Complementary High Density Trench MOSFET (60V,2.6A)

PRODUCT SUMMARY

PRODUCT SUMMARY (N-Channel)			PRODUCT SUMMARY (P-Channel)		
V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Typ.	V_{DSS}	I_D	$R_{DS(on)}$ (mΩ) Typ.
60V	3.5A	88@ VGS = 10V，ID=3.5A	-60V	-2.6A	180@ VGS = 10V,ID=2.6A
		100@ VGS = 4.5V，ID=1A			200@ VGS = 4.5V，ID=1A

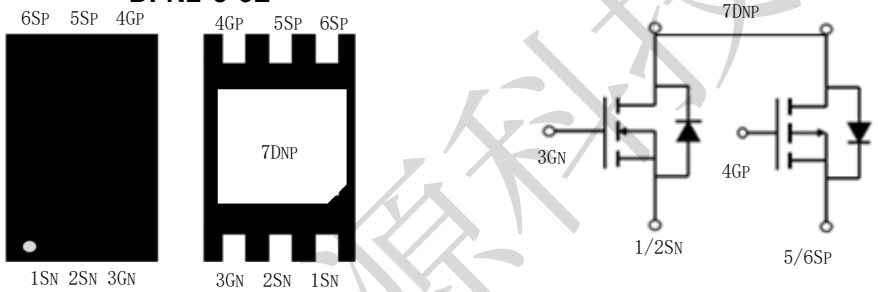
Features

- ✧ Super high density cell design for extremely low $R_{DS(ON)}$
- ✧ Exceptional on-resistance and maximum DC current capability
- ✧ Excellent Qg x $R_{DS(ON)}$ product (FOM)
- ✧ Lead（Pb）-free and halogen-free

Applications

- ✧ Motor control and drive
- ✧ LED Backlight

DFN2*3-6L



TOP Marking

ET6608
XXXXXX

XXXXXX:D/C

Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Symbol	Parameter	Max N	Max P	Units
V_{DS}	Drain-Source Voltage	60	-60	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current (Continuous)@TA=25°C	3.5	-2.6	A
	Drain Current (Continuous)@TA=75°C	2.5	-1.5	A
I_{DM}	Drain Current (Pulsed) [a]	14	-10	A
P_D	Total Power Dissipation @T_c=25°C	2.8	1.8	W
	Total Power Dissipation @T_c=75°C	1.8	1.1	W
I_S	Maximum Diode Forward Current	3.5	2.6	A
T_j, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	-55 to +150	°C
R_{QJA}	Thermal Resistance Junction to Ambient (PCB mounted) [b]	43	56	°C/W

a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

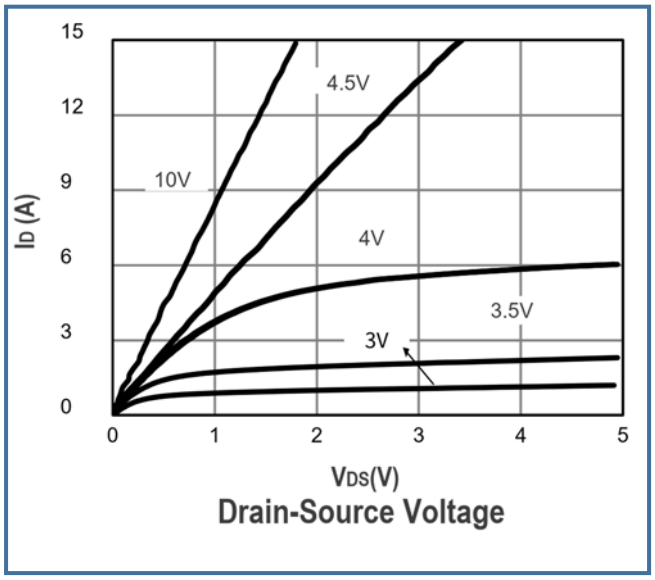
b: 1-in^2 2oz Cu PCB board

N-Channel Electrical Characteristics (TA=25°C, unless otherwise noted)

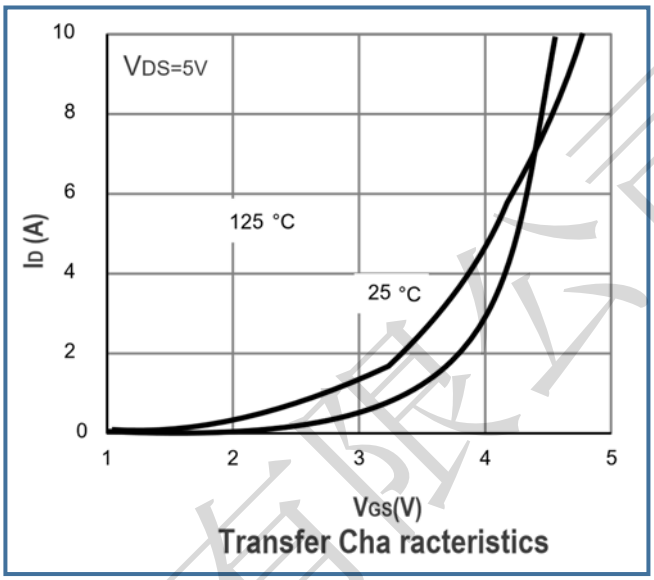
Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• **Off Characteristics**						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
• **On Characteristics**						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1.0	1.3	2.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=3.5A	-	85	120	mΩ
		V_{GS}=4.5V, I_D=1A	-	100	135	
gfs	Forward Transconductance	V_{DS}=10V,ID=3.5A		25		S
• **Dynamic Characteristics**						
C_{iss}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz	-	235	-	PF
C_{oss}	Output Capacitance		-	28	-	
C_{rss}	Reverse Transfer Capacitance		-	9	-	
• **Switching Characteristics**						
Q_g	Total Gate Charge	V_{DS}=30V, I_D=2A, V_{GS}=10V	-	4.4	-	nC
Q_{gs}	Gate-Source Charge		-	0.9	-	
Q_{gd}	Gate-Drain Charge		-	1.1	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, R_L=15Ω, I_D=2A, V_{GEN}=10V, RG=3Ω	-	4.5	-	nS
t_r	Turn-on Rise Time		-	1.5	-	
$t_{d(off)}$	Turn-off Delay Time		-	15	-	
t_f	Turn-off Fall Time		-	1.5	-	
• **Drain-Source Diode Characteristics**						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=3.5A	-	-	1.2	V
Rg	Gate resistance	V_{GS}=0V, VDS=0V,F=1MHz	-	1.4	-	Ω

Note: Pulse Test: Pulse Width≤300us, Duty Cycle≤2%

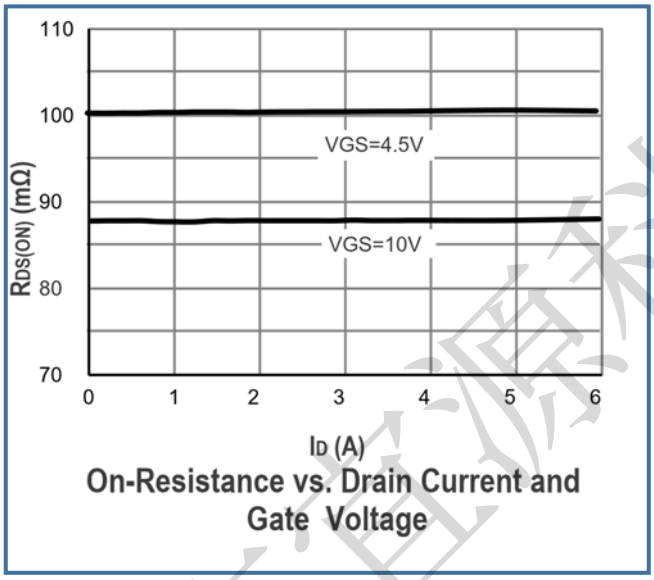
N-Channel Typical Characteristics Curves (Ta=25°C, unless otherwise note)



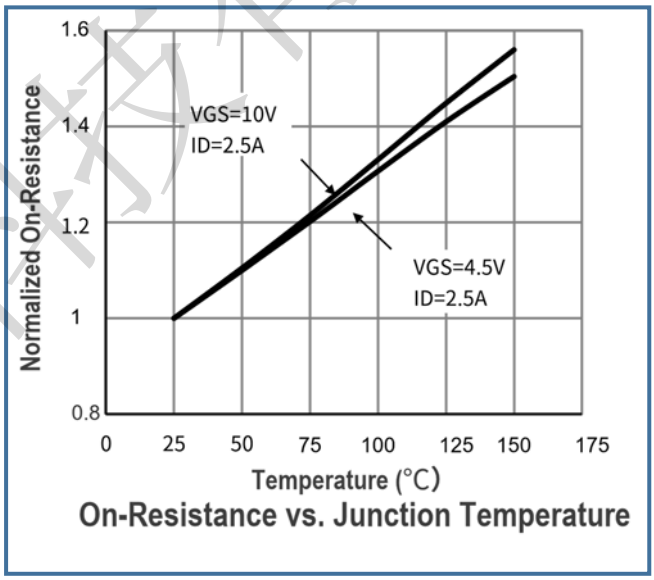
Drain-Source Voltage



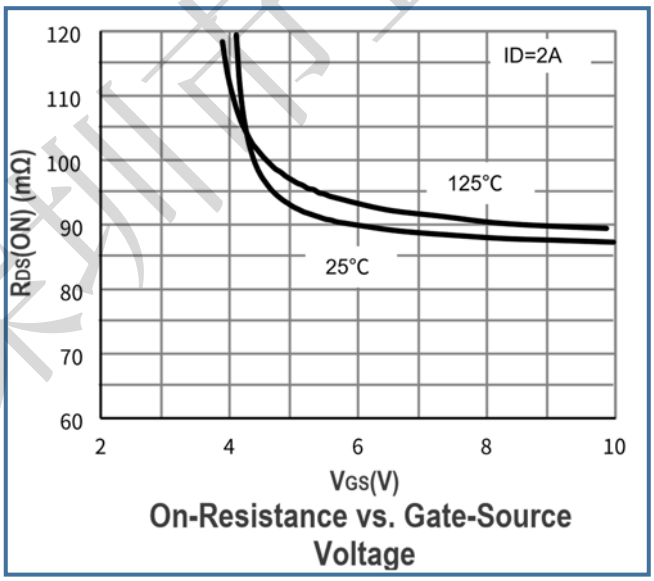
Transfer Cha racteristics



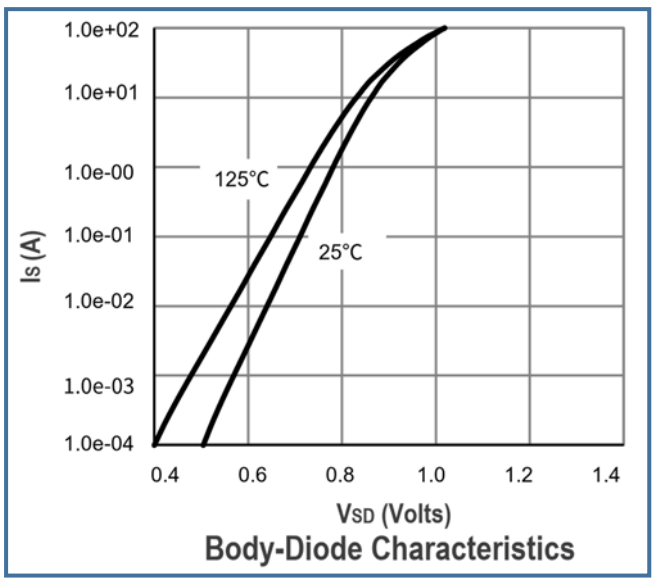
On-Resistance vs. Drain Current and Gate Voltage



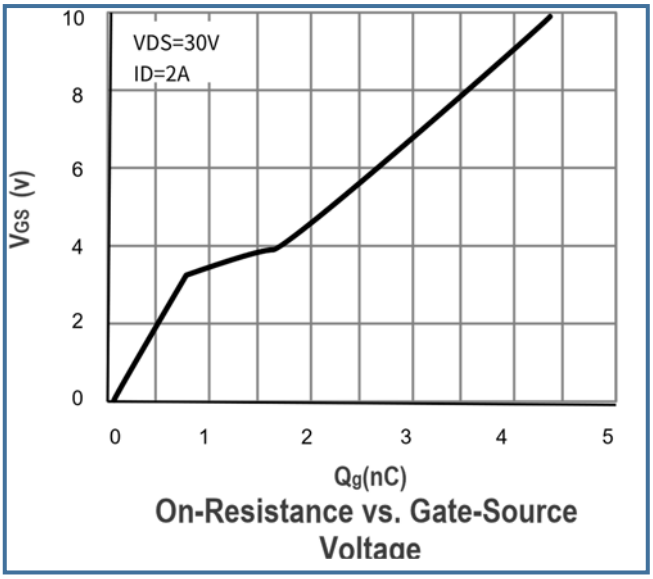
On-Resistance vs. Junction Temperature



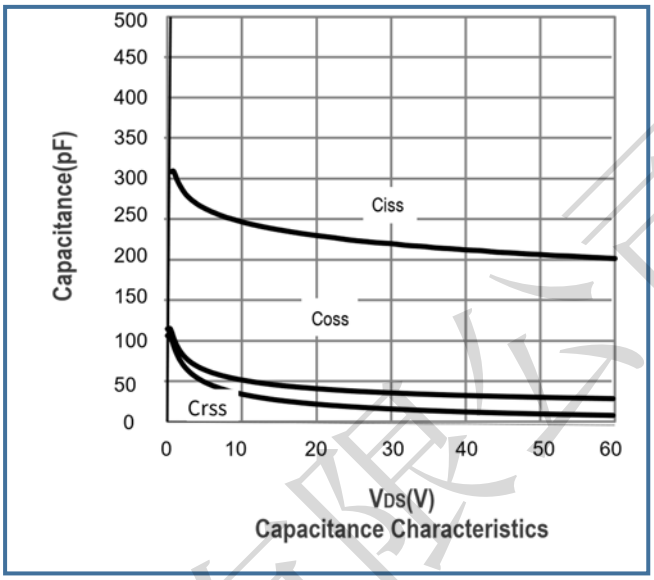
On-Resistance vs. Gate-Source Voltage



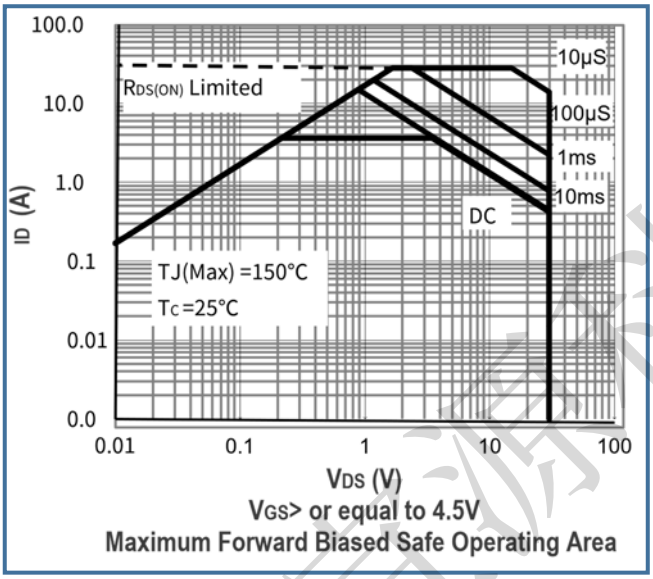
Body-Diode Characteristics



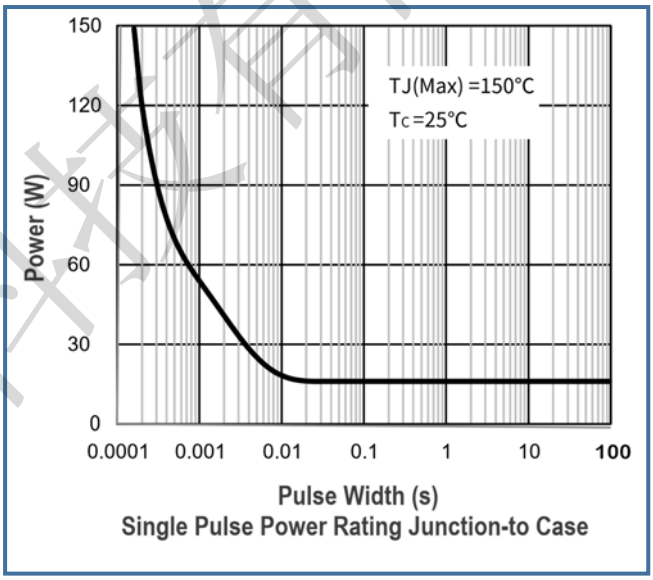
On-Resistance vs. Gate-Source Voltage



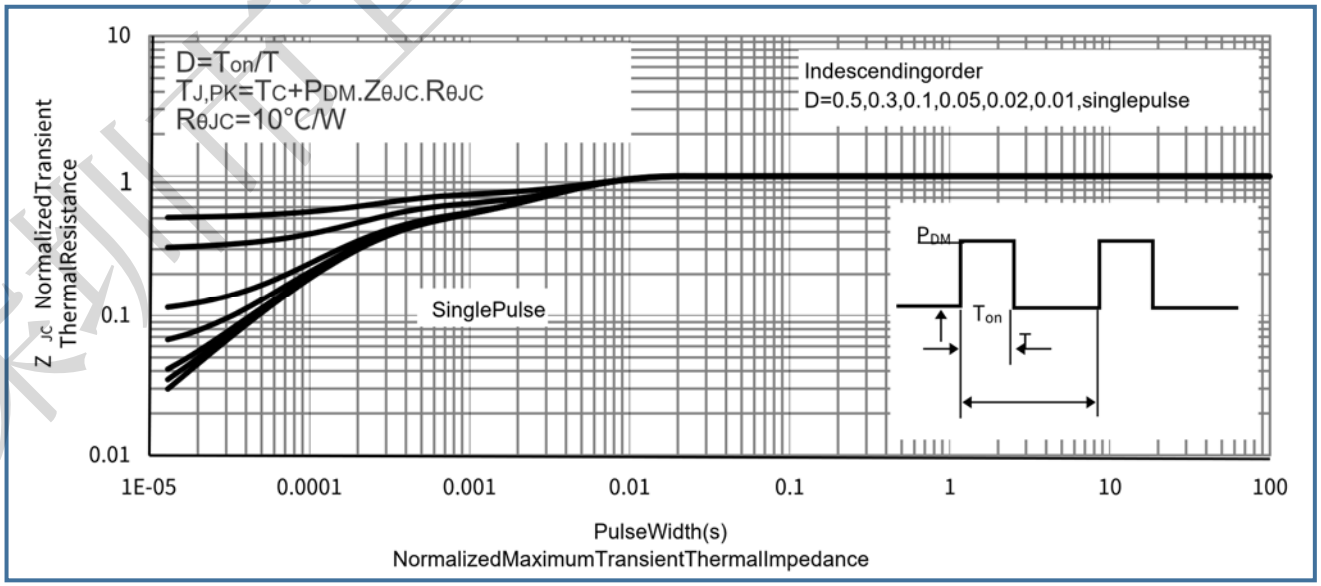
Capacitance Characteristics



VGS> or equal to 4.5V
Maximum Forward Biased Safe Operating Area

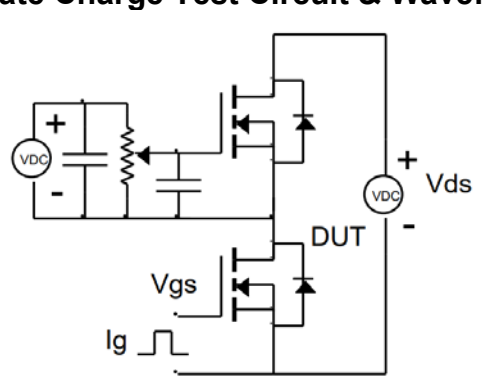


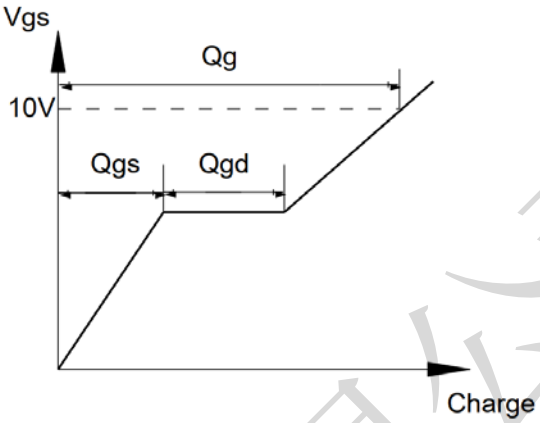
Single Pulse Power Rating Junction-to Case



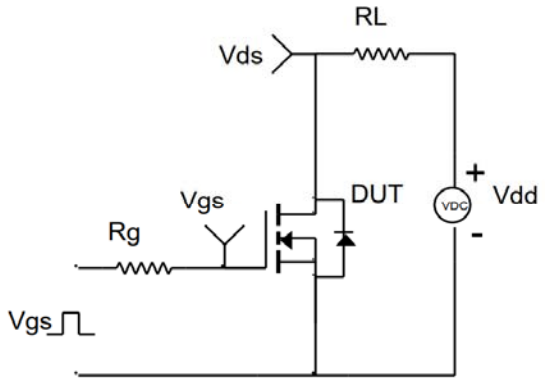
NormalizedMaximumTransientThermalImpedance

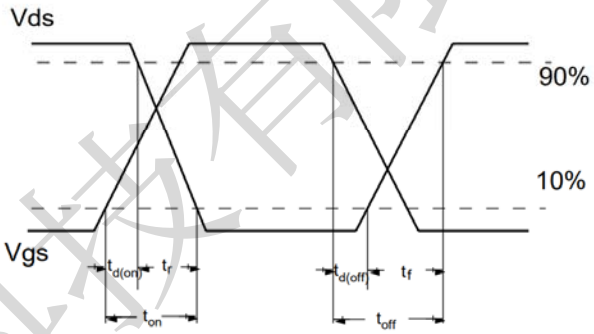
N Gate Charge Test Circuit & Waveforms



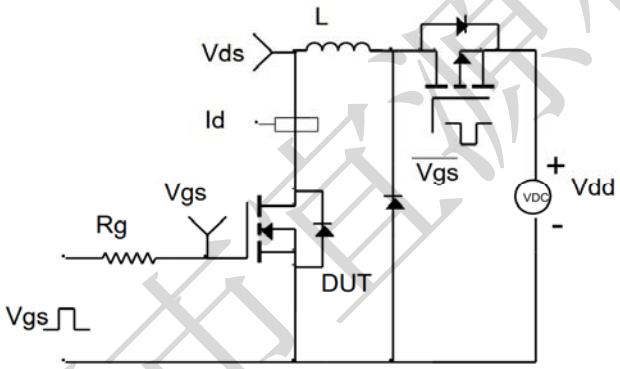


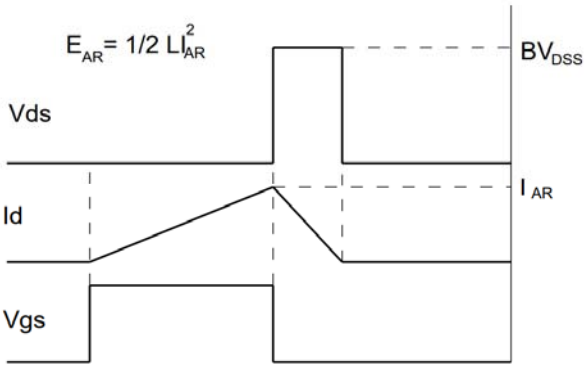
N Resistive Switching Test Circuit & Waveforms



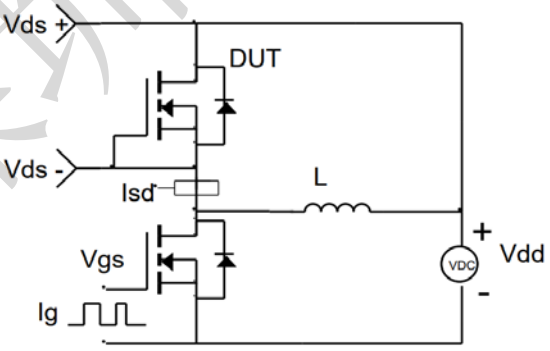


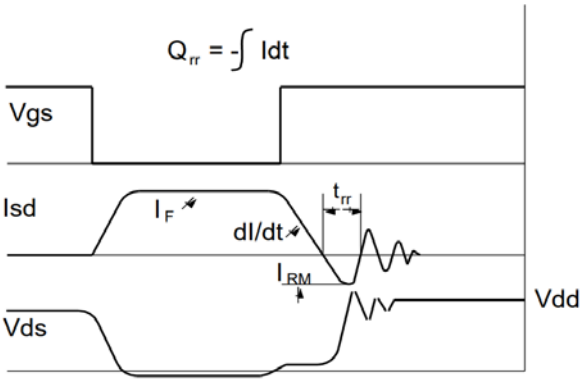
N Unclamped Inductive Switching（UIS）Test Circuit & Waveforms





N Diode Recovery Test Circuit & Waveforms



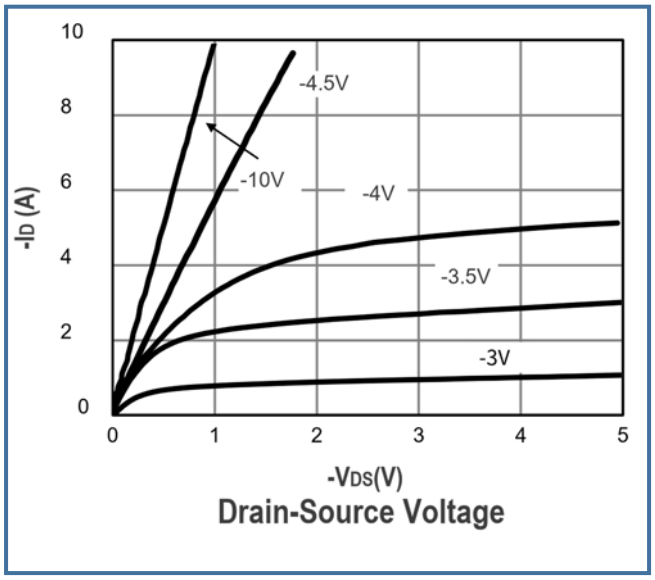


P-Channel Electrical Characteristics (TA=25°C, unless otherwise noted)

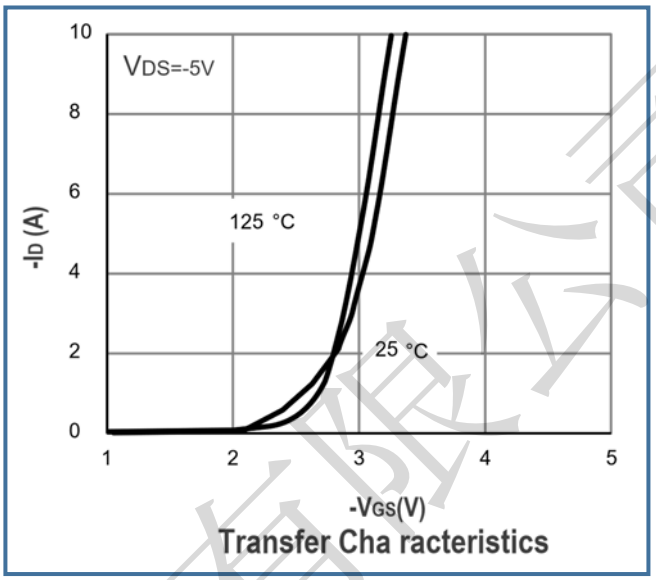
Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• **Off Characteristics**						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250uA	-60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-60V, V_{GS}=0V	-	-	-1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
• **On Characteristics**						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250uA	-1.0	-1.7	-2.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=-10V, I_D=-2.6A	-	180	230	mΩ
		V_{GS}=-4.5V, I_D=-1A	-	190	260	
gfs	Forward Transconductance	V_{DS}=-10V,ID=-2.6A		8		S
• **Dynamic Characteristics**						
C_{iss}	Input Capacitance	V_{DS}=-30V, V_{GS}=0V, f=1MHz	-	265	-	PF
C_{oss}	Output Capacitance		-	27	-	
C_{rss}	Reverse Transfer Capacitance		-	9	-	
• **Switching Characteristics**						
Q_g	Total Gate Charge	V_{DS}=-30V, I_D=-2A, V_{GS}=-10V	-	4.6	-	nC
Q_{gs}	Gate-Source Charge		-	0.9	-	
Q_{gd}	Gate-Drain Charge		-	1.1	-	
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=-30V, R_L=15Ω, I_D=-2A, V_{GEN}=-10V, RG=3Ω	-	4.3	-	nS
t_r	Turn-on Rise Time		-	1.6	-	
$t_{d(off)}$	Turn-off Delay Time		-	16	-	
t_f	Turn-off Fall Time		-	1.5	-	
• **Drain-Source Diode Characteristics**						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=-2.6A	-	-	-1.2	V
Rg	Gate resistance	V_{GS}=0V, VDS=0V,F=1MHz	-	1.3	-	Ω

Note: Pulse Test: Pulse Width≤300us, Duty Cycle≤2%

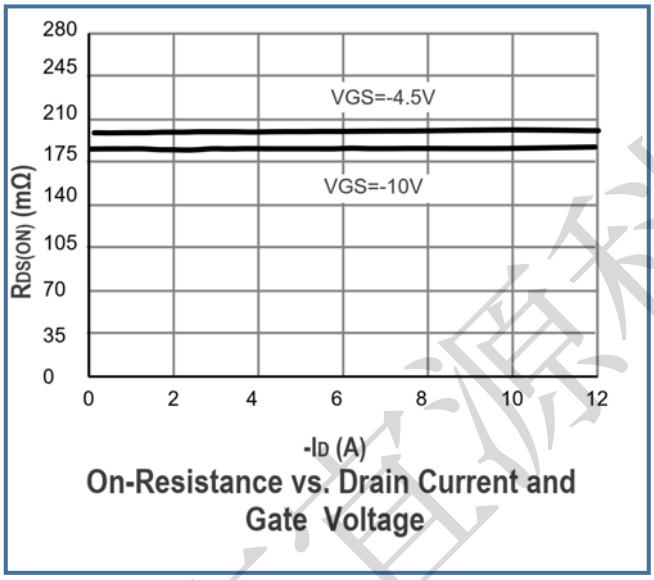
P-Channel Typical Characteristics Curves (Ta=25°C, unless otherwise note)



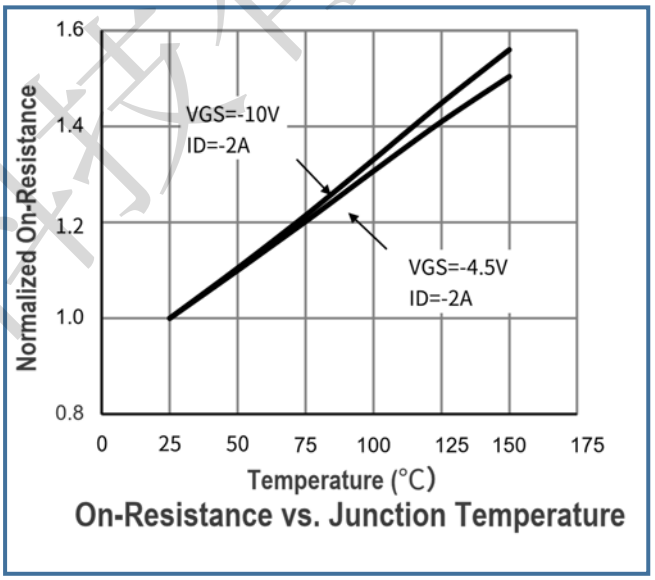
Drain-Source Voltage



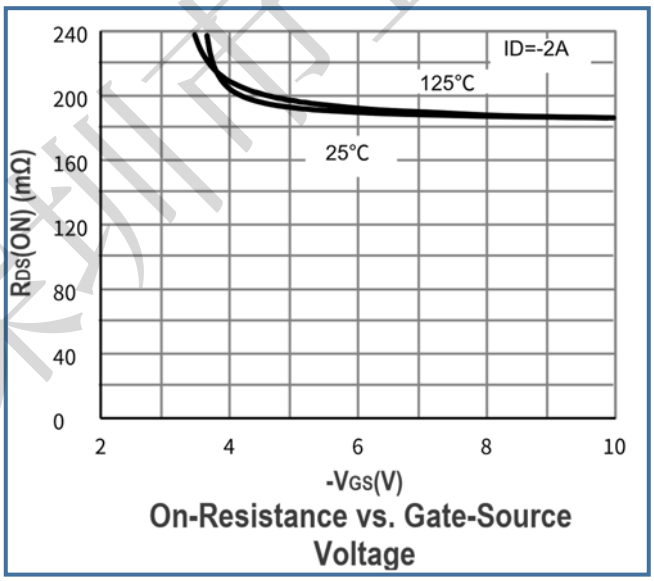
Transfer Cha racteristics



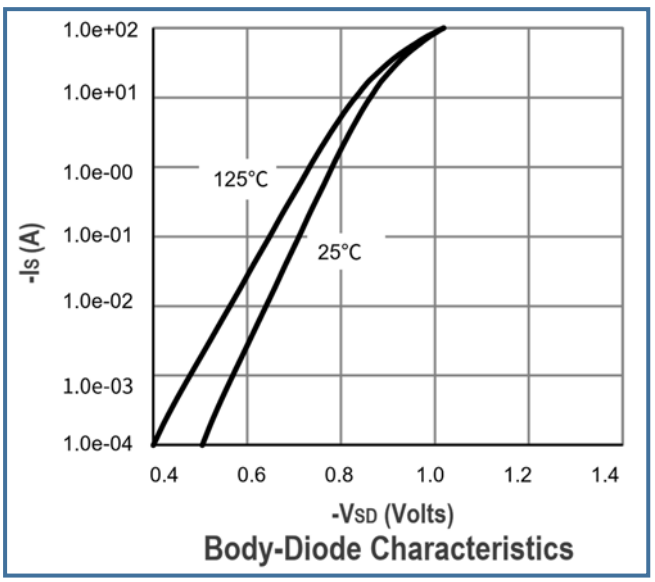
On-Resistance vs. Drain Current and Gate Voltage



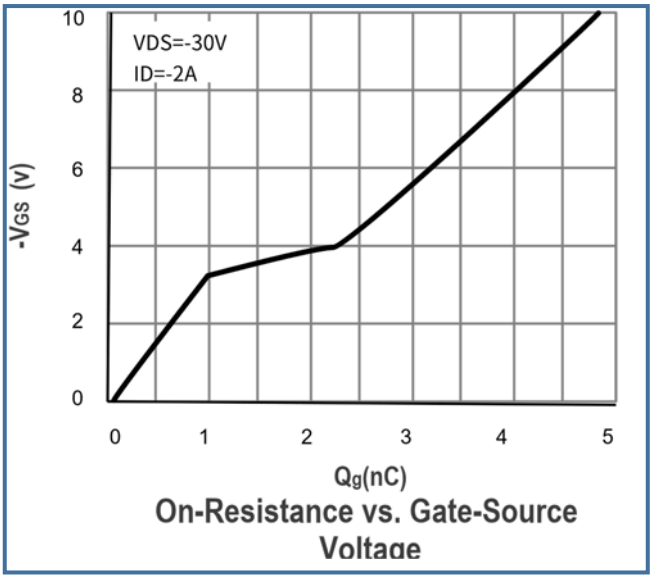
On-Resistance vs. Junction Temperature



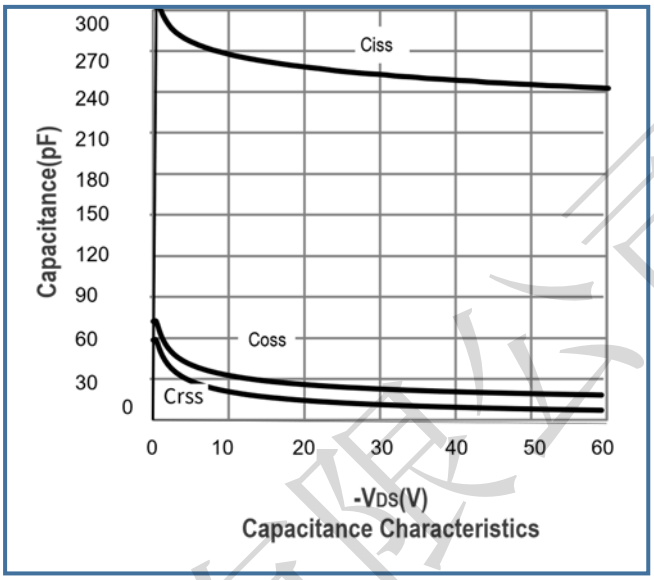
On-Resistance vs. Gate-Source Voltage



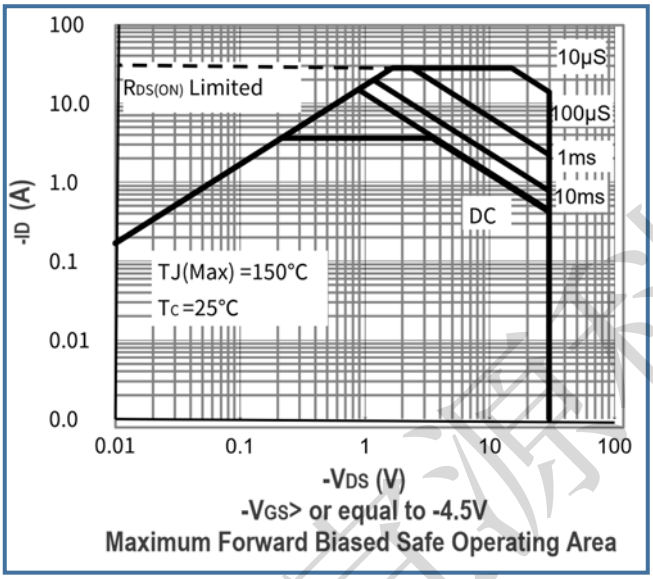
Body-Diode Characteristics



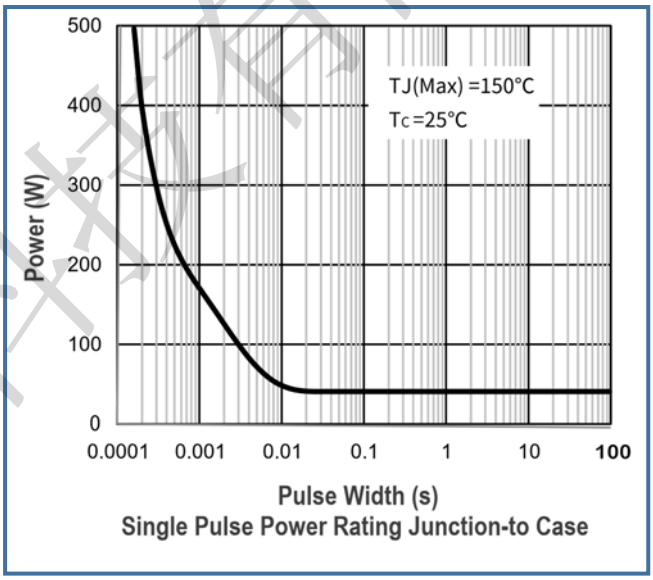
On-Resistance vs. Gate-Source Voltage



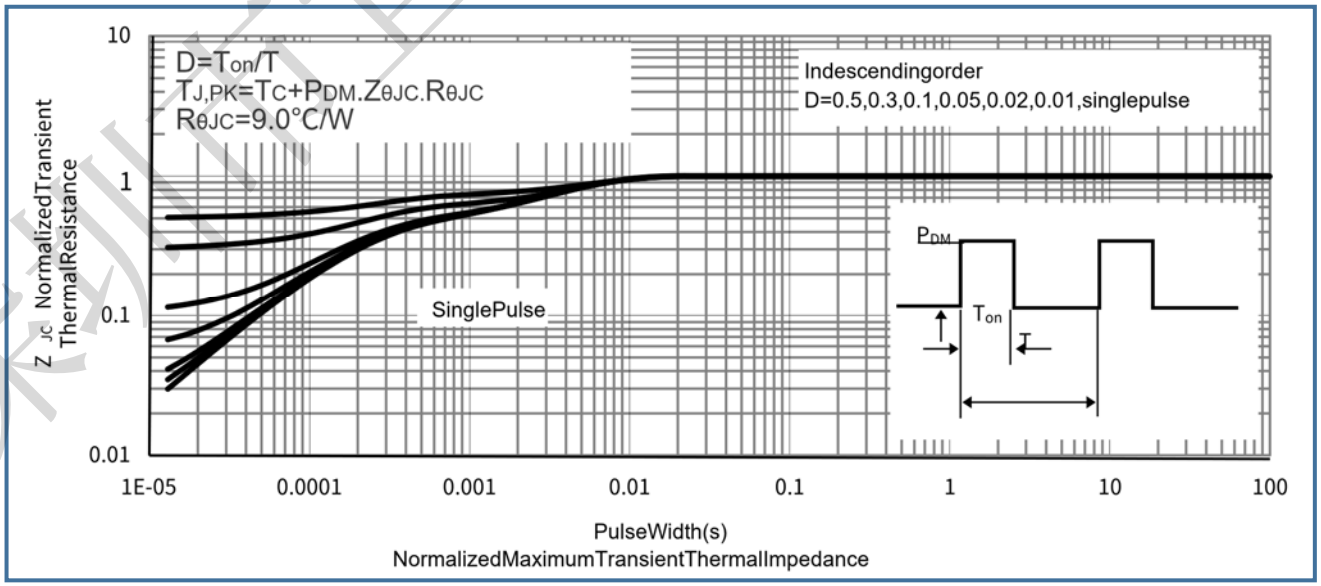
Capacitance Characteristics



-VGS> or equal to -4.5V
Maximum Forward Biased Safe Operating Area

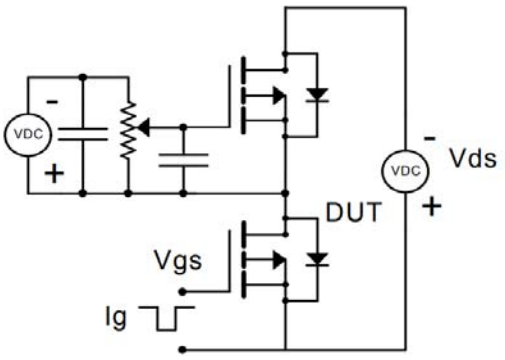


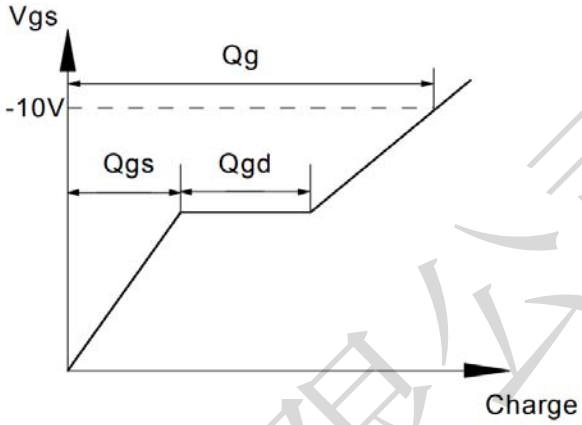
Single Pulse Power Rating Junction-to Case



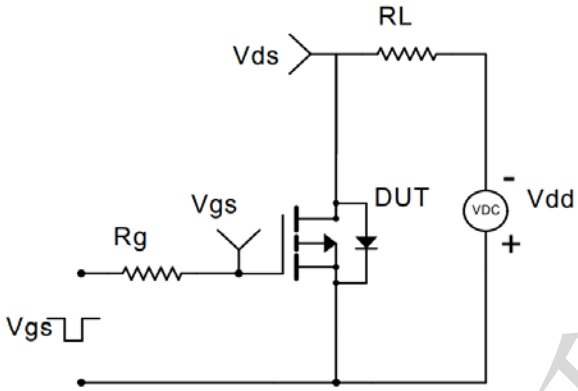
NormalizedMaximumTransientThermalImpedance

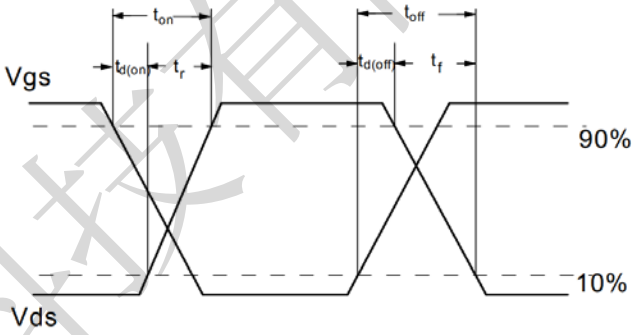
P Gate Charge Test Circuit & Waveforms



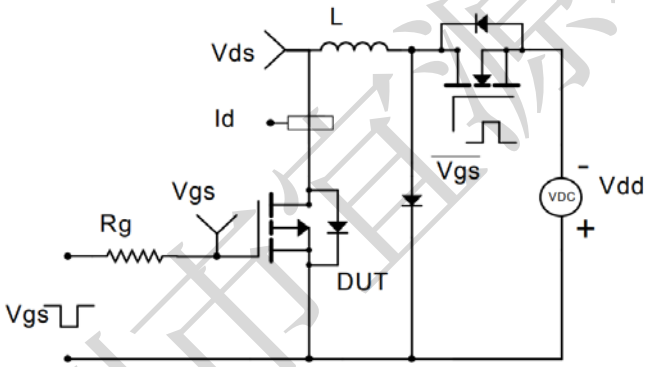


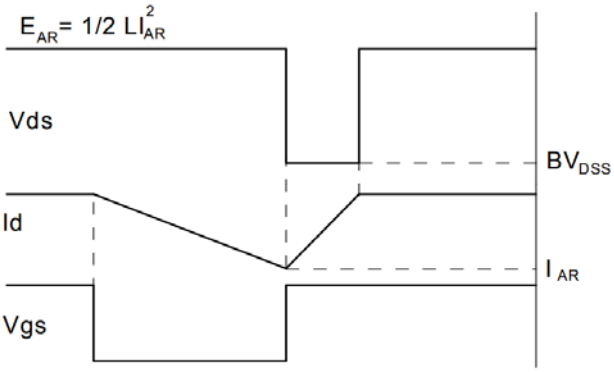
P Resistive Switching Test Circuit & Waveforms



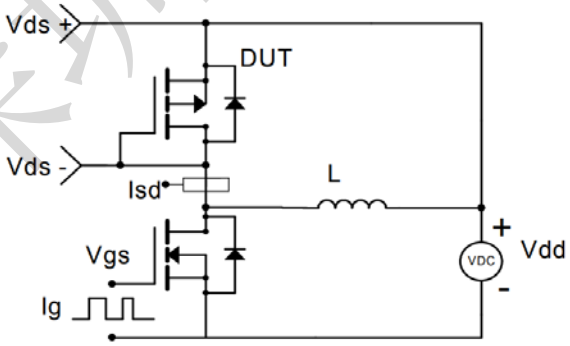


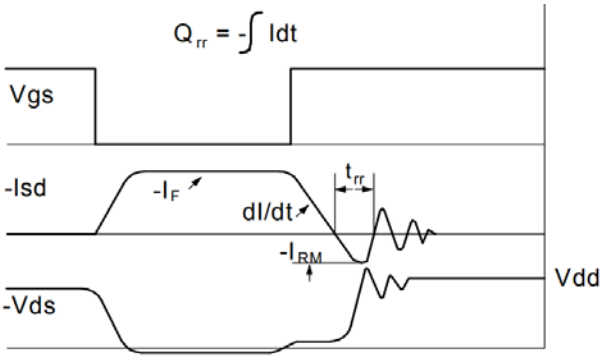
P Unclamped Inductive Switching（UIS）Test Circuit & Waveforms



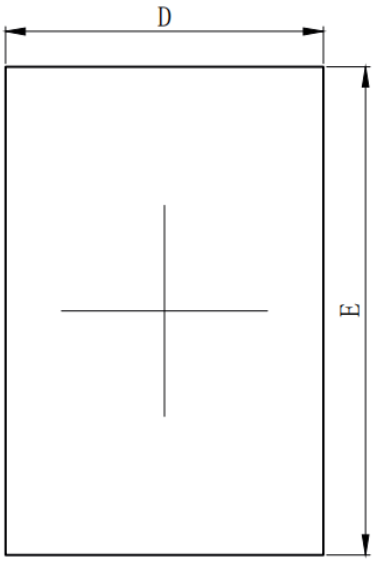


P Diode Recovery Test Circuit & Waveforms

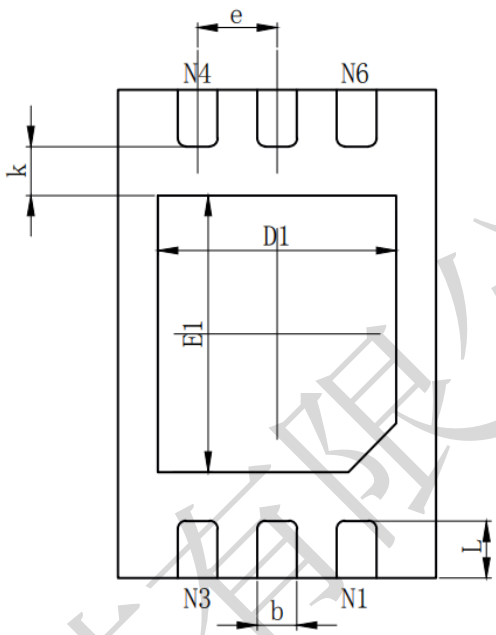




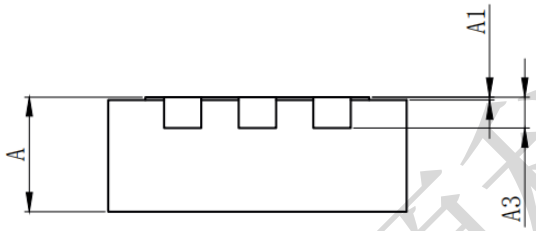
DFN2*3-6L Package Outline Data



TOPVIEW



BOTTOMVIEW



SIDEVIEW

Symbol	Dimensions （unit ： mm)		
	Min	TYP	Max
A	0.700	0.750	0.800
A1	0.000	0.010	0.050
A3		0.203REF	
D	1.950	2.000	2.050
E	2.950	3.000	3.050
D1	1.450	1.500	1.550
E1	1.650	1.700	1.750
k		0.200min	
b	0.200	0250	0.300
e		0.500TYP	
L	0.300		0.400

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