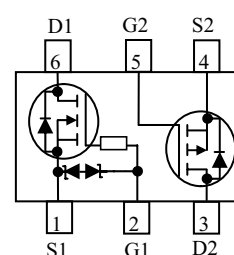
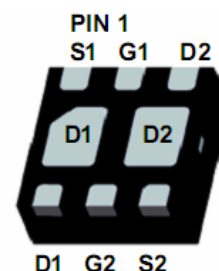


WCM2001

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

[Http://www.willsemi.com](http://www.willsemi.com)

$V_{(BR)DSS}$	$R_{DS(on)}$ Typ. (m Ω)
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



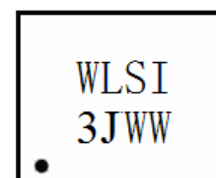
Pin configuration (Top view)

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 $R_{ds(on)}$
- Exceptional ON resistance and maximum DC current capability
- Small package design with DFN2x2-6L.



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

Marking

Order Information

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

Applications

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

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 _{θJA}	Thermal Resistance, Junction to Ambient – Note1	65	82	52	65	°C/W
R _{0JA}	Thermal Resistance, Junction to Ambient – Note2	145	175	116	140	°C/W

Note1: Surface mounted on a 2 oz copper, 1 in² pad, FR-4 board.

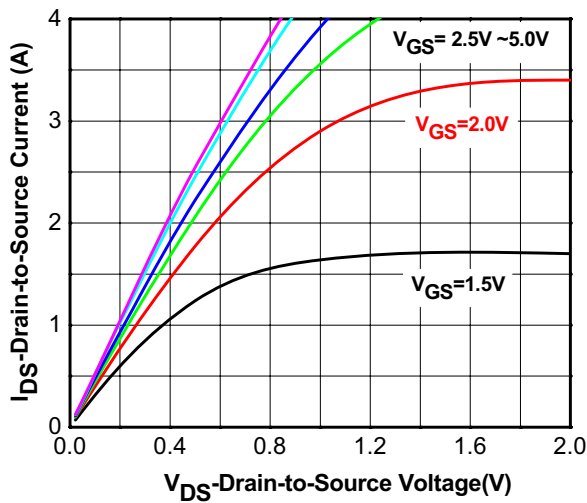
Note2: Surface mounted on a 2 oz copper, minimum pad, FR-4 board

Electronics Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

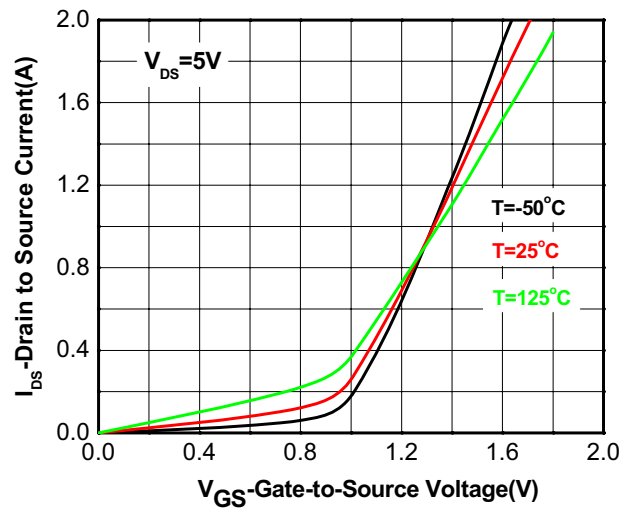
Symbol	Parameter	Test Condition	Min	Typ.	Max	Unit	
Off Characteristics							
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	N-Ch	20		V	
		V _{GS} =0V, I _D =-250uA	P-Ch	-20			
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V	N-Ch		1	uA	
		V _{DS} =-16V, V _{GS} =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
Coss	Output Capacitance		P-Ch		470		
			N-Ch		13		
Crss	Reverse Transfer Capacitance		P-Ch		55		
			N-Ch		8		
			P-Ch		50		
Q _{G(TOT)}	Total Gate Charge	NMOS: V _{DS} =10V, V _{GS} =4.5V, I _D =0.55A	N-Ch		1.15		nC
Q _{G(TH)}	Threshold gate charge		P-Ch		6		
			N-Ch		0.06		
			P-Ch		0.34		
Q _{GS}	Gate-Source Charge	PMOS: V _{DS} =-10V, V _{GS} =-4.5V, I _D =-2.7A	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							
td(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		
tr	Turn-On Rise Time		N-Ch		80		
			P-Ch		7		
td(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		
tf	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	

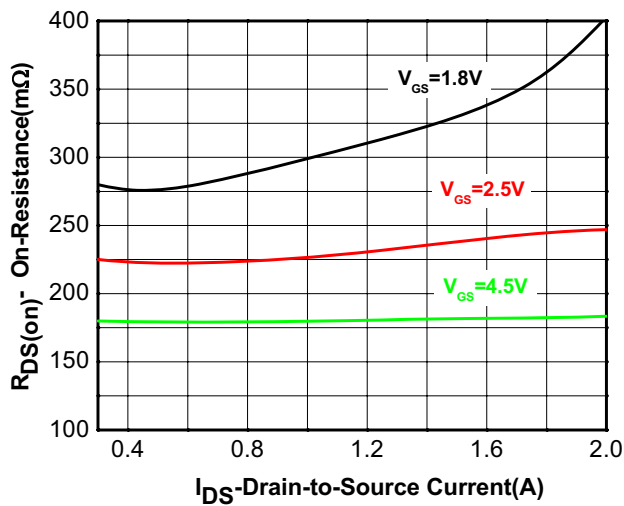
Typical Performance Graph (N-Channel)



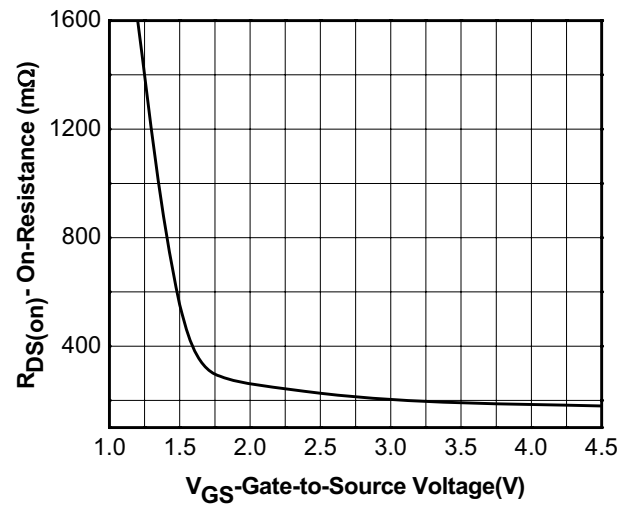
Output characteristics



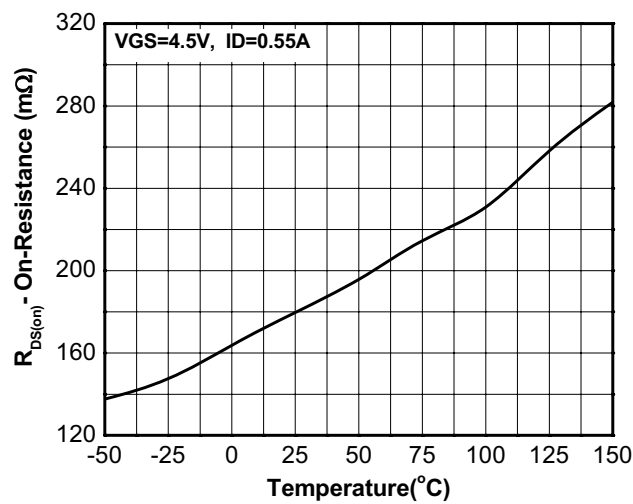
Transfer characteristics



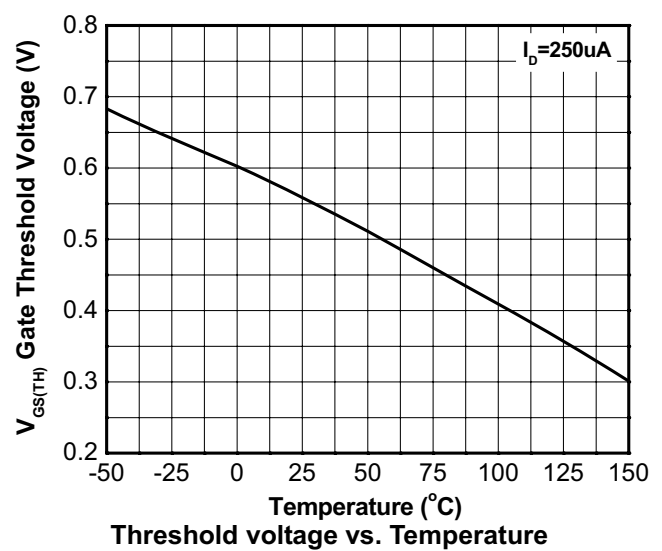
On-Resistance vs. Drain current



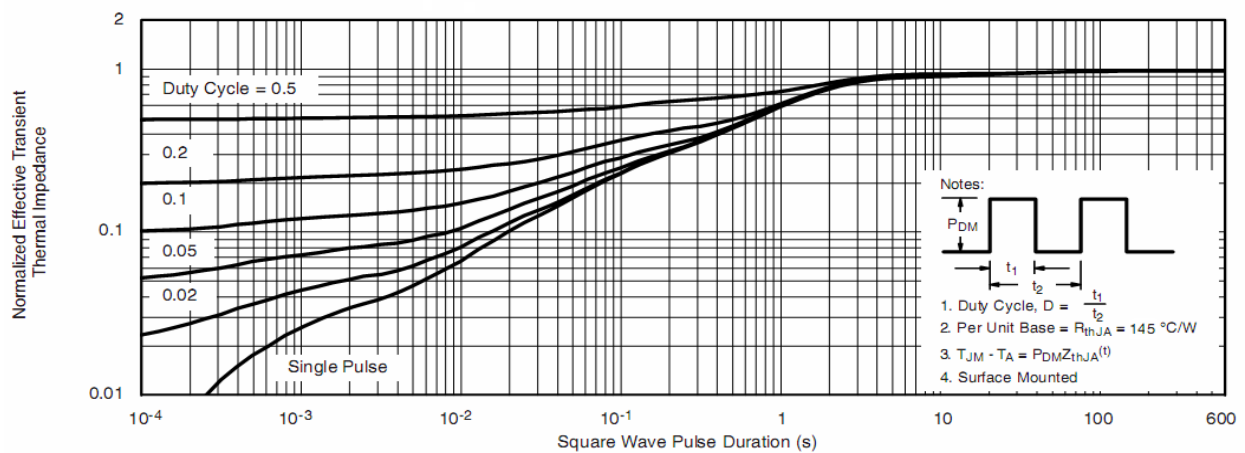
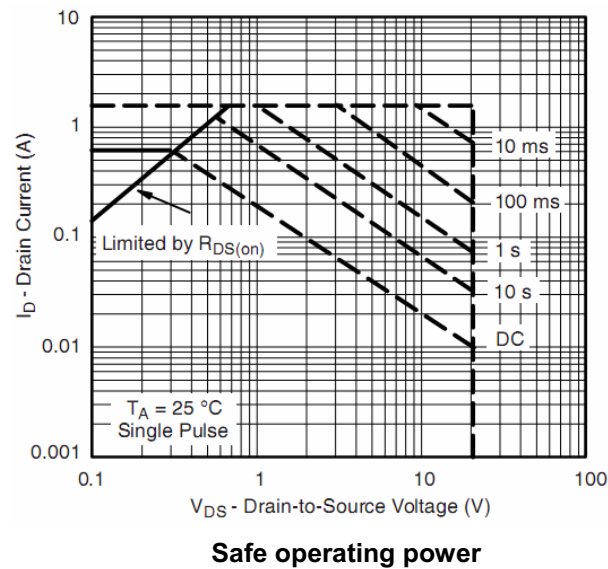
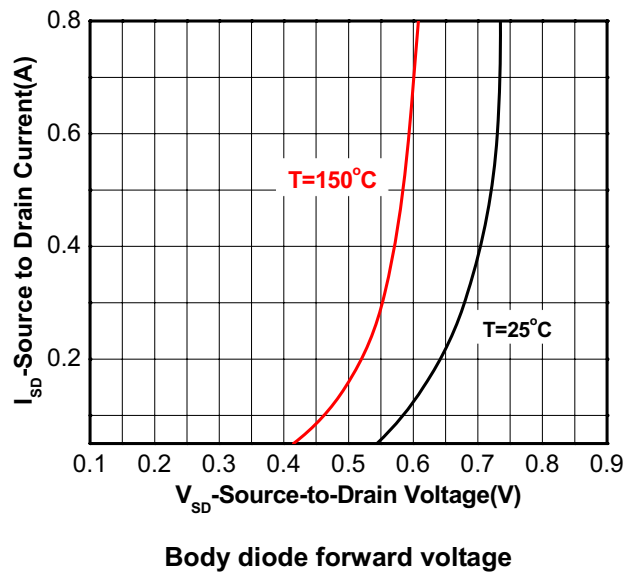
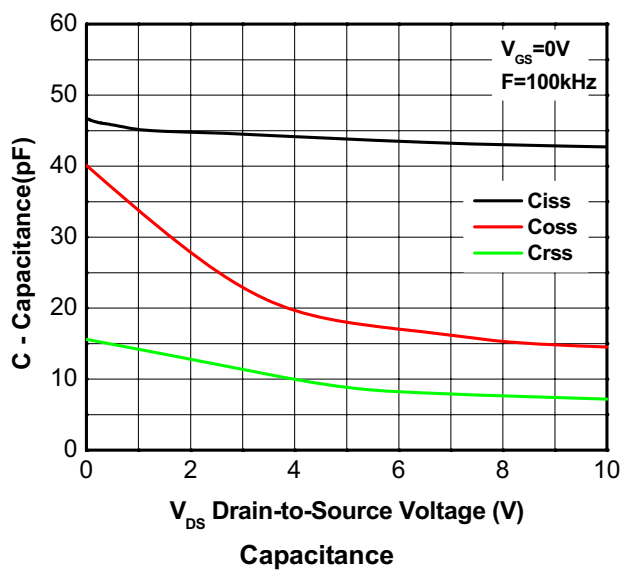
On-Resistance vs. Gate-to-Source voltage



On Resistance vs. Junction Temperature

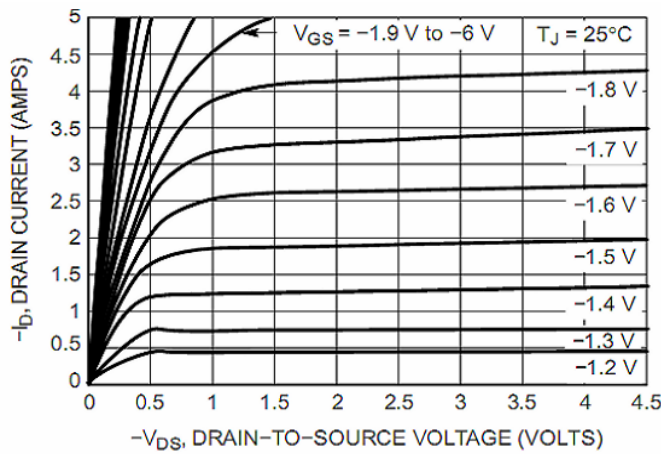


Threshold voltage vs. Temperature

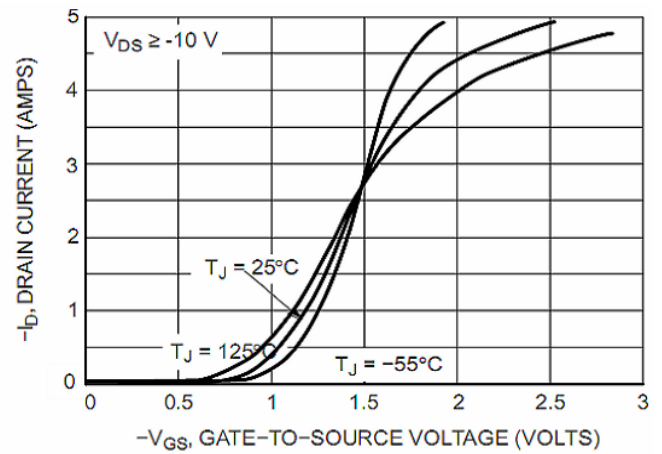


**Normalized Thermal Transient Impedance,
Junction-to-Ambient**

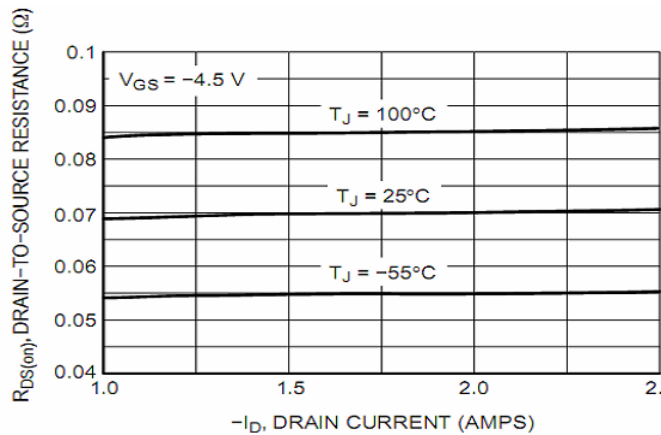
Typical Performance Graph (P-Channel)



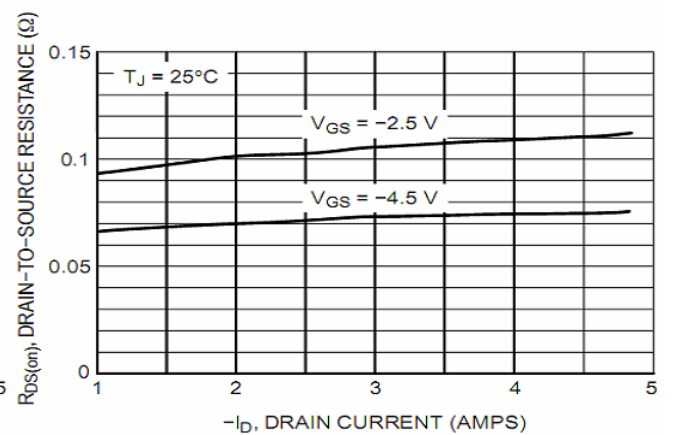
On-Region Characteristics



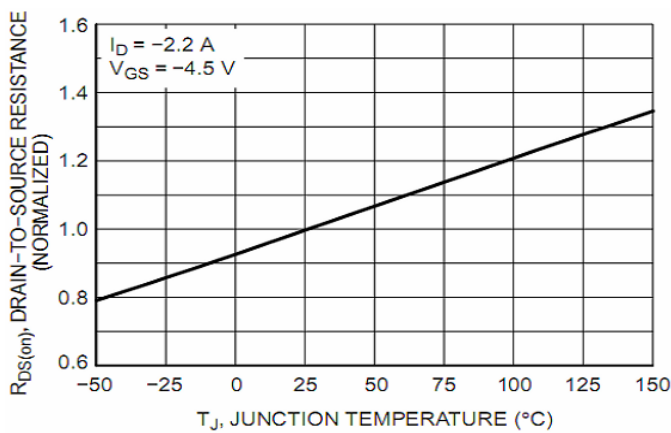
Transfer Characteristics



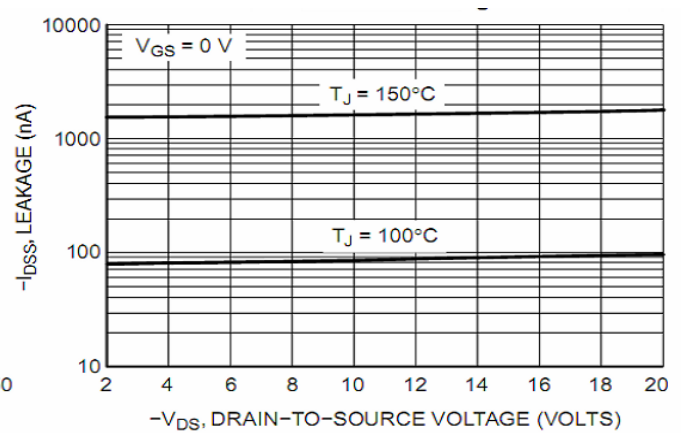
On-Resistance versus Drain Current



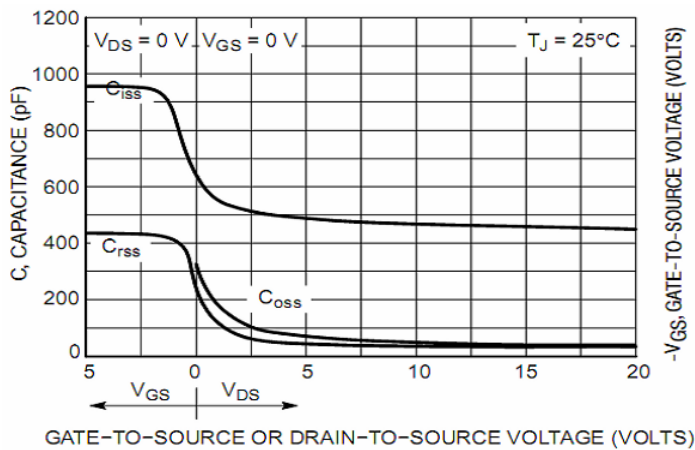
On-Resistance versus Drain Current and Gate Voltage



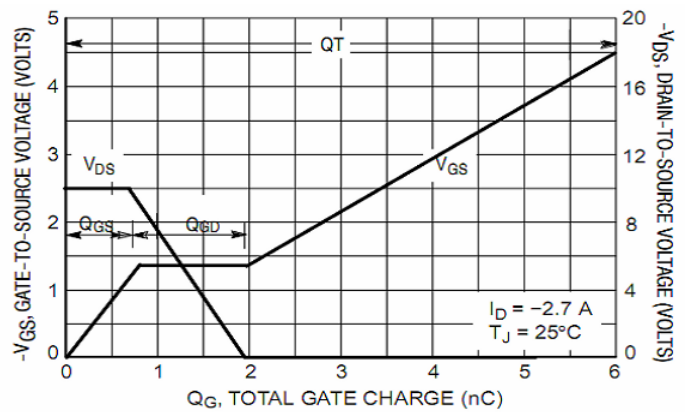
On-Resistance Variation with Temperature



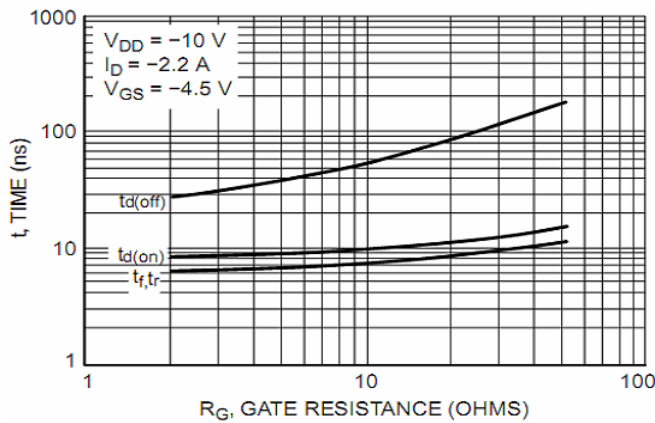
Drain-to-Source Leakage Current versus Voltage



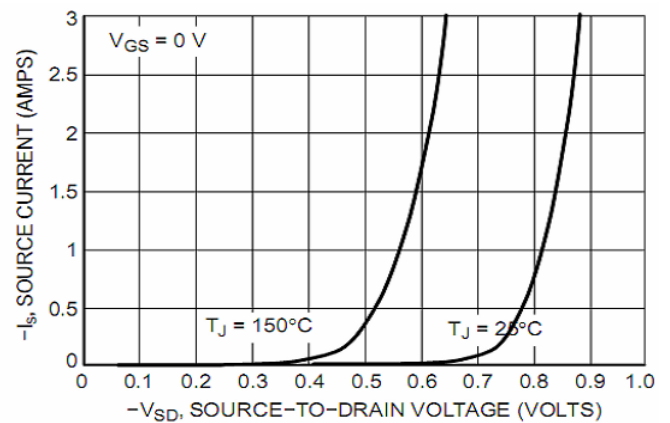
Capacitance Variation



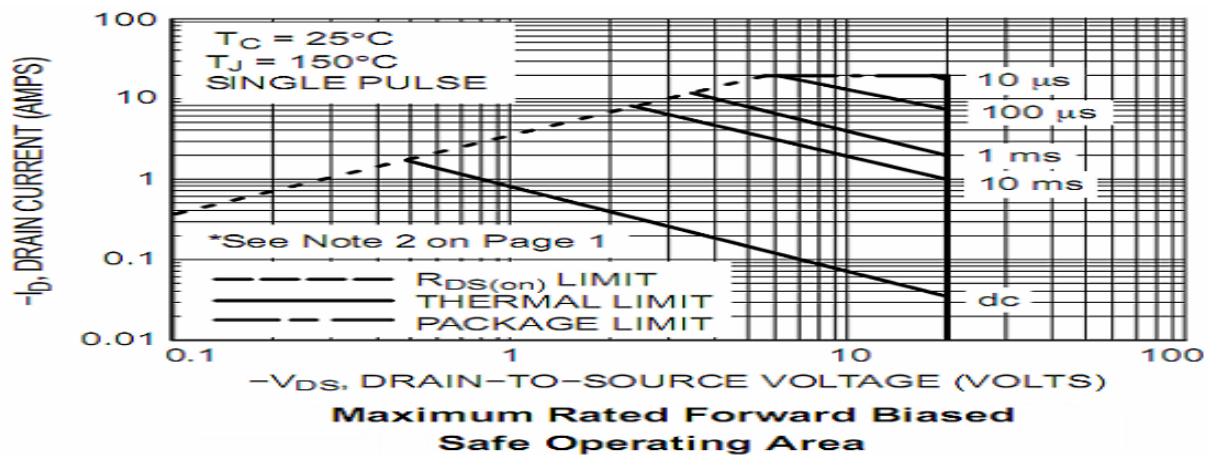
Gate-to-Source and Drain-to-Source Voltage versus Total Charge



Resistive Switching Time Variation versus Gate Resistance

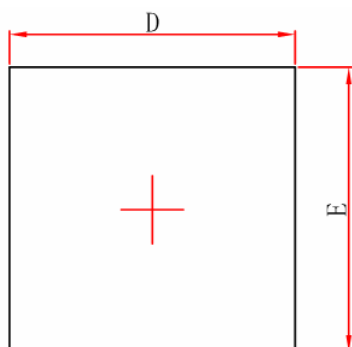


Diode Forward Voltage versus Current

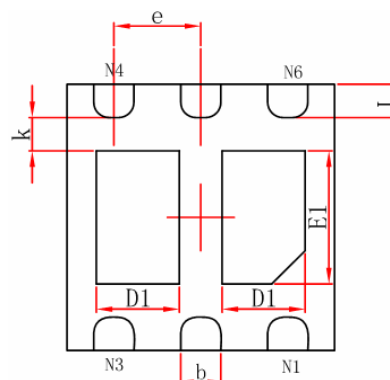


Package Outline Dimension

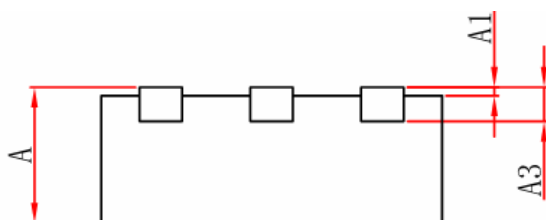
DFN2x2-6L Dual



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