



SOT-23-6L Plastic-Encapsulate MOSFETS

ME3587/ME3587-G

N- and P-Channel 20V (D-S) MOSFET

Features

- $R_{DS(ON)} \leq 45m\Omega @ V_{GS}=4.5V$ (N-Ch)
- $R_{DS(ON)} \leq 68m\Omega @ V_{GS}=2.5V$ (N-Ch)
- $R_{DS(ON)} \leq 120m\Omega @ V_{GS}=1.8V$ (N-Ch)
- $R_{DS(ON)} \leq 110m\Omega @ V_{GS}=-4.5V$ (P-Ch)
- $R_{DS(ON)} \leq 130m\Omega @ V_{GS}=-2.5V$ (P-Ch)
- $R_{DS(ON)} \leq 170m\Omega @ V_{GS}=-1.8V$ (P-Ch)
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

Applications

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- Load Switch
- DSC
- LCD Display inverter

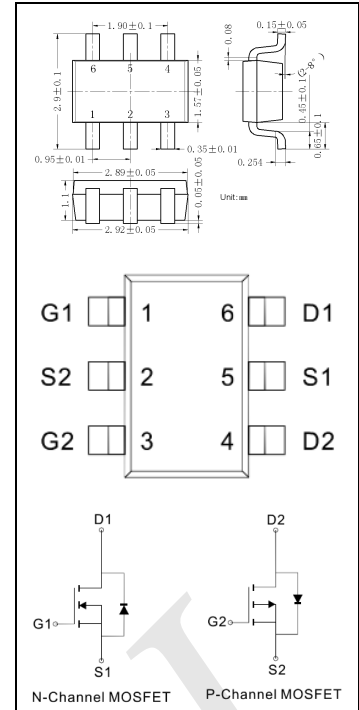
General Description

The ME3587 is the N- and P-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high-density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where low in-line power loss are needed in a very small outline surface mount package.

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

Symbol	Parameter	Value		Unit	
		N-channel	P-channel		
V_{DS}	Drain-Source voltage	20	-20	V	
V_{GS}	Gate-Source voltage	± 8	± 8		
I_D	Continuous Drain Current *	$T_A = 25^\circ C$	3.4	-2	A
		$T_A = 70^\circ C$	2.7	-1.6	
I_{DM}	Pulsed Drain Current		14	-8	
P_D	Maximum Power Dissipation	$T_A = 25^\circ C$	0.8	0.7	W
		$T_A = 70^\circ C$	0.5	0.5	
	Linear Derating Factor			3.7	W/ $^\circ C$
T_J	Operating Junction Temperature	-55 to +150	-55 to +150		$^\circ C$
$R_{\theta JA}$	Maximum Junction-to-Ambient*		150	175	$^\circ C/W$

* The device mounted on 1in² FR4 board with 2 oz copper



N-Channel Electrical Characteristics (T_A=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	20			V
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	0.5		1.2	V
I _{GSS}	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±8V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V, V _{GS} = 0V			1	μA
R _{DS(on)}	Drain-Source On-Resistance ¹⁾	V _{GS} = 4.5V, I _D = 3.4A		37	45	mΩ
		V _{GS} = 2.5V, I _D = 3A		52	68	
		V _{GS} = 1.8V, I _D = 2A		92	120	
V _{SD}	Diode Forward Voltage	I _S = 1A, V _{GS} = 0V		0.7		V
Dynamic						
Q _g	Total Gate Charge	V _{GS} = 4.5V, I _D = 2.1A, V _{DS} = 15V		5.3		nC
Q _{gs}	Gate-Source Charge			1.7		
Q _{gd}	Gate-Drain Charge			1.4		
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz		340		pF
C _{oss}	Output Capacitance			50		
C _{rss}	Reverse Transfer Capacitance			15		
t _{d(on)}	Turn-On Delay Time	V _{DS} = 10V, R _L = 10Ω R _{GEN} = 3Ω, V _{GS} = 5V		11		ns
t _r	Rise Time			17		
t _{d(off)}	Turn-Off Delay Time			30		
t _f	Fall Time			3		

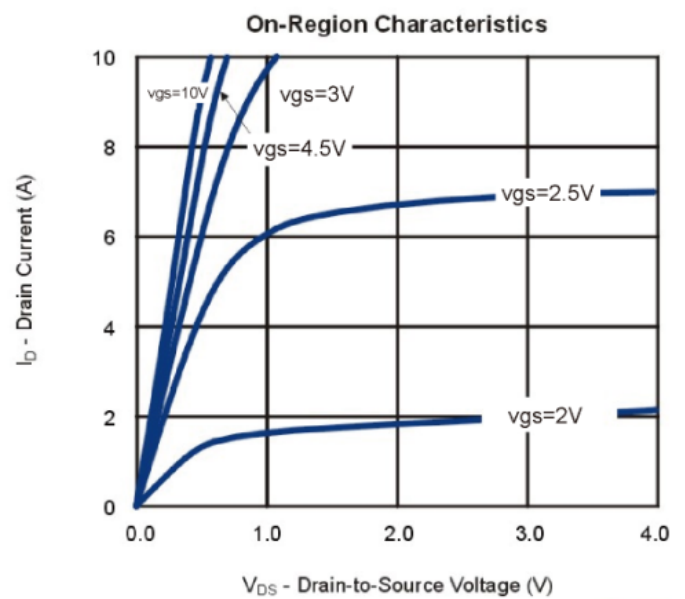
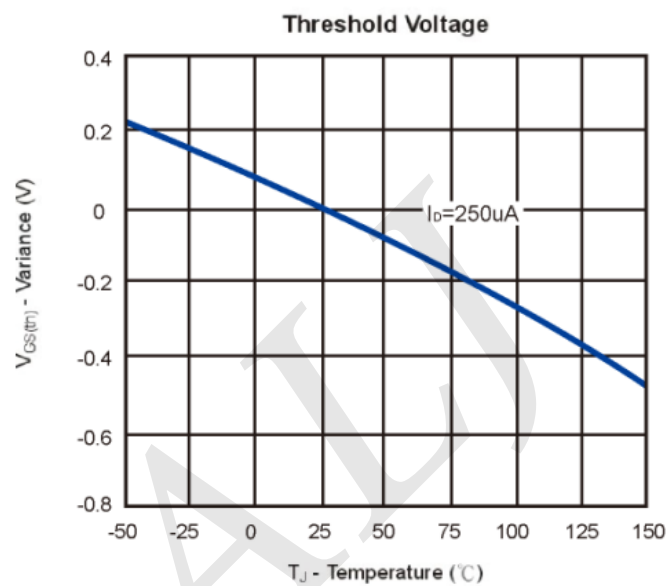
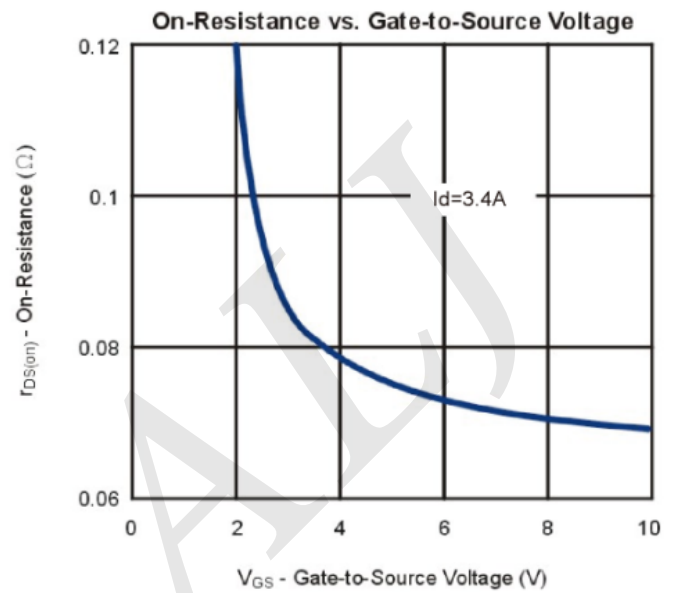
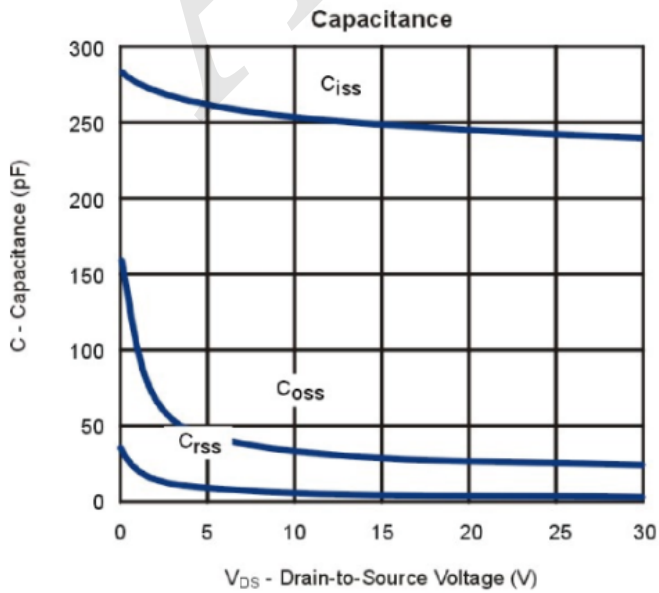
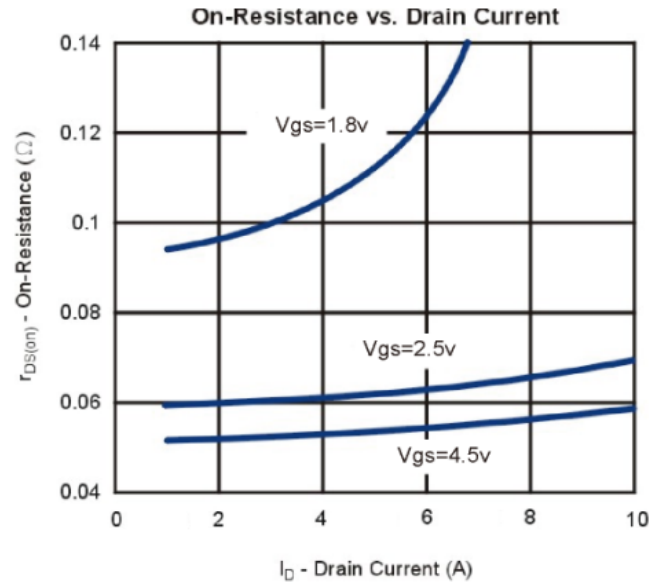
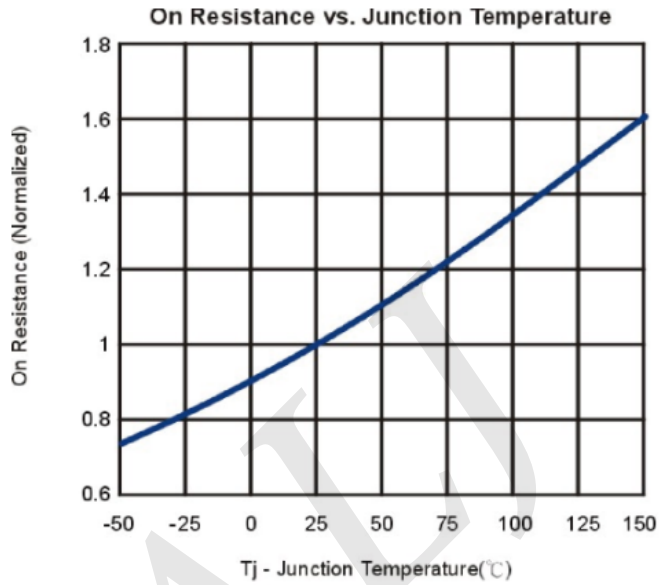
P-Channel Electrical Characteristics (T_A=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-20			V
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.4		-1	V
I _{GSS}	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±8V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} = 0V			-1	μA
R _{DS(on)}	Drain-Source On-Resistance ¹⁾	V _{GS} = -4.5V, I _D = -2.8A		85	110	mΩ
		V _{GS} = -2.5V, I _D = -2A		110	130	
		V _{GS} = -1.8V, I _D = -1A		130	170	
V _{SD}	Diode Forward Voltage	I _S = -1A, V _{GS} = 0V		-0.7	-1.4	V
Dynamic						
Q _g	Total Gate Charge	V _{GS} = -4.5V, I _D = -2.1A, V _{DS} = -15V		7.2		nC
Q _{gs}	Gate-Source Charge			2.2		
Q _{gd}	Gate-Drain Charge			1.2		
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = -15V f = 1.0MHz		480		pF
C _{oss}	Output Capacitance			46		
C _{rss}	Reverse Transfer Capacitance			10		
t _{d(on)}	Turn-On Delay Time	V _{DS} = -6V, R _L = 6Ω R _{GEN} = 6Ω, V _{GS} = -4.5V		50		ns
t _r	Rise Time			30		
t _{d(off)}	Turn-Off Delay Time			40		
t _f	Fall Time			11		

Notes

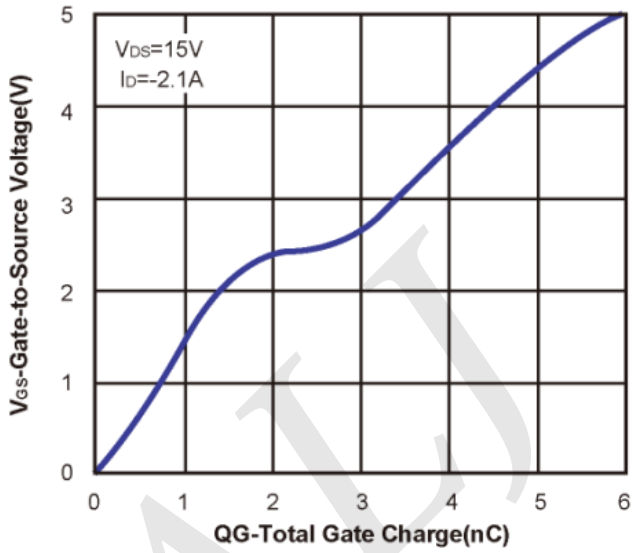
1. Pulse test; pulse width ≅ 300us, duty cycle ≅ 2%

N-Channel Typical Characteristics

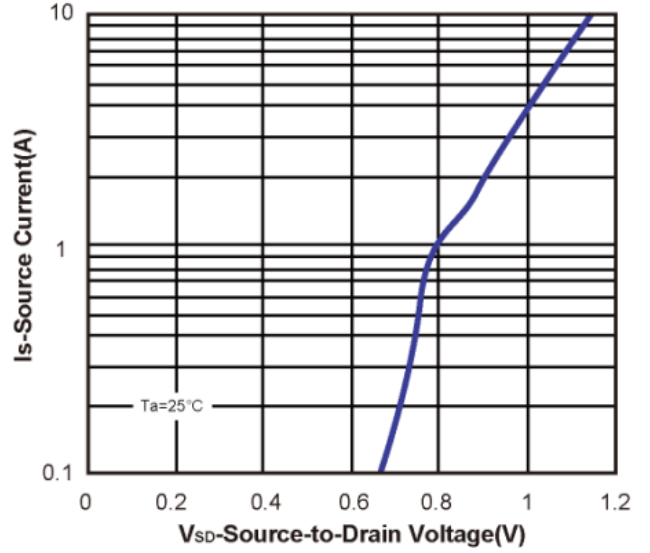


N-Channel Typical Characteristics (Cont.)

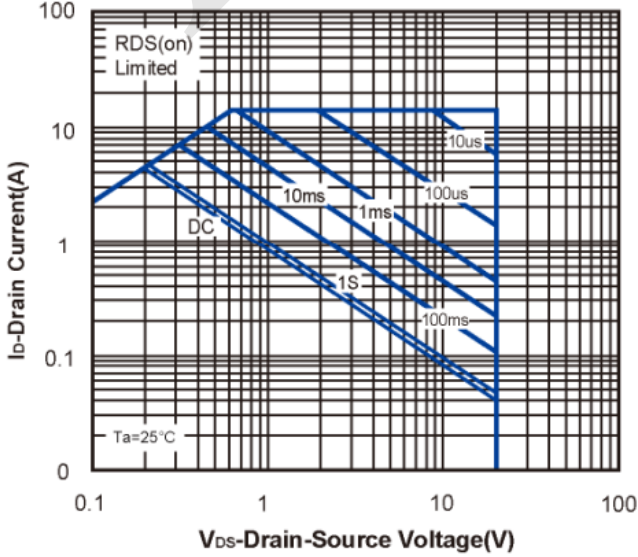
Gate Charge



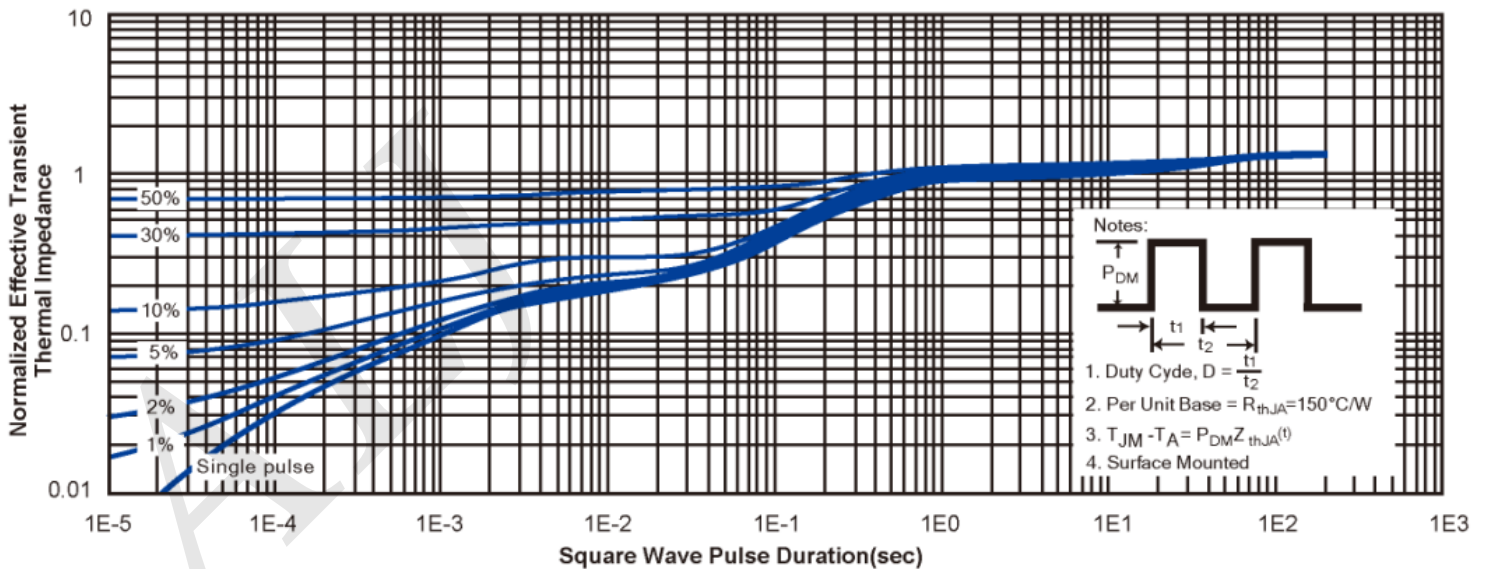
Body-diode characteristics



Maximum Forward Biased Safe Operating Area

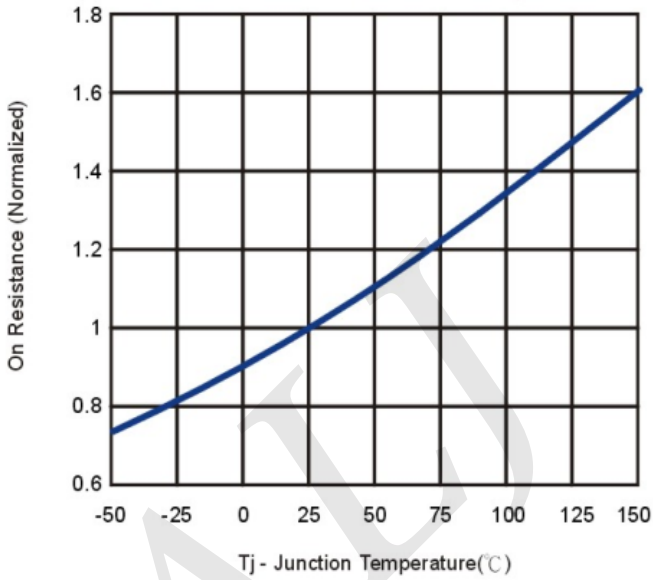


Normalized Thermal Transient Impedance, Junction-to-Ambient

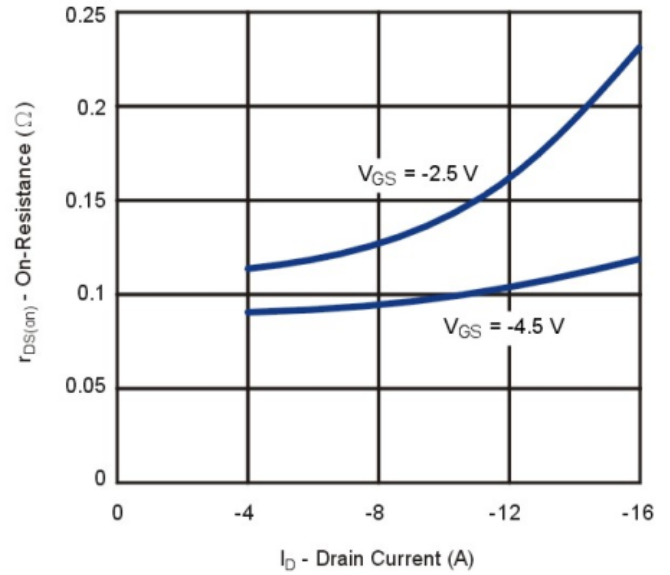


P-Channel Typical Characteristics

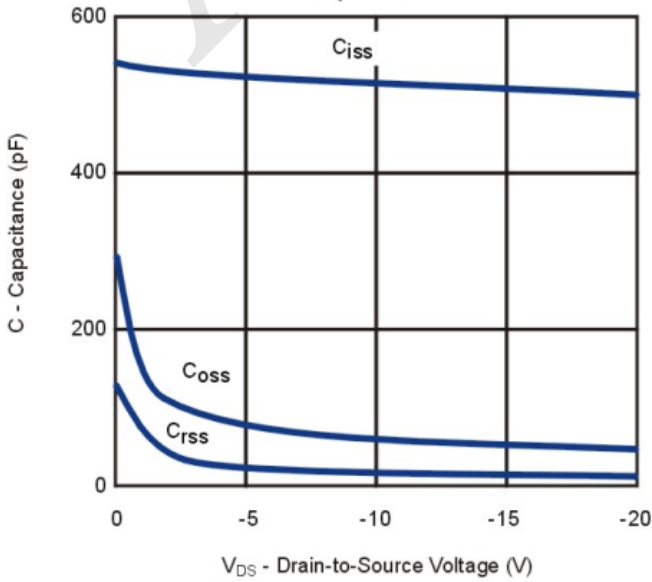
On Resistance vs. Junction Temperature



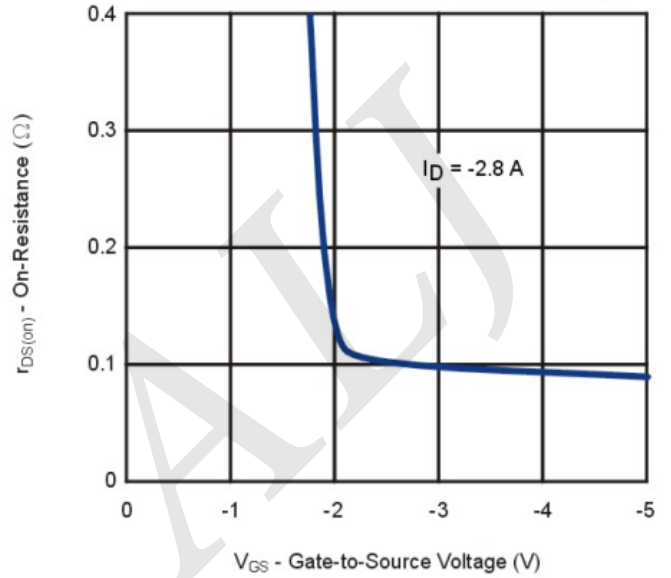
On-Resistance vs. Drain Current



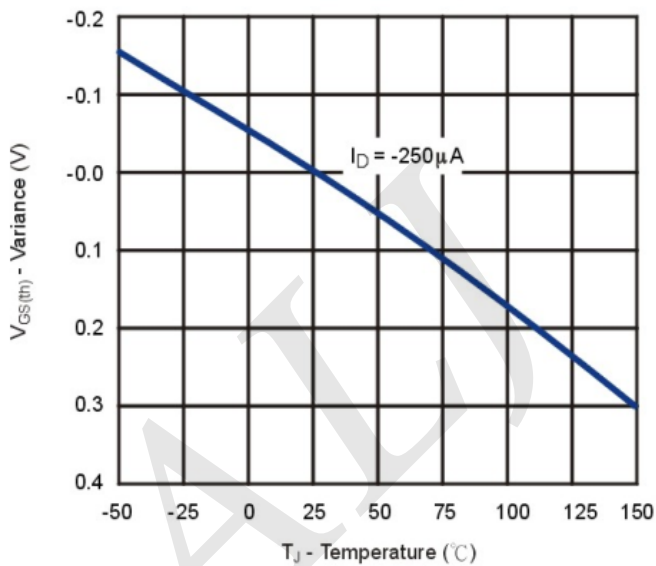
Capacitance



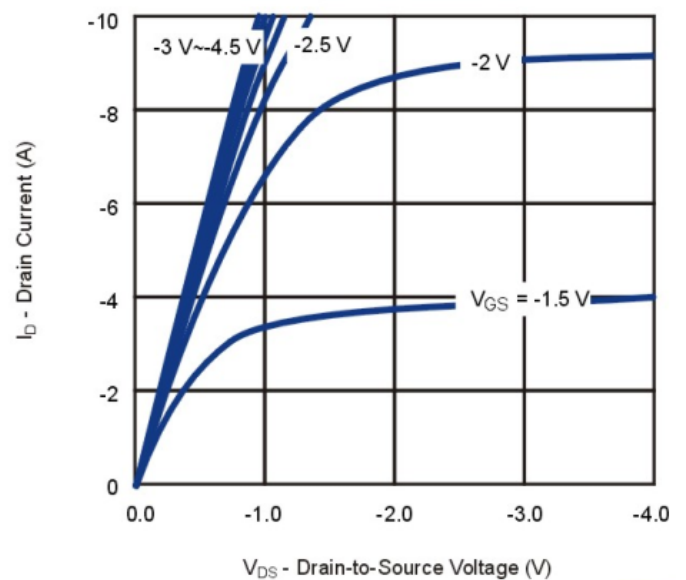
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



On-Region Characteristics



P-Channel Typical Characteristics (Cont.)

