	-	0.72	1.2	V
Body-Diode Continuous Current	$-I_S$	-	-	11.4	A
Body-Diode Continuous Current, Pulsed	$-I_{SM}$	-	-	60	A
Body Diode Reverse Recovery Time at $-I_S = 6\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	t_{rr}	-	12	-	ns
Body Diode Reverse Recovery Charge at $-I_S = 6\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$	Q_{rr}	-	3.9	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

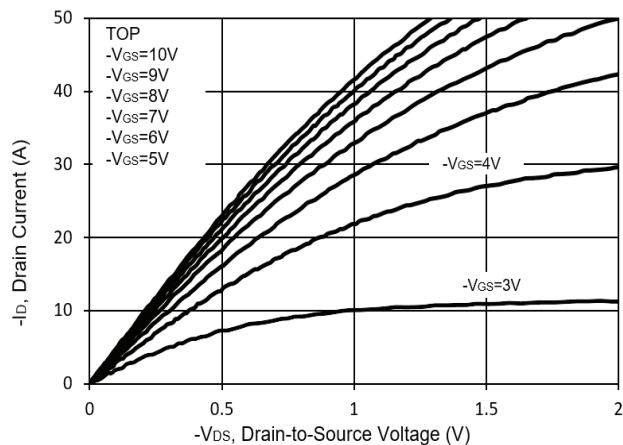


Fig. 2 Typical Transfer Characteristics

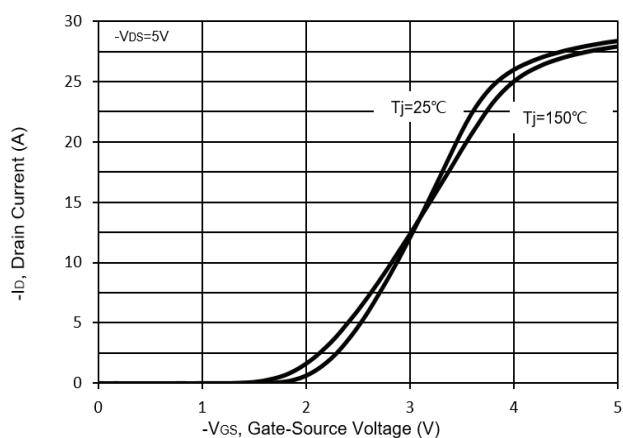


Fig. 3 on-Resistance vs. Gate to Source Voltage

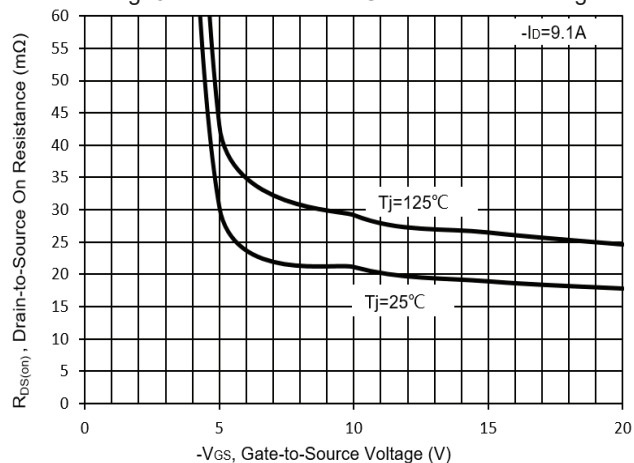


Fig. 4 on-Resistance vs. T_J

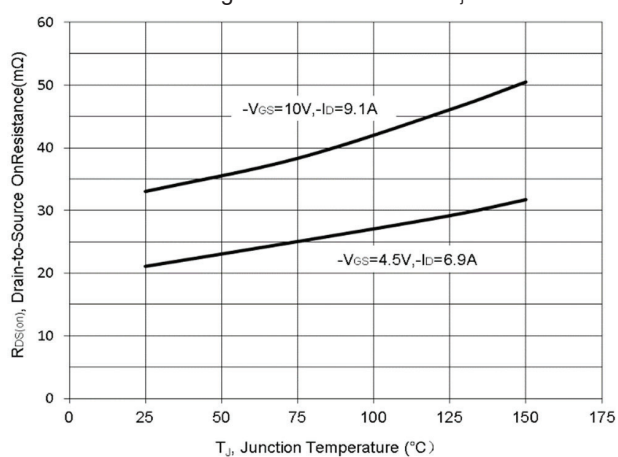


Fig. 5 Drain Source vs. on-Resistance

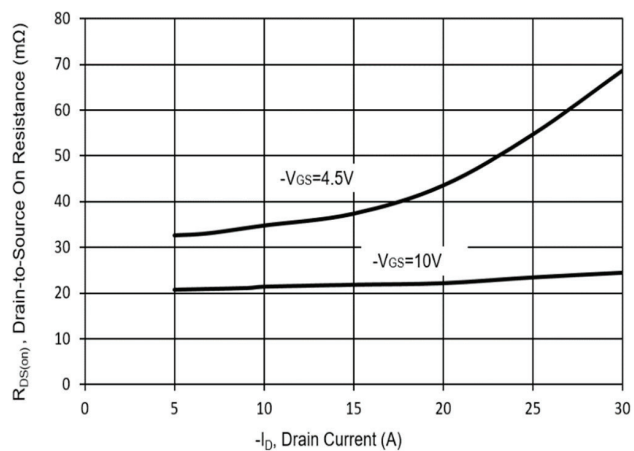
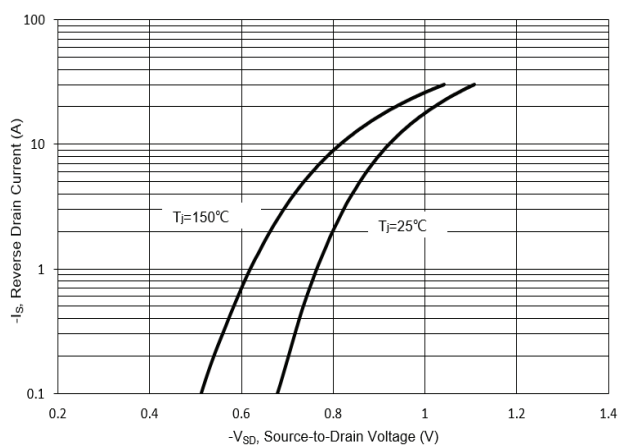


Fig. 6 Typical Body Diode Forward Characteristics



Test Circuits

Fig.1-1 Switching times test circuit

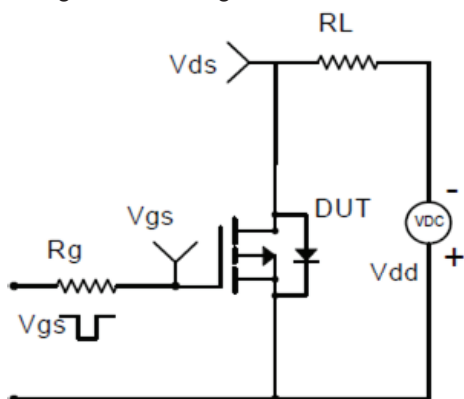


Fig.1-2 Switching Waveform

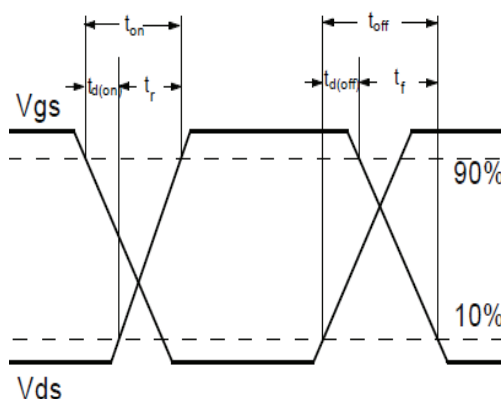


Fig.2-1 Gate charge test circuit

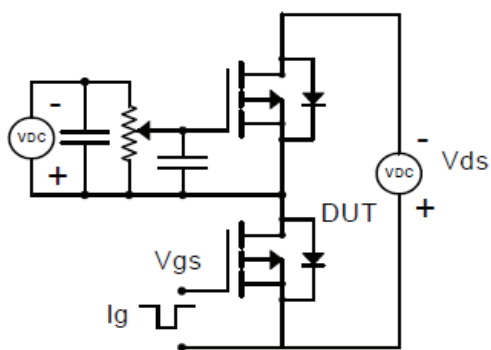


Fig.2-2 Gate charge waveform

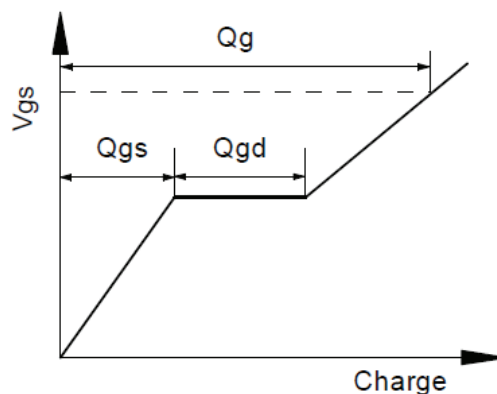


Fig.3-1 Avalanche test circuit

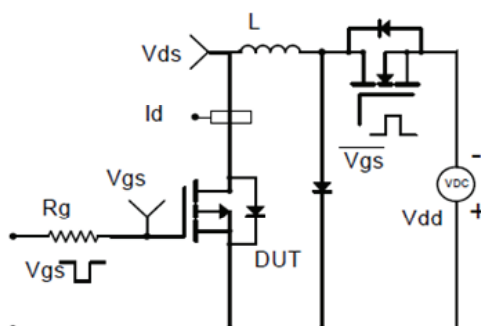
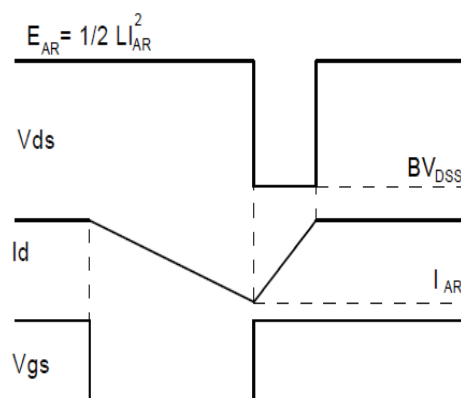
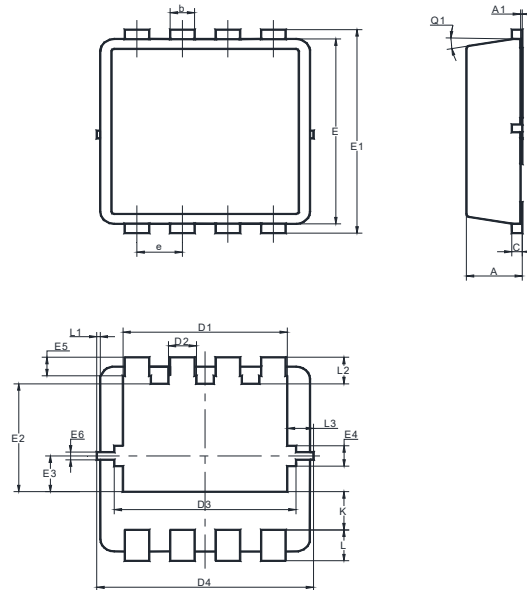


Fig.3-2 Avalanche waveform



Package Outline Dimensions (Units: mm)

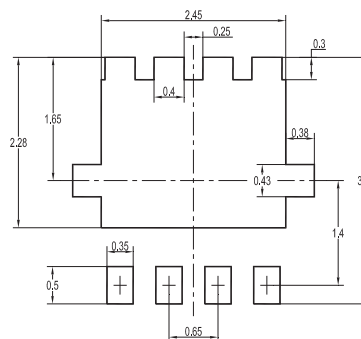
DFN3030



UNIT	A	A1	b	c	D1	D2	D3	D4	E	E1	E2	E3	E4
mm	0.9	0.05	0.35	0.25	2.6	0.5	2.7	3.2	3.1	3.3	1.85	0.68	0.43
	0.7	0	0.24	0.1	2.4	0.3	2.5	3	2.9	3.1	1.65	0.48	0.23

UNIT	E5	E6	e	K	L	L1	L2	L3	θ1
mm	0.4	0.25	0.7	0.72	0.5	0.1	0.53	0.475	12°
	0.2	0.15	0.6	0.52	0.3	0	0.33	0.275	0°

Recommended Soldering Footprint



Packing information

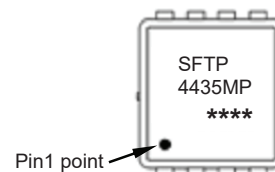
Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN3030	12	8 ± 0.1	0.315 ± 0.004	330	13	5,000

Marking information

" SFTP4435MP " = Part No.

" **** " = Date Code Marking

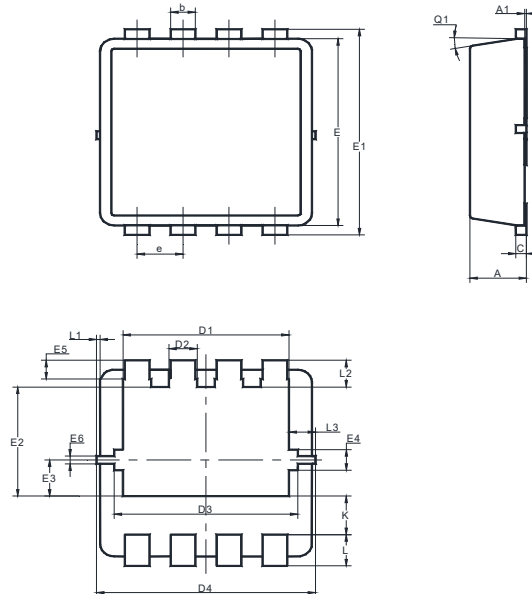
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Package Outline Dimensions (Units: mm)

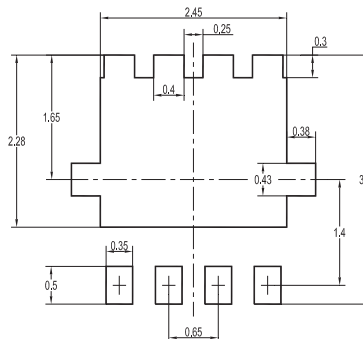
DFN3030



UNIT	A	A1	b	c	D1	D2	D3	D4	E	E1	E2	E3	E4
mm	0.9	0.05	0.35	0.25	2.6	0.5	2.7	3.2	3.1	3.3	1.85	0.68	0.43
	0.7	0	0.24	0.1	2.4	0.3	2.5	3	2.9	3.1	1.65	0.48	0.23

UNIT	E5	E6	e	K	L	L1	L2	L3	θ1
mm	0.4	0.25	0.7	0.72	0.5	0.1	0.53	0.475	12°
	0.2	0.15	0.6	0.52	0.3	0	0.33	0.275	0°

Recommended Soldering Footprint



Packing information

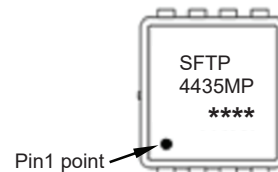
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		mm	inch	mm	inch	
DFN3030	12	8 ± 0.1	0.315 ± 0.004	330	13	5,000

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Electrical Characteristics Curves

Fig. 7 $V_{(BR)DSS}$ vs. Junction Temperature

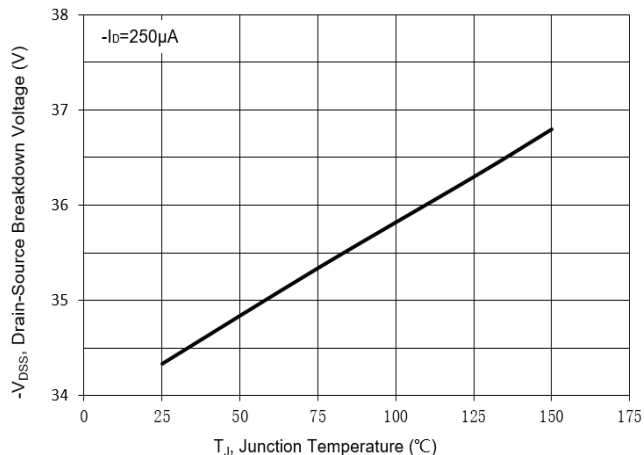


Fig. 8 Gate Threshold Variation vs. T_J

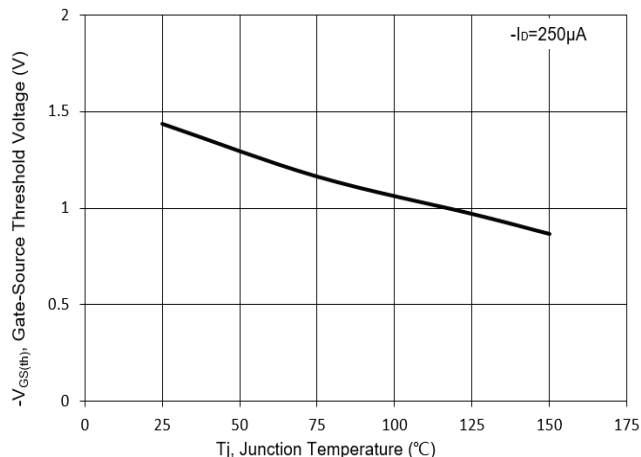


Fig. 9 Typical Junction Capacitance

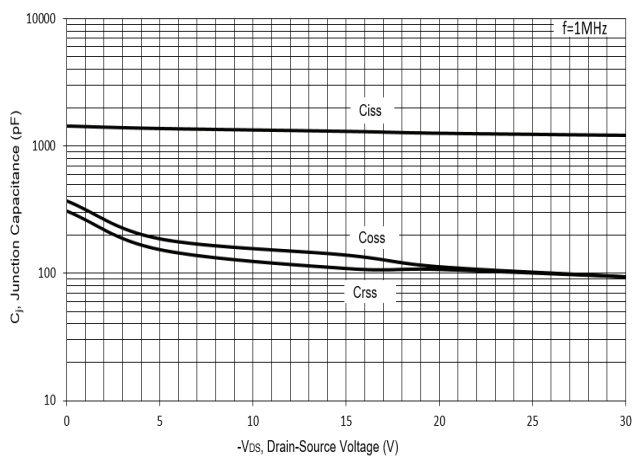


Fig. 10 Gate Charge

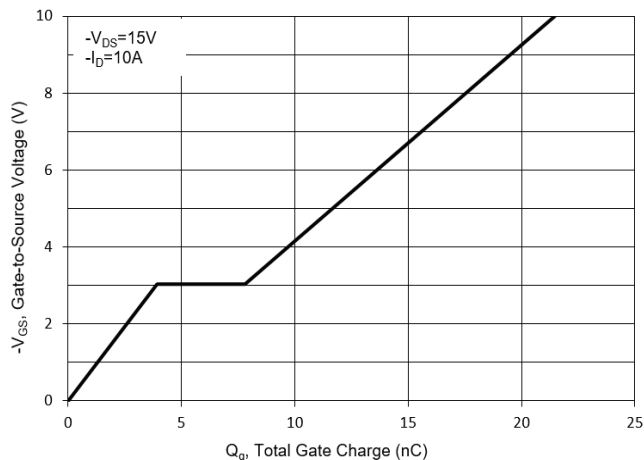


Fig. 11 Drain-Source Leakage Current

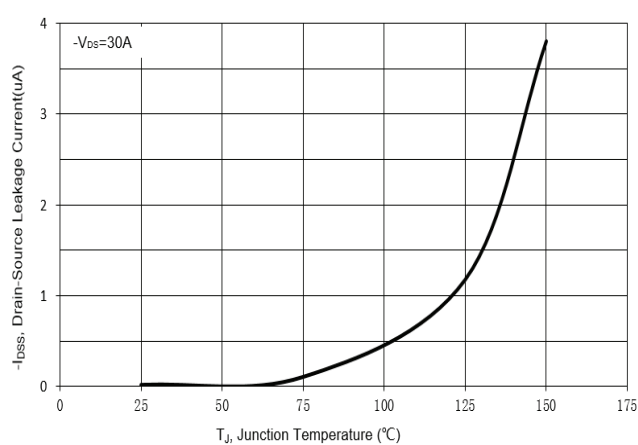


Fig. 12 Safe Operation Area

