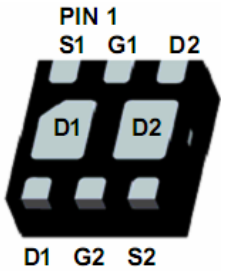
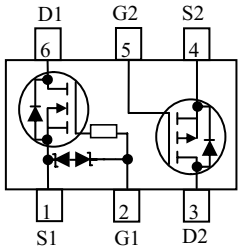
WCM2001

N- and P-Channel Complementary, 20V, MOSFET

Http://www.willsemi.com

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ. (mΩ)
N-Channel 20 V	180 @ 4.5V
	225 @ 2.5V
	280 @ 1.8V
P-Channel -20 V	85 @ -4.5V
	110 @ -2.5V
	150 @ -1.8V





Pin configuration (Top view)

Descriptions

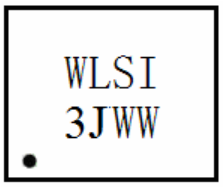
The WCM2001 is the N- and P-Channel enhancement MOS Field Effect Transistor as a single package for DC-DC converter or Load switch applications, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Standard Product WCM2001 is Pb-free.

Features

- Trench Technology
- Supper high density cell design for extremely low Rds(on)
- Exceptional ON resistance and maximum DC current capability
- Small package design with DFN2x2-6L.

Applications

- Driver: Relays, Solenoids, Lamps, Hammers
- Power supply converters circuit
- Load/Power Switching for potable device



WLSI =Company
3J = Device Code
WW = Week Code

Marking

Order Information

Device	Package	Shipping
WCM2001-6/TR	DFN2x2-6L	3000/Tape&Reel

Absolute Maximum Ratings

(T_A=25°C unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Unit
V_{DSS}	Drain-to-Source Voltage	20	-20	V
V_{GSS}	Gate-to-Source Voltage	±6	±8	V
I_D	Drain Current – Continue **Note1**	0.65	-3.1	A
	Drain Current – Pulsed (t<300us, Duty<2%) **Note1**	1.4	-4.1	A
P_D	Power Dissipation – **Note1**	1. 5		W
	Power Dissipation – **Note2**	0.7		
T_J	Operation junction temperature range	150		°C
T_{SG}	Storage temperature range	-55~150		°C

Thermal Resistance Ratings

(T_A=25°C unless otherwise noted)

Symbol	Parameter	Single Operation		Dual Operation		Unit
		Typ.	Max.	Typ.	Max.	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient – **Note1**	65	82	52	65	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient – **Note2**	145	175	116	140	°C/W

Note1: Surface mounted on a 2 oz copper, 1 in^2 pad, FR-4 board.

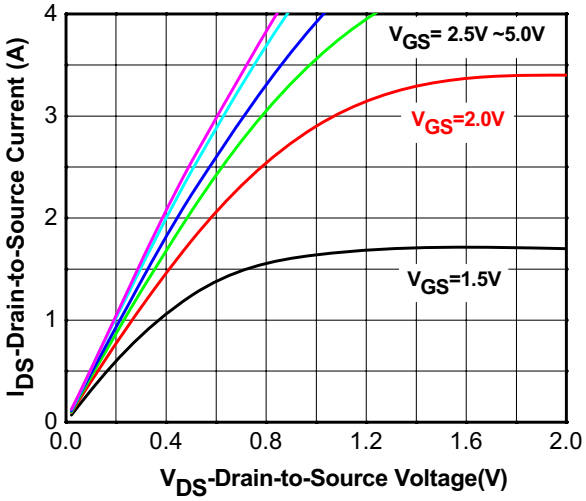
Note2: Surface mounted on a 2 oz copper, minimum pad, FR-4 board

Electronics Characteristics (T_A=25°C unless otherwise noted)

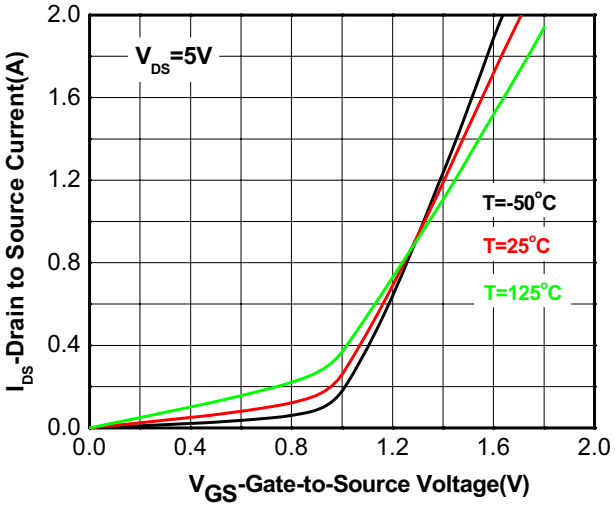
Symbol	Parameter	Test Condition		Min	Typ.	Max	Unit
Off Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	N-Ch	20			V
		V_{GS}=0V, I_D=-250uA	P-Ch	-20			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	N-Ch			1	uA
		V_{DS}=-16V, V_{GS}=0V	P-Ch			-1	
I_{GSS}	Gate –Source leakage current	V_{DS}=0V, V_{GS}=±5V	N-Ch			±5	uA
		V_{DS}=0V, V_{GS}=±8V	P-Ch			±0.1	
ON Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250uA	N-Ch	0.4	0.55	0.85	V
		V_{DS}= V_{GS}, I_D=-250uA	P-Ch	-0.4	-0.56	-1.00	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=4.5V, I_D=0.55A	N-Ch		180	310	mΩ
		V_{GS}=-4.5V, I_D=-3.1A	P-Ch		85	120	
		V_{GS}=2.5V, I_D=0.45A	N-Ch		225	360	
		V_{GS}=-2.5V, I_D=-2.8A	P-Ch		110	150	
		V_{GS}=1.8V, I_D=0.35A	N-Ch		280	460	
		V_{GS}=-1.8V, I_D=-1.5A	P-Ch		150	200	
g_{FS}	Forward Transconductance	V_{DS} = 5 V, ID = 0.55A	N-Ch		2.0		S
		V_{DS} = -5 V, I_D =-0.45A	P-Ch		12		
Dynamic Characteristics							
Ciss	Input Capacitance	NMOS: V_{DS}=10V, V_{GS}=0V, F=100kHz PMOS:V_{DS}=-10V, V_{GS}=0V, F=1MHz	N-Ch		50		pF
			P-Ch		470		
Coss	Output Capacitance		N-Ch		13		
			P-Ch		55		
Crss	Reverse Transfer Capacitance		N-Ch		8		
			P-Ch		50		
$Q_{G(TOT)}$	Total Gate Charge	NMOS: V_{DS}=10V, V_{GS}=4.5V, I_D=0.55A PMOS: V_{DS}=-10V, V_{GS}=-4.5V, I_D=-2.7A	N-Ch		1.15		nC
			P-Ch		6		
$Q_{G(TH)}$	Threshold gate charge		N-Ch		0.06		
			P-Ch		0.34		
Q_{GS}	Gate-Source Charge		N-Ch		0.15		
			P-Ch		0.75		
Q_{GD}	Gate-Drain Charge		N-Ch		0.23		
			P-Ch		1.2		

Symbol	Parameter	Test Condition		Min	Typ.	Max	Unit
Switching Characteristics							
$t_{d(on)}$	Turn-On Delay Time	NMOS:V_{DD}=10V, R_L=18Ω , V_{GEN}=4.5V, I_D=0.55A, R_G=6Ω	N-Ch		22		ns
			P-Ch		9		
t_r	Turn-On Rise Time		N-Ch		80		
			P-Ch		7		
$t_{d(off)}$	Turn-Off Delay Time	PMOS:V_{DD}=-10V, R_L=3.7Ω , V_{GEN}=-4.5V, I_D=-2.7A, , R_G=6Ω	N-Ch		700		
			P-Ch		40		
t_f	Turn-Off Fall Time		N-Ch		380		
			P-Ch		7		
Drain-to-Source Diode Characteristics							
V_{SD}	Forward Diode Voltage	V_{GS}=0V, I_S=0.15A	N-Ch	0.5	0.70	1.5	V
		V_{GS}=0V, I_S=-0.9A	P-Ch	-0.5	-0.70	-1.5	

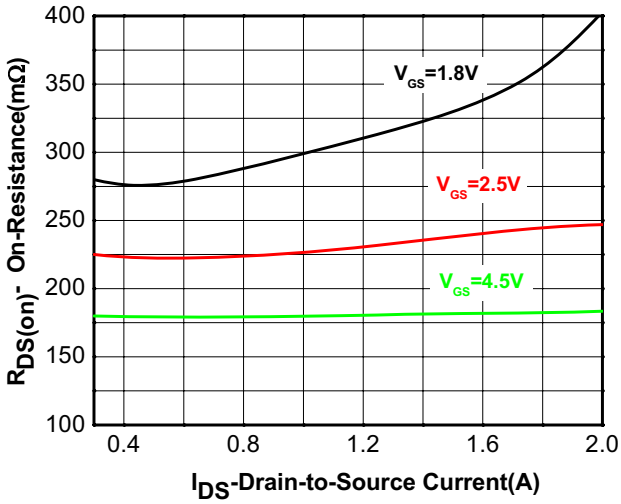
Typical Performance Graph (N-Channel)



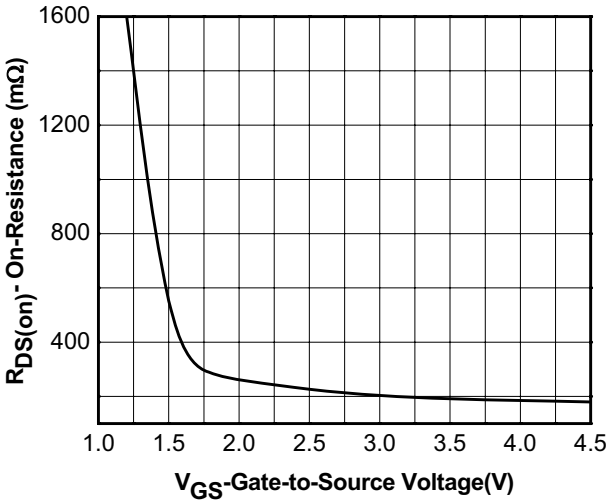
Output characteristics



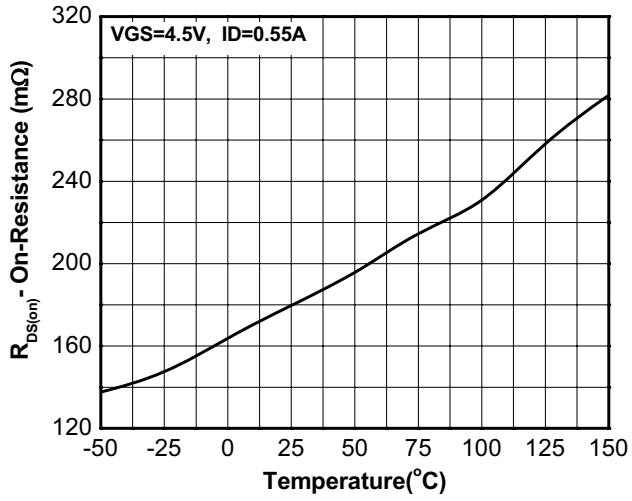
Transfer characteristics



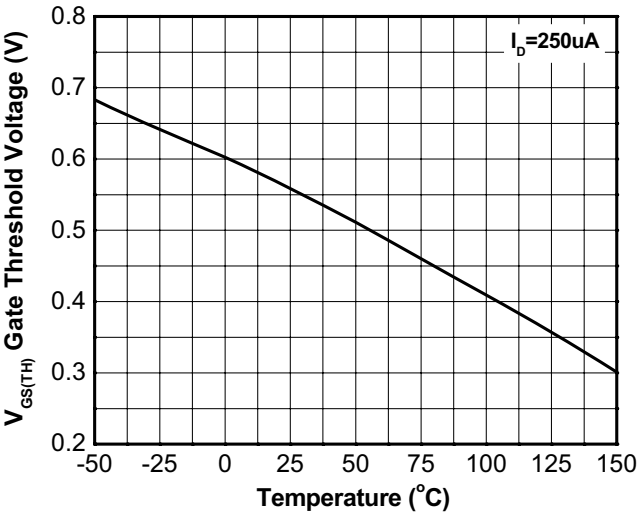
On-Resistance vs. Drain current



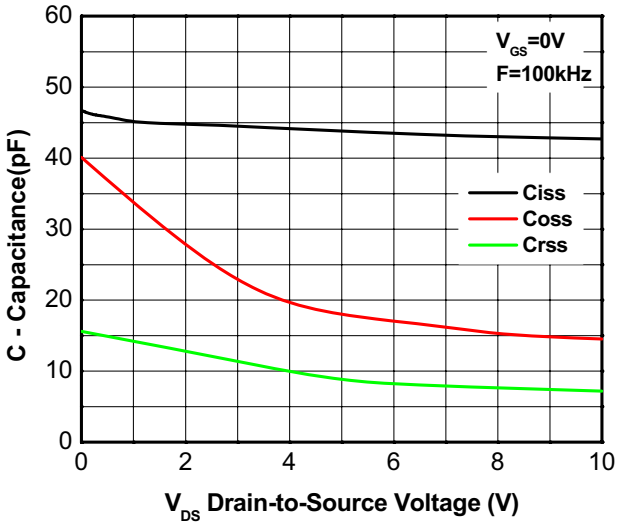
On-Resistance vs. Gate-to-Source voltage



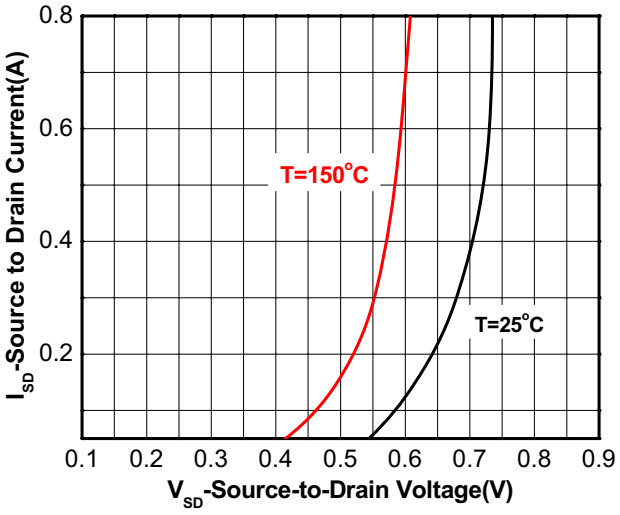
On Resistance vs. Junction Temperature



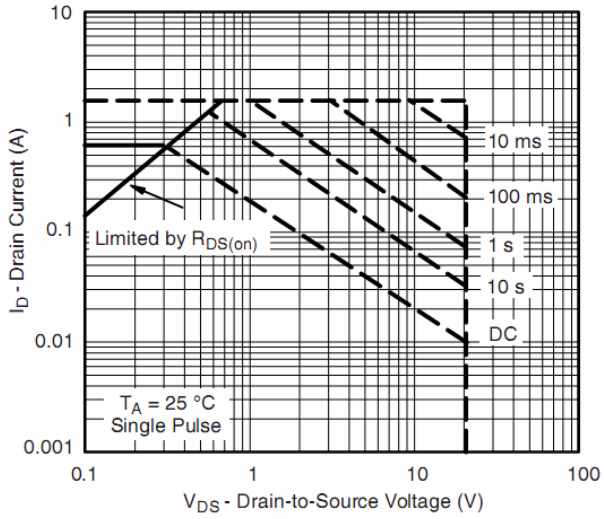
Threshold voltage vs. Temperature



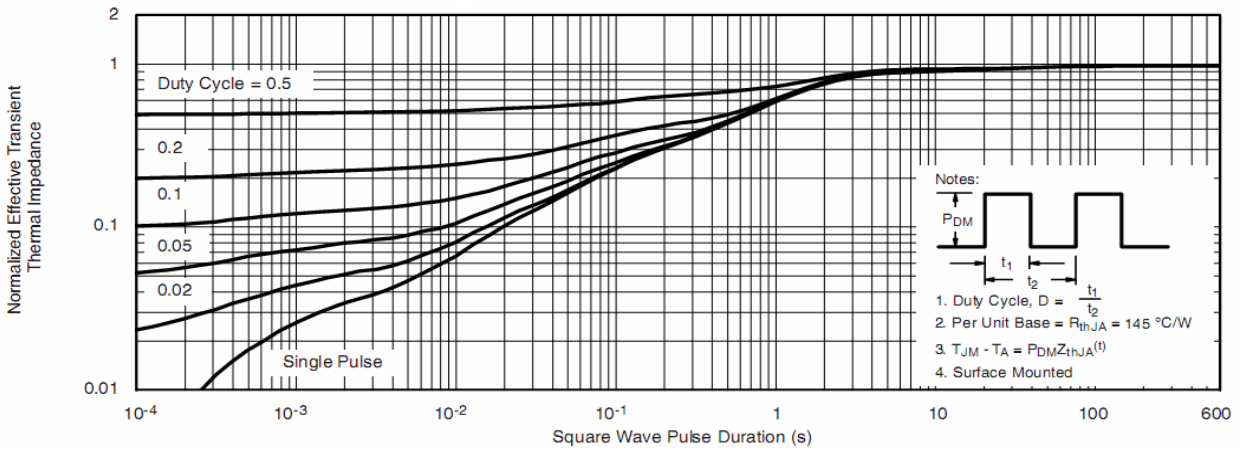
Capacitance



Body diode forward voltage

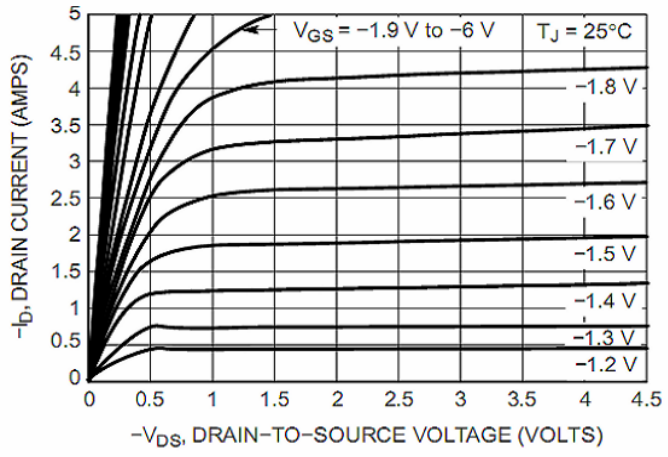


Safe operating power

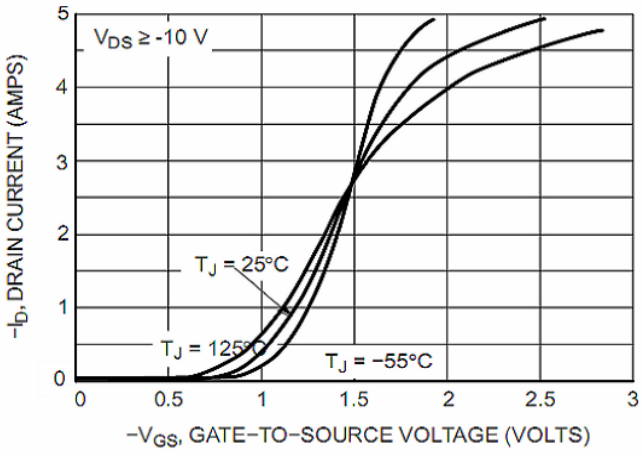


Normalized Thermal Transient Impedance, Junction-to-Ambient

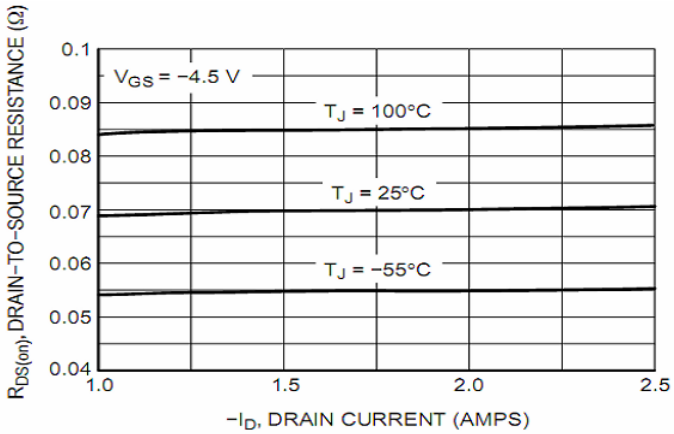
Typical Performance Graph (P-Channel)



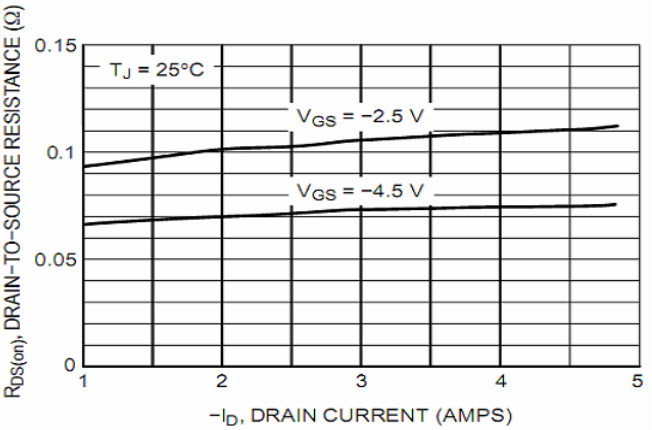
On−Region Characteristics



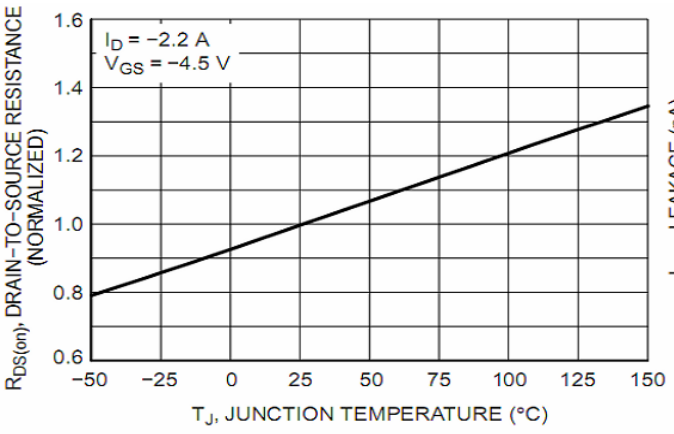
Transfer Characteristics



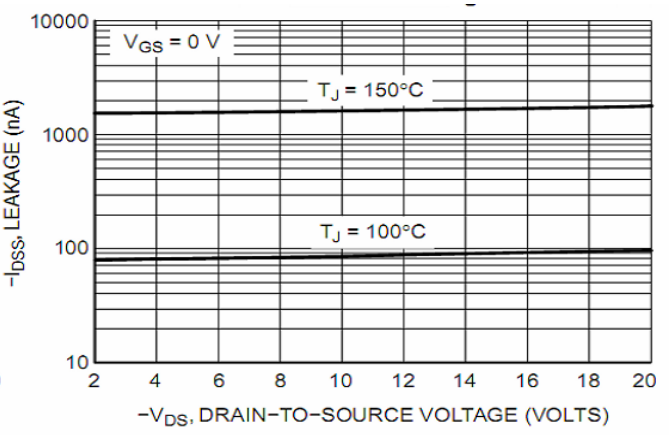
On−Resistance versus Drain Current



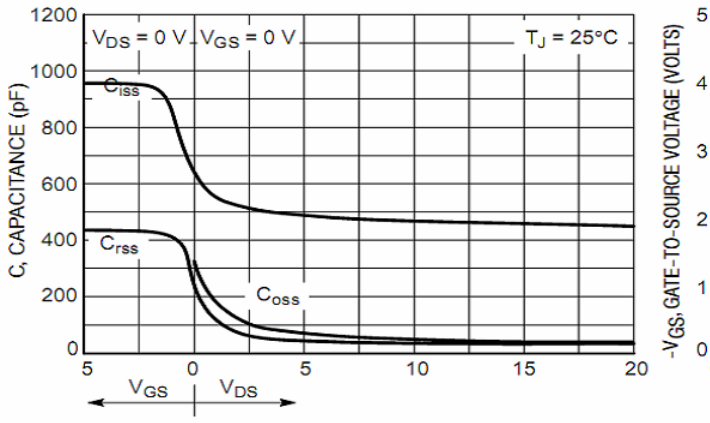
On−Resistance versus Drain Current and Gate Voltage



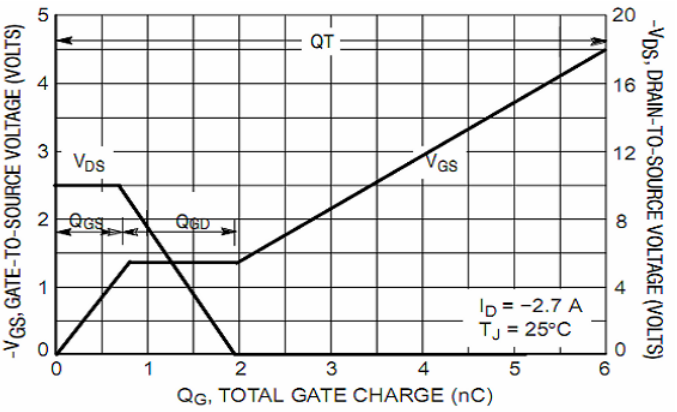
On−Resistance Variation with Temperature



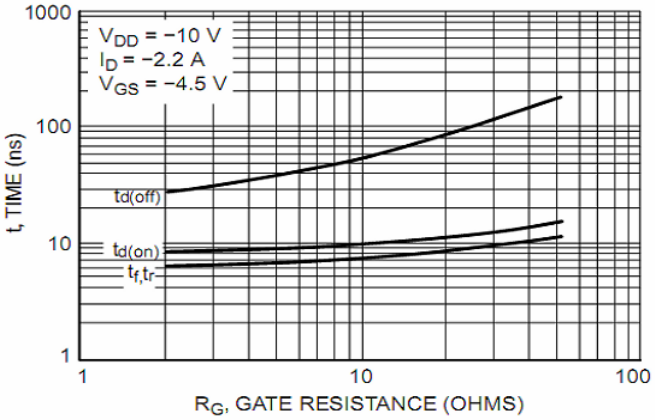
Drain−to−Source Leakage Current versus Voltage



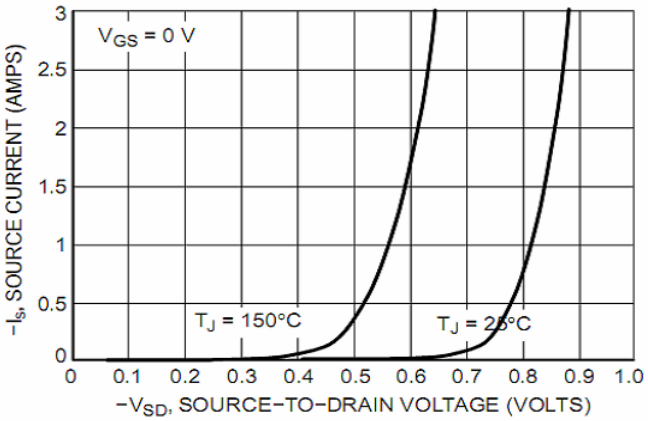
Capacitance Variation



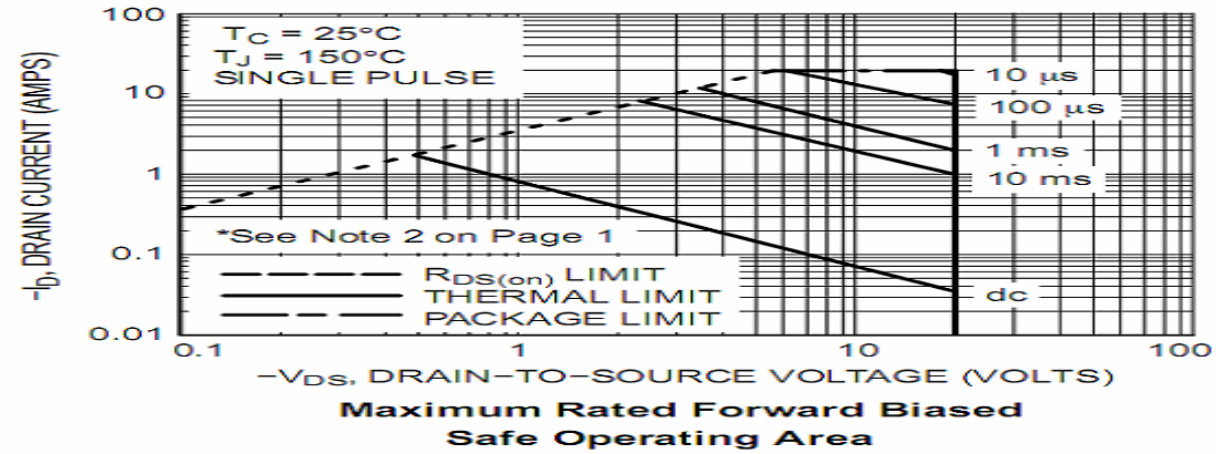
Gate−To−Source and Drain−To−Source Voltage versus Total Charge



Resistive Switching Time Variation versus Gate Resistance



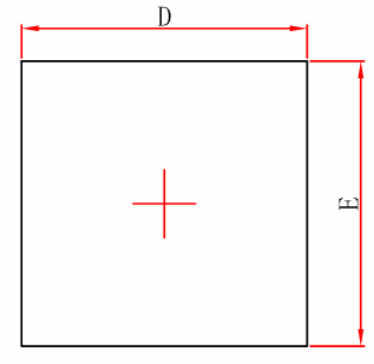
Diode Forward Voltage versus Current



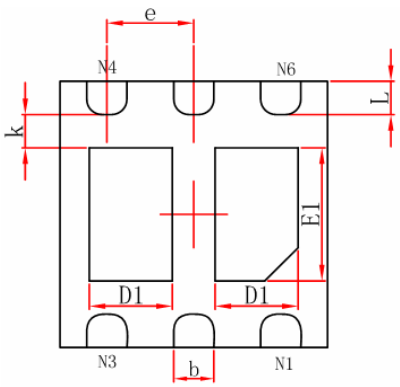
Maximum Rated Forward Biased Safe Operating Area

Package Outline Dimension

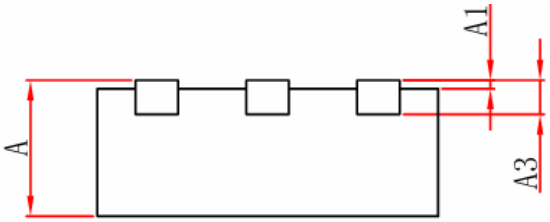
DFN2x2-6L Dual



Top View



Bottom View



Side View

Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.700	0.800
A1	0.000	0.050
A3	0.203REF	
D	1.924	2.076
E	1.924	2.076
D1	0.520	0.720
E1	0.900	1.100
k	0.200MIN	
b	0.250	0.350
e	0.650TYP	
L	0.174	0.326