

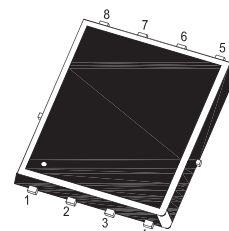
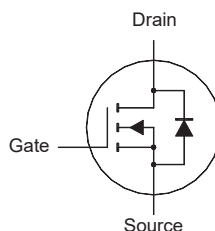
N-Channel Enhancement Mode MOSFET

Features

- Low Miller Capacitance
- Fully Characterized Capacitance and Avalanche
- Halogen and Antimony Free(HAF),
RoHS compliant

Application

- BLDC Motor drive applications
- Battery powered circuits
- Synchronous rectifier applications
- Resonant mode power supplies



1.Source 2.Source 3.Source 4.Gate
5.Drain 6.Drain 7.Drain 8.Drain
DFN5060 Plastic Package

Key Parameters

Parameter	Value	Unit
BV _{DSS}	100	V
R _{DS(ON)} Max	7.5 @ V _{GS} = 10 V	mΩ
	9.5 @ V _{GS} = 4.5 V	
V _{GS(th)} typ	1.7	V
Q _g typ	75 @ V _{GS} = 10 V	nC

Absolute Maximum Ratings(at T_a = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	100	V
Gate-Source Voltage	V _{GS}	± 20	V
Drain Current	I _D	60	A
		37.8	
Peak Drain Current, Pulsed ¹⁾	I _{DM}	320	A
Single Pulse Avalanche Current	I _{AS}	24	A
Single Pulse Avalanche Energy ²⁾	E _{AS}	144	mJ
Power Dissipation	P _{tot}	50	W
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to + 150	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	R _{θJC}	2.5	°C/W
Thermal Resistance from Junction to Ambient ³⁾	R _{θJA}	50	°C/W

¹⁾ Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%, Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C.

²⁾ Limited by T_{J(MAX)}, starting T_J = 25 °C, L = 0.5 mH, R_g = 25 Ω, I_{AS} = 24 A, V_{GS} = 10 V.

³⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250\ \mu\text{A}$	BV_{DSS}	100	-	-	V
Drain-Source Leakage Current at $V_{DS} = 80\ \text{V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1.2	-	2.4	V
Drain-Source On-State Resistance at $V_{GS} = 10\ \text{V}$, $I_D = 50\ \text{A}$ at $V_{GS} = 4.5\ \text{V}$, $I_D = 20\ \text{A}$	$R_{DS(on)}$	- -	6 -	7.5 9.5	m Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 5\ \text{V}$, $I_D = 30\ \text{A}$	g_{fs}	-	104	-	S
Gate Resistance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 0\ \text{V}$, $f = 1\ \text{MHz}$	R_g	-	1	-	Ω
Input Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	3742	-	pF
Output Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	698	-	pF
Reverse Transfer Capacitance at $V_{GS} = 0\ \text{V}$, $V_{DS} = 50\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	34	-	pF
Gate charge total at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$ at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 4.5\ \text{V}$	Q_g	- -	75 40	- -	nC
Gate to Source Charge at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gs}	-	14	-	nC
Gate to Drain Charge at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gd}	-	22	-	nC
Turn-On Delay Time at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_g = 3.3\ \Omega$	$t_{d(on)}$	-	26	-	ns
Turn-On Rise Time at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_g = 3.3\ \Omega$	t_r	-	43	-	ns
Turn-Off Delay Time at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_g = 3.3\ \Omega$	$t_{d(off)}$	-	23	-	ns
Turn-Off Fall Time at $V_{DS} = 50\ \text{V}$, $I_D = 50\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_g = 3.3\ \Omega$	t_f	-	8	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $I_S = 50\ \text{A}$, $V_{GS} = 0\ \text{V}$	V_{SD}	-	-	1.3	V
Body-Diode Continuous Current	I_S	-	-	60	A
Body-Diode Continuous Current, Pulsed	I_{SM}	-	-	320	A
Body Diode Reverse Recovery Time at $I_S = 50\ \text{A}$, $V_{DD} = 50\ \text{V}$, $di/dt = 200\ \text{A} / \mu\text{s}$	t_{rr}	-	48	-	ns
Body Diode Reverse Recovery Charge at $I_S = 50\ \text{A}$, $V_{DD} = 50\ \text{V}$, $di/dt = 200\ \text{A} / \mu\text{s}$	Q_{rr}	-	106	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

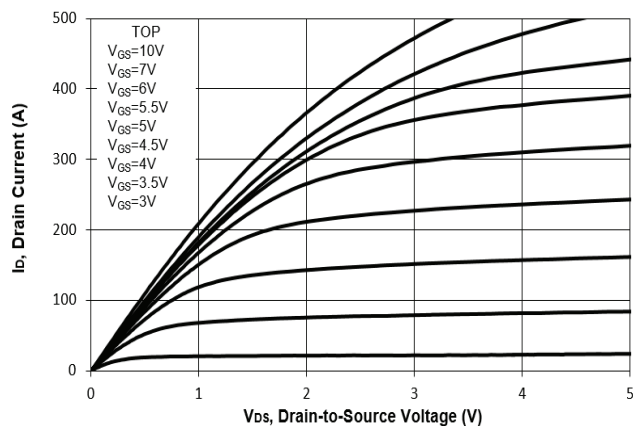


Fig. 2 Typical Transfer Characteristics

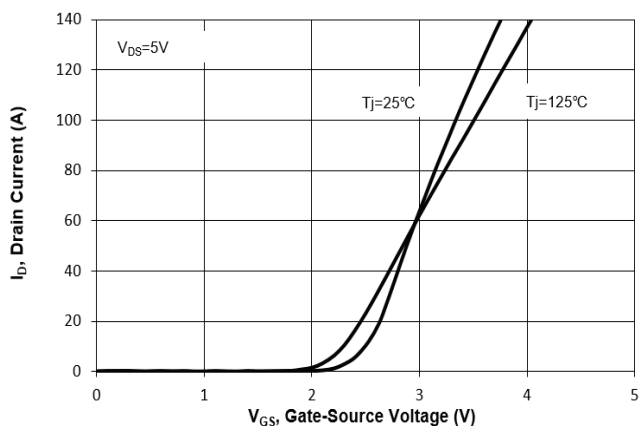


Fig. 3 on-Resistance vs. Drain Current

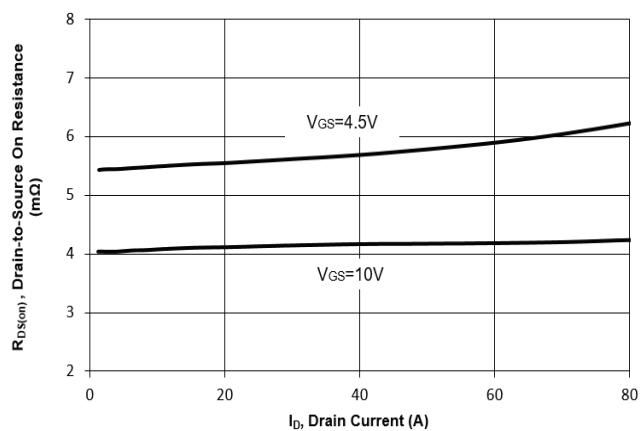


Fig. 4 on-Resistance vs. Gate to Source Voltage

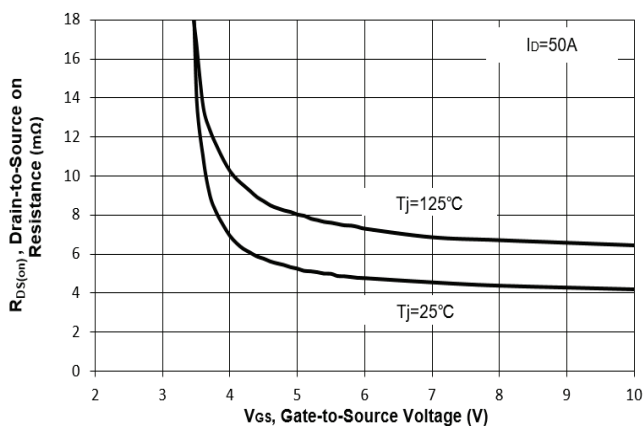


Fig. 5 on-Resistance vs. TJ

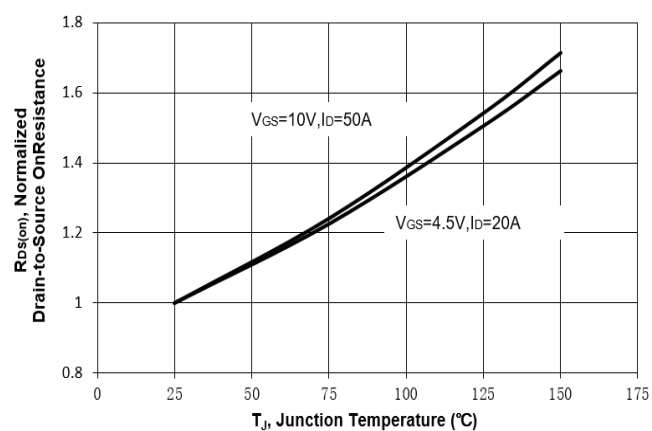
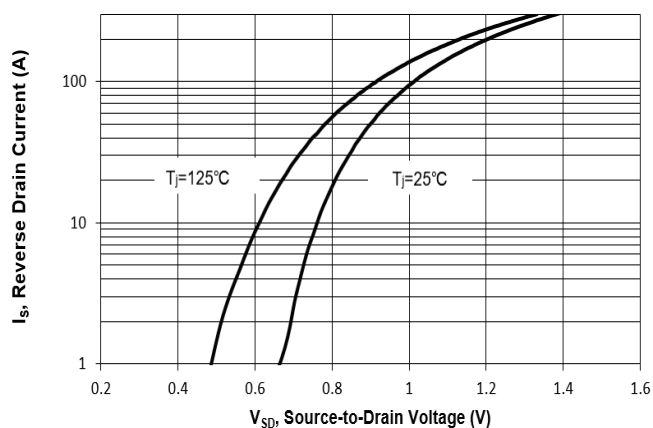


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

Fig.13 Normalized Maximum Transient Thermal Impedance($Z_{\theta JC}$)

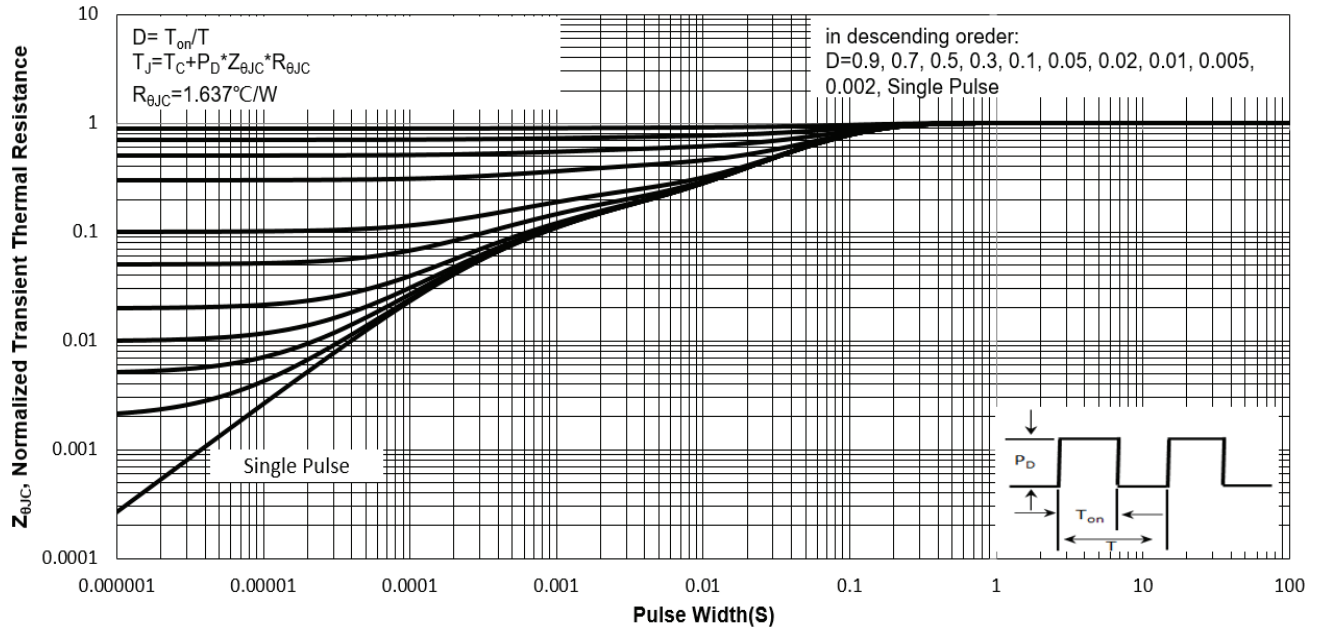


Fig.14 Normalized Maximum Transient Thermal Impedance($Z_{\theta JA}$)

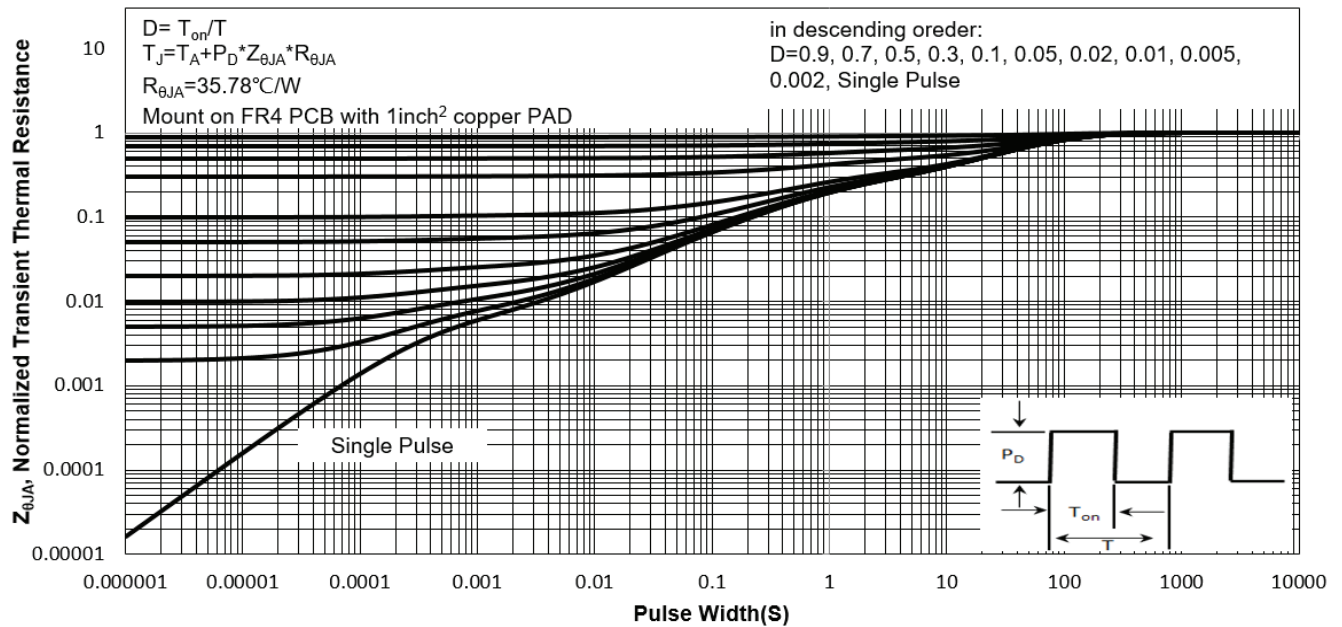


Fig. 7 Typical Junction Capacitance

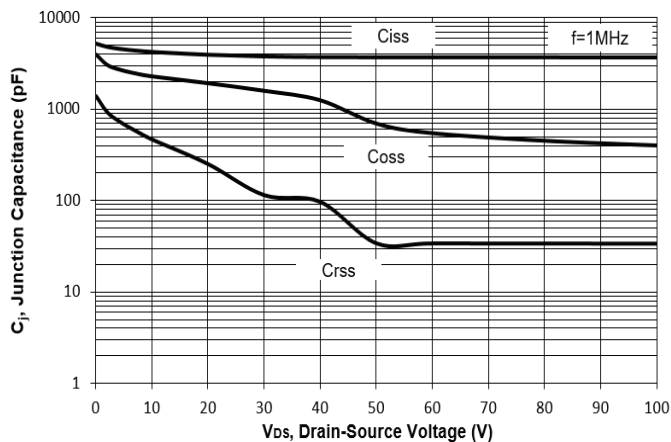


Fig. 8 Drain-Source Leakage Current vs. T_J

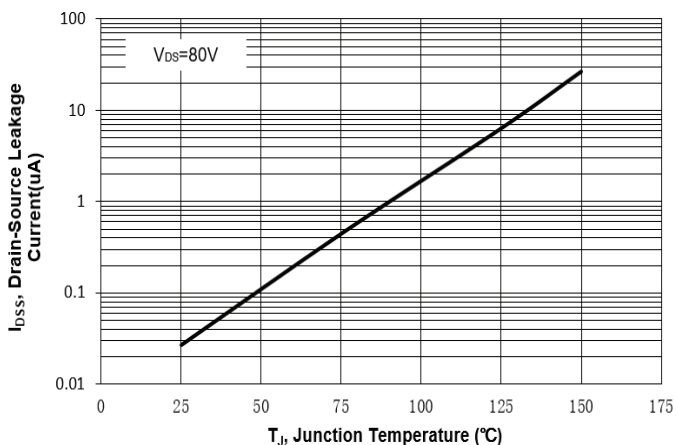


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

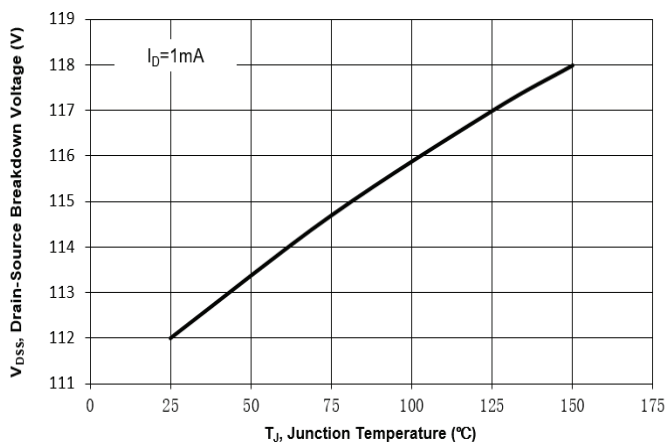


Fig. 10 Gate Threshold Variation vs. T_J

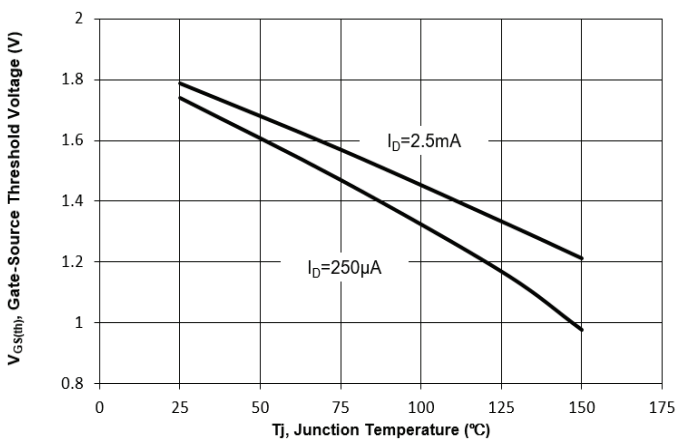


Fig. 11 Gate Charge

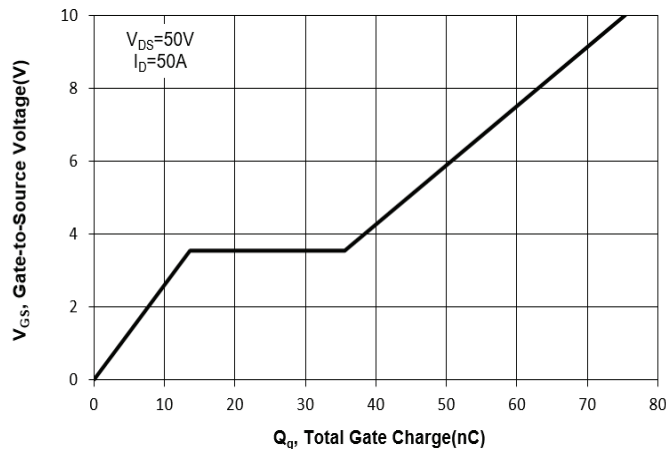
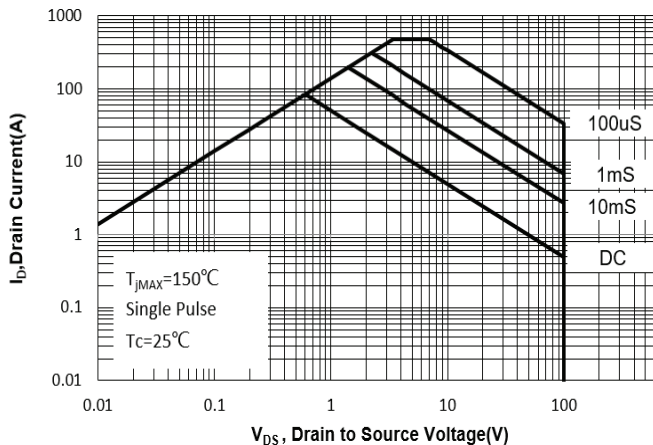
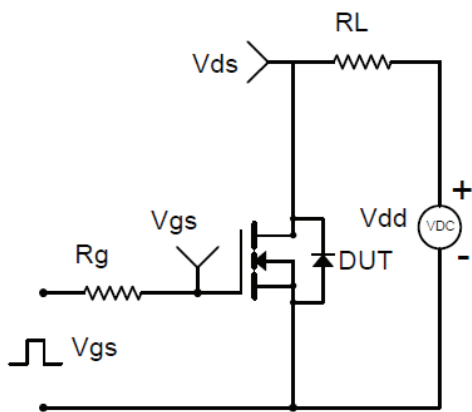
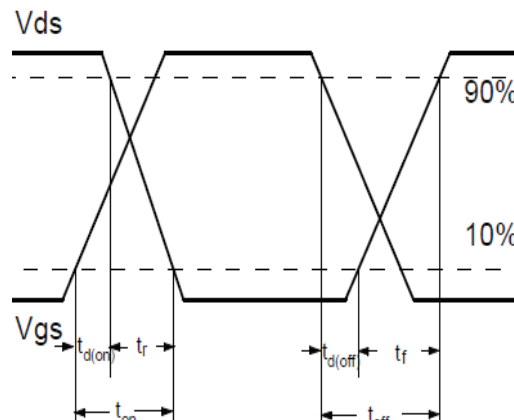
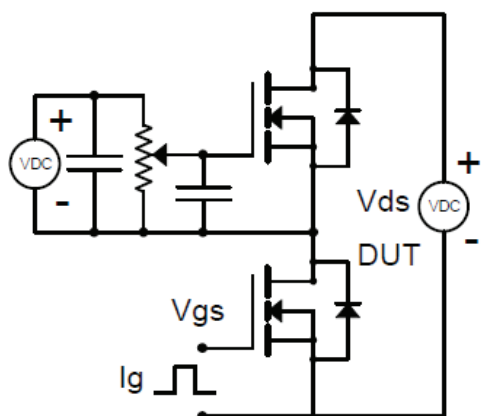
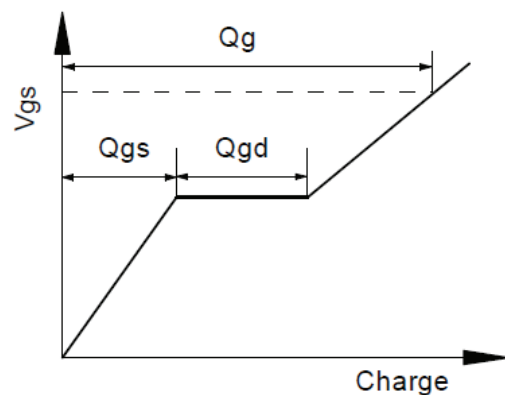
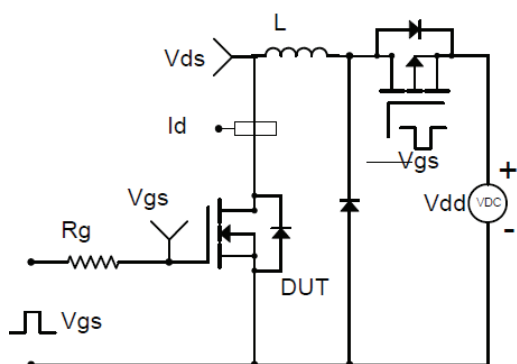
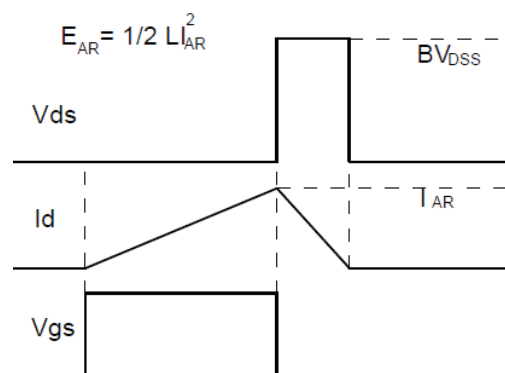


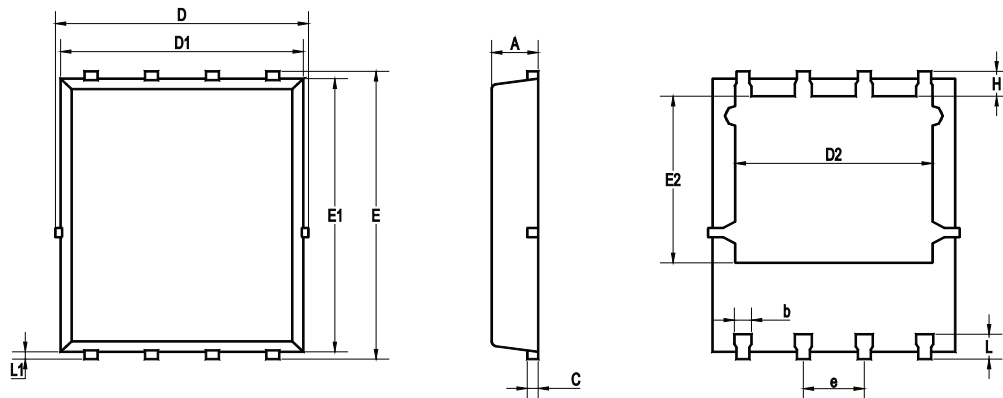
Fig. 12 Safe Operation Area



Test Circuits
Fig.1-1 Switching times test circuit

Fig.1-2 Switching Waveform

Fig.2-1 Gate charge test circuit

Fig.2-2 Gate charge waveform

Fig.3-1 Avalanche test circuit

Fig.3-2 Avalanche waveform


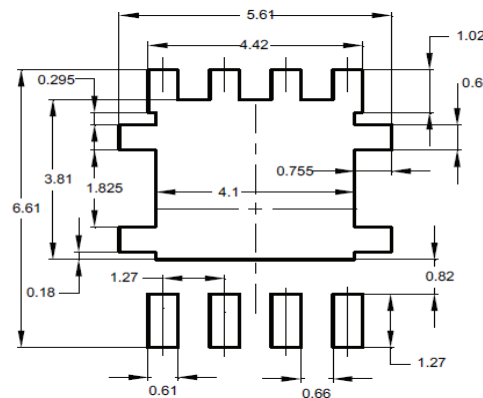
Package Outline Dimensions (Units: mm)

DFN5060



UNIT	A	b	C	D	D1	D2	E	E1	E2	e	L	L1	H
mm	1.12	0.51	0.34	5.26	5.1	4.5	6.25	6	3.66	1.37	0.71	0.2	0.71
	0.9	0.33	0.11	4.7	4.7	3.56	5.75	5.6	3.18	1.17	0.35	0.06	0.35

Recommended Soldering Footprint

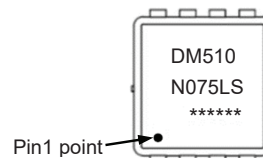


Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
DFN5060	12	8 ± 0.1	0.315 ± 0.004	330	13	5,000

Marking information

" DM510N075LS " = Part No.
 " ***** " = Date Code Marking
 Font type: Arial



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