

SLS30L03T

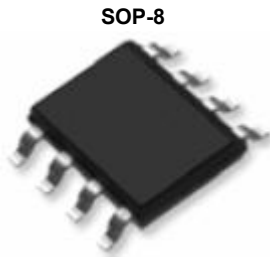
N And P-Channel Enhancement Mode MOSFET

General Description

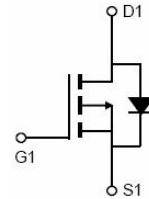
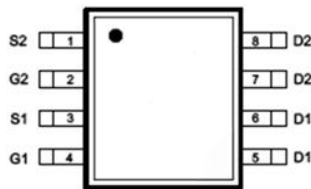
This Power MOSFET is produced using Maple semi's advanced planar stripeTRENCH technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for AC/DC power conversion in switching mode operation for higher efficiency.

Features

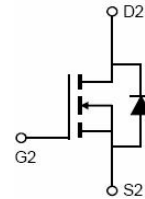
- N-Channel: 30V 6A
 $R_{DS(on)Typ} = 18.6m\Omega @ V_{GS} = 10V$
 $R_{DS(on)Typ} = 30m\Omega @ V_{GS} = 4..5V$
- P-Channel: -30V- 6A
 $R_{DS(on)Typ} = 27m\Omega @ V_{GS} = 10V$
 $R_{DS(on)Typ} = 42m\Omega @ V_{GS} = 4..5V$
- Very Low On-resistance RDS(ON)
- LowCrss (typical 5.7pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



SOP-8



P-Channel



N-Channel

Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DSS}	Drain-Source Voltage	30	-30	V
I_D	Drain Current - Continuous ($T_C = 25^\circ C$) - Continuous ($T_C = 100^\circ C$)	6	-6	A
		5	-5	A
I_{DM}	Drain Current - Pulsed (Note 1)	30	-30	A
V_{GSS}	Gate-Source Voltage	± 20	± 20	V
P_D	Power Dissipation ($T_C = 25^\circ C$)	2		W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	100		W/ $^\circ C$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		$^\circ C$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300		$^\circ C$

* Drain current limited by maximum junction temperature.

N-Channel Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 24\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.55	3.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 6\text{ A}$	--	18.6	22	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 5\text{ A}$	-	30	37	
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 6\text{ A}$	--	15	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	255	310	pF
C_{oss}	Output Capacitance		--	45	60	pF
C_{rSS}	Reverse Transfer Capacitance		--	35	37	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V},$ $R_L = 2.5\text{ }\Omega, R_{REN} = 3\text{ }\Omega$	--	4.5	--	ns
t_r	Turn-On Rise Time		--	2.5	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	14.5	--	ns
t_f	Turn-Off Fall Time		--	3.5	--	ns
Q_g	Total Gate Charge	$V_{DS} = 15\text{ V}, I_D = 6\text{ A},$ $V_{GS} = 10\text{ V}$	--	5.2	--	nC
Q_{gs}	Gate-Source Charge		--	2.5	--	nC
Q_{gd}	Gate-Drain Charge		--	1.0	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	6	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	30	A

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Widths \leq 300 μ s, Duty Cycle \leq 2%

P-Channel Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 24\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.8	-1.32	-2.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{ V}, I_D = -6\text{ A}$	--	27	352	m Ω
		$V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$	-	42	50	
g_{FS}	Forward Transconductance	$V_{DS} = -5\text{ V}, I_D = -6\text{ A}$	--	18	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	760	-	pF
C_{oss}	Output Capacitance		--	140	-	pF
C_{rss}	Reverse Transfer Capacitance		--	95	-	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = -10\text{ V}, V_{DS} = -15\text{ V},$ $R_L = 2.3\text{ }\Omega, R_{REN} = 3\text{ }\Omega$	--	11	--	ns
t_r	Turn-On Rise Time		--	35	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	30	--	ns
t_f	Turn-Off Fall Time		--	10	--	ns
Q_g	Total Gate Charge	$V_{DS} = -15\text{ V}, I_D = -6\text{ A},$ $V_{GS} = -10\text{ V}$	--	13.6	--	nC
Q_{gs}	Gate-Source Charge		--	2.5	--	nC
Q_{gd}	Gate-Drain Charge		--	3.2	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	-6	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	-30	A

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Widths $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

N- Channel Typical Characteristics

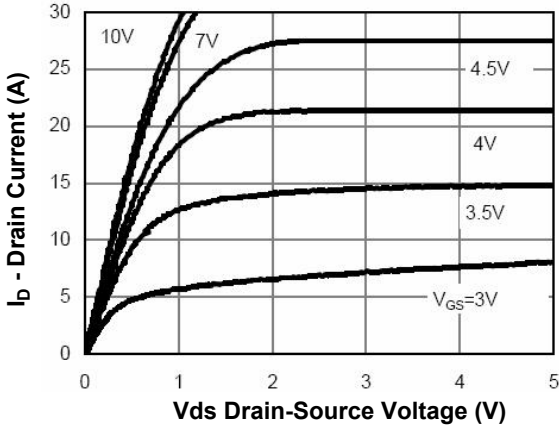


Figure 1. On-Region Characteristics

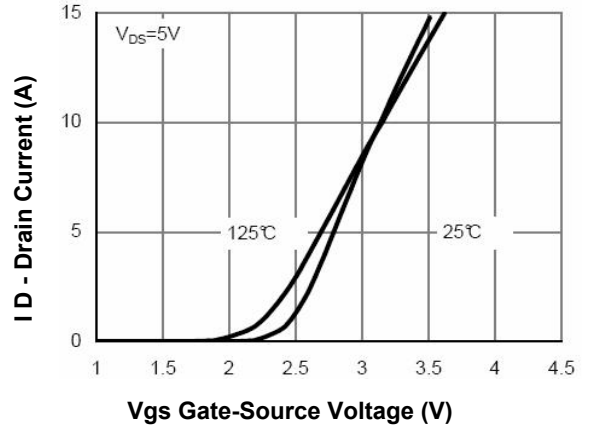


Figure 2. Transfer Characteristics

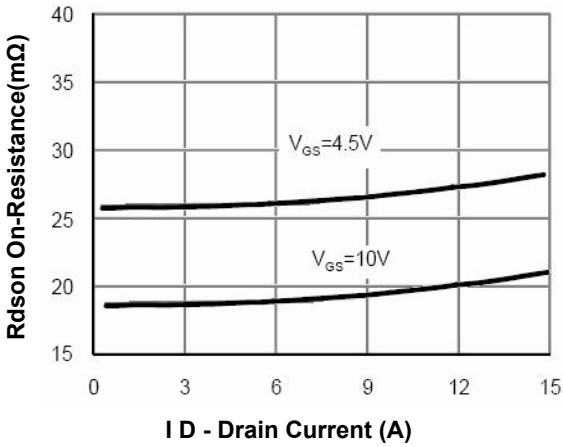


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

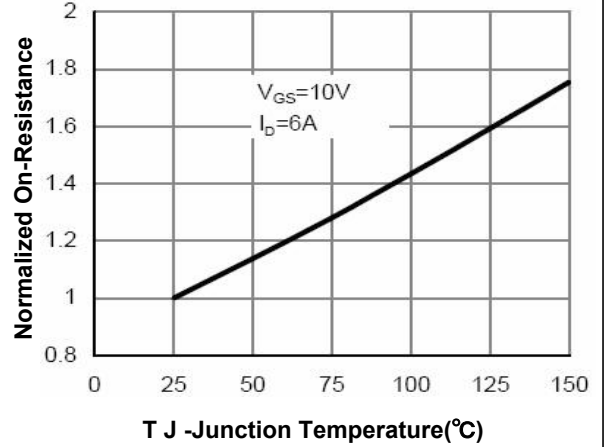


Figure 4. On-Resistance Variation vs Temperature

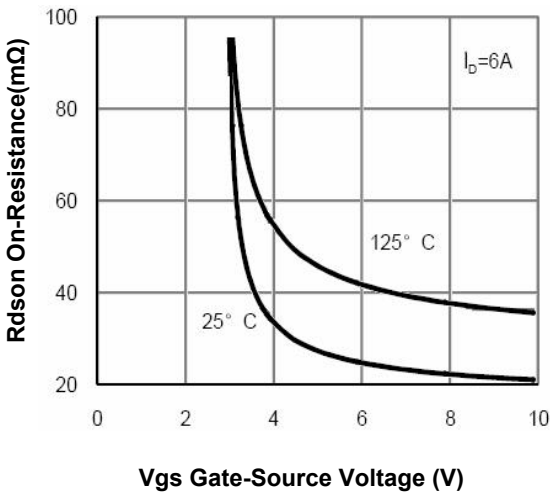


Figure 5. On-Resistance Variation vs Temperature

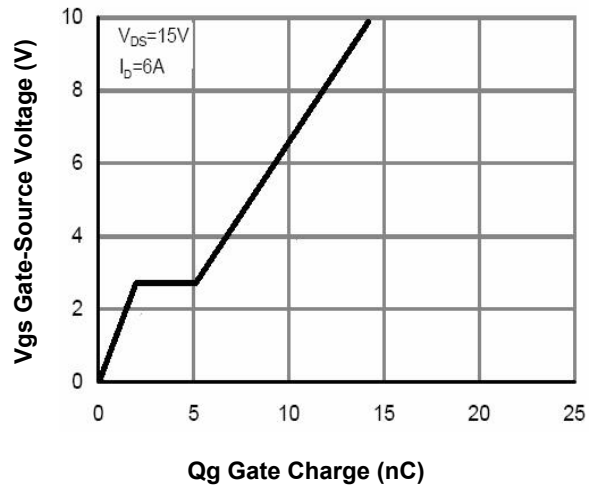


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

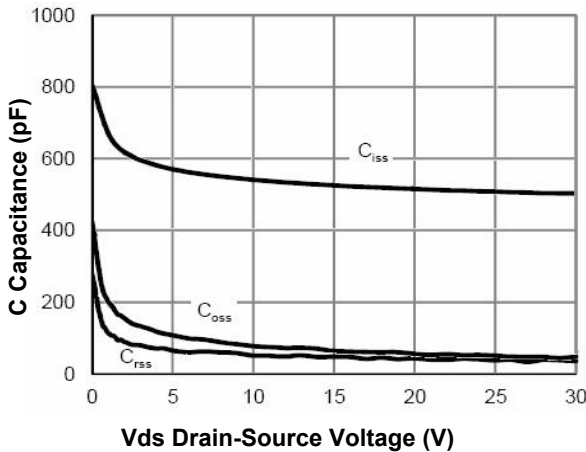


Figure 7. Capacitance vs Vds

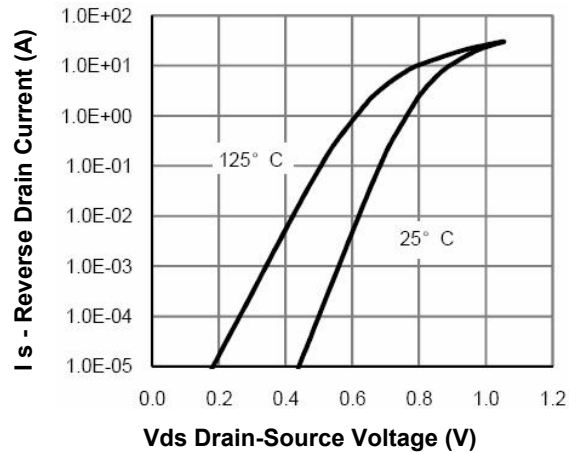


Figure 8. Reverse Drain Current vs Temperature

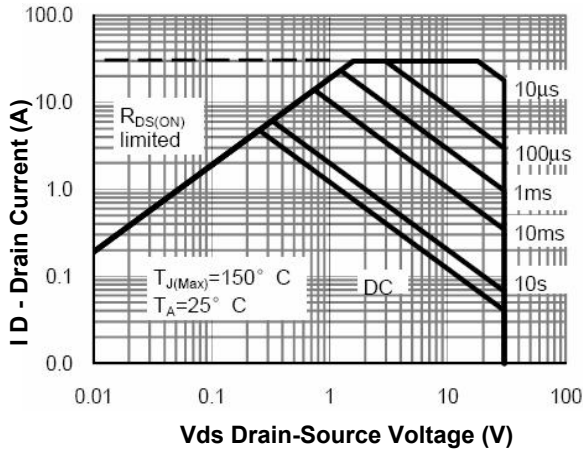


Figure 9. Maximum Safe Operating Area

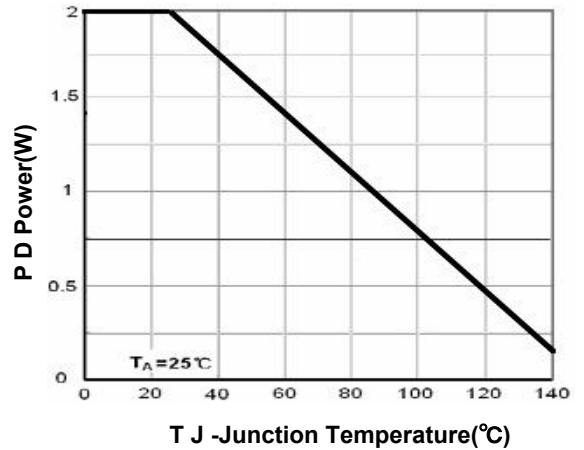


Figure 10. Maximum Power Dissipation vs Case Temperature

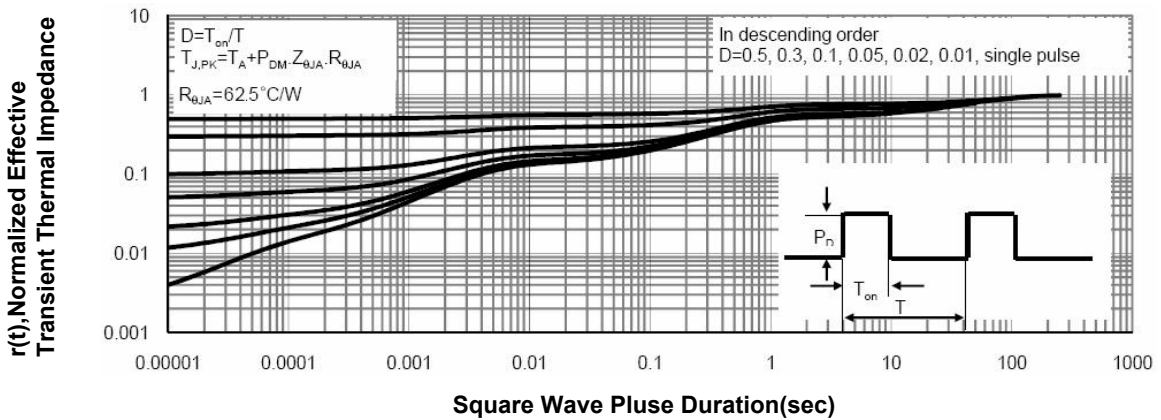


Figure 11. Transient Thermal Response Curve

P- Channel Typical Characteristics

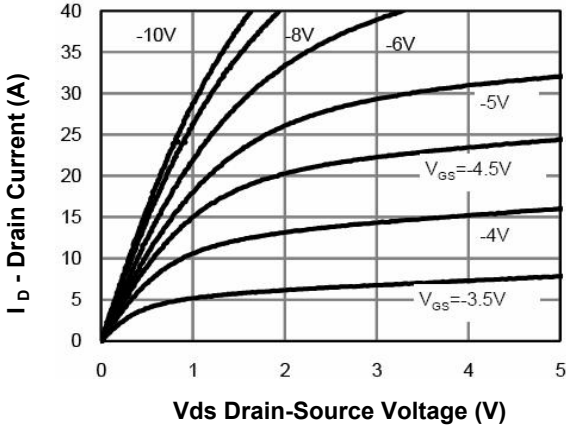


Figure 1. On-Region Characteristics

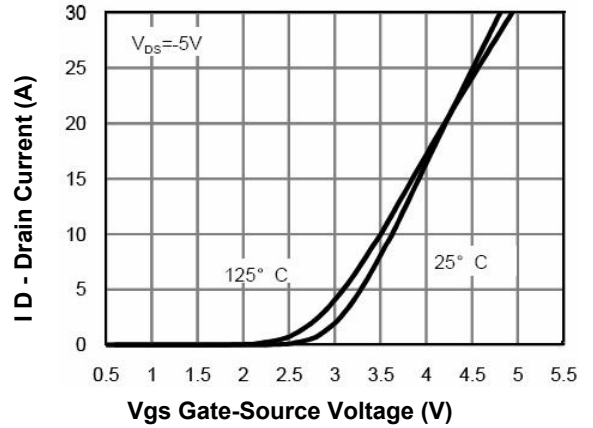


Figure 2. Transfer Characteristics

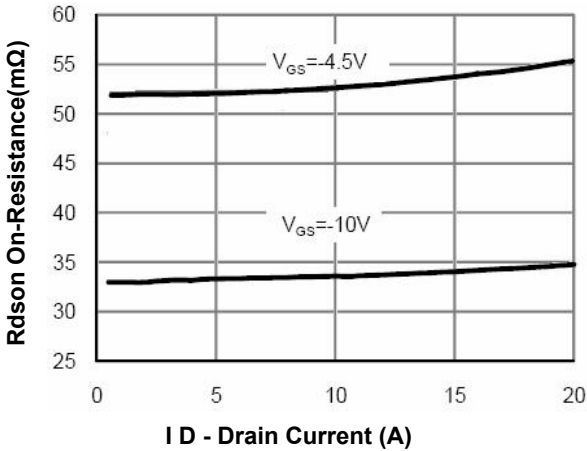


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

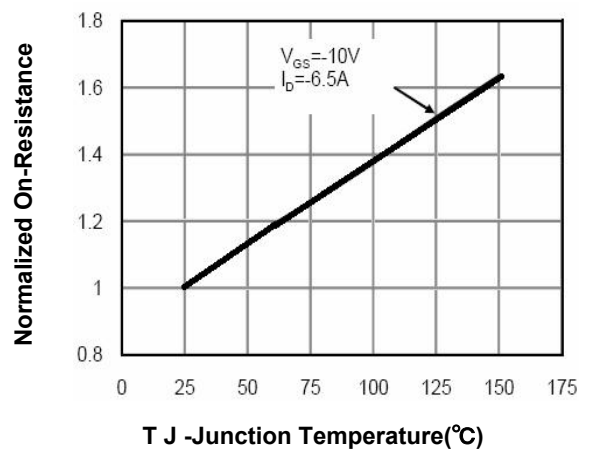


Figure 4. On-Resistance Variation vs Temperature

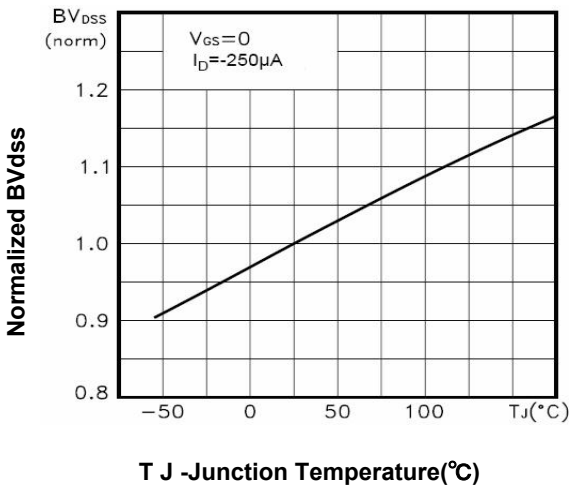


Figure 5. BV DSS vs Junction Temperature

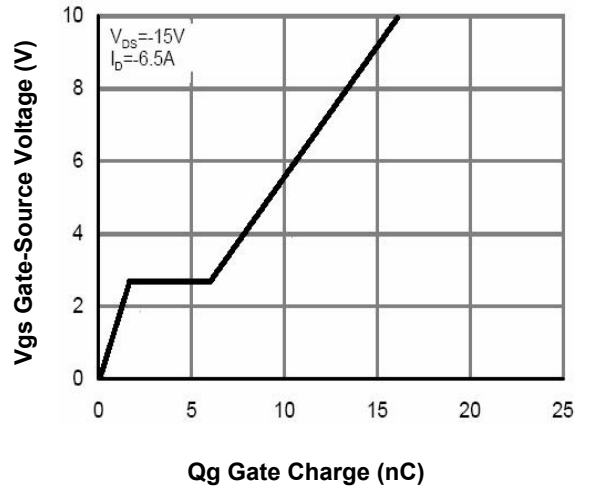


Figure 6. Gate Charge Characteristics

P- Channel Typical Characteristics (Continued)

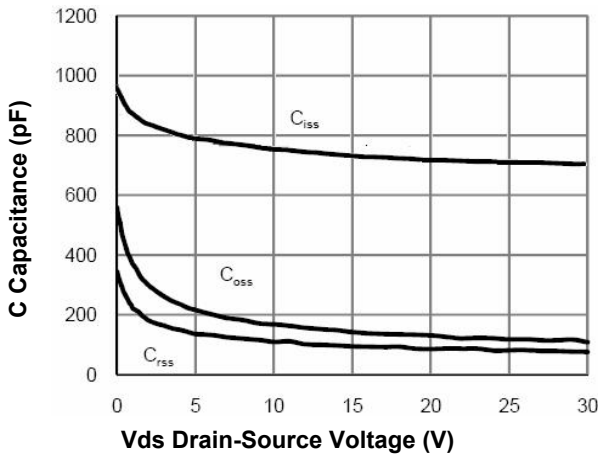


Figure 7. Capacitance vs Vds

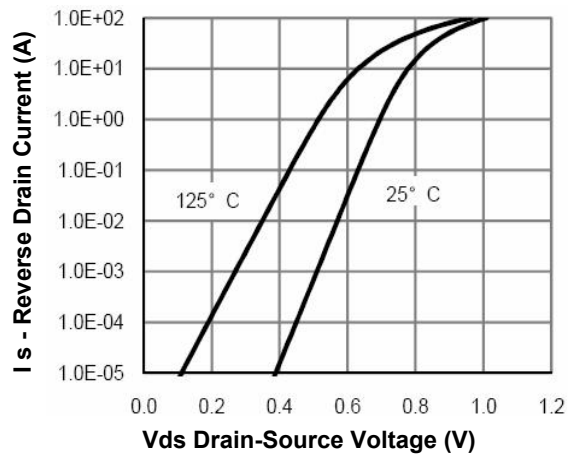


Figure 8. Reverse Drain Current vs Temperature

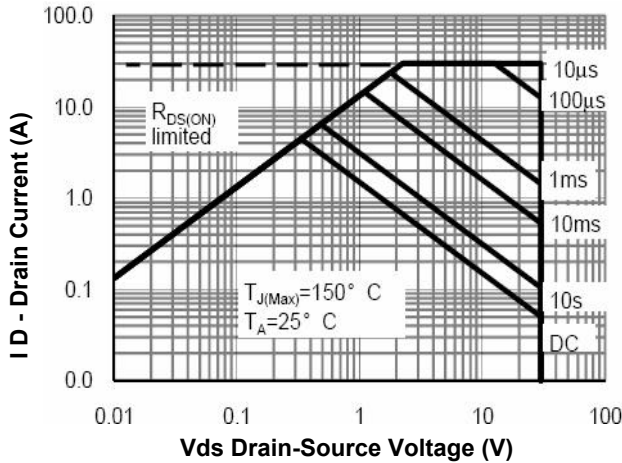


Figure 9. Maximum Safe Operating Area

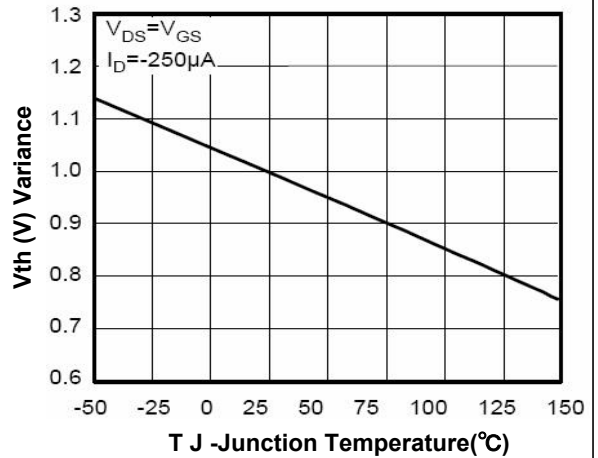


Figure 10. V GS(th) Dissipation vs Case Temperature

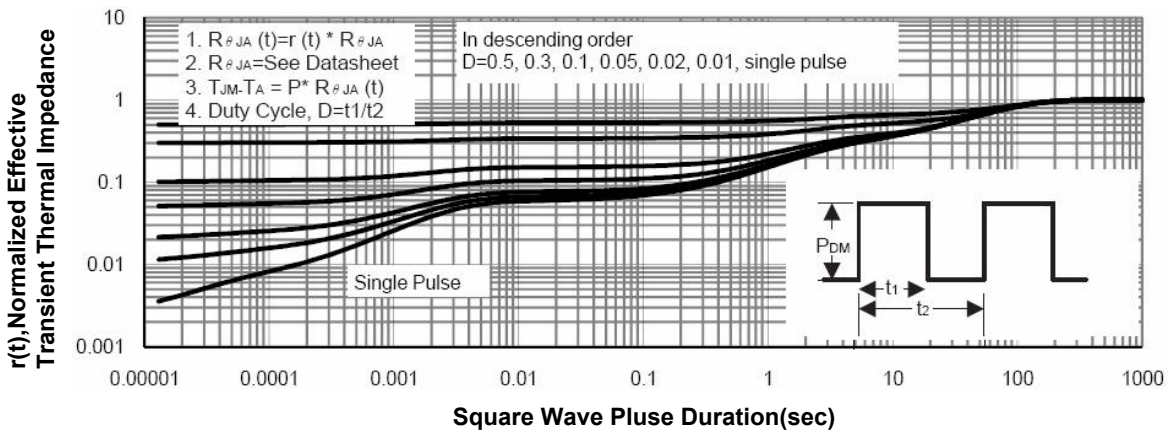


Figure 11. Transient Thermal Response Curve

Switching Test Circuit & Switching Waveforms

