

XPJ102N09N8R-G

ETR11082-002

N-channel MOSFET 100V, 9.4mΩ, 59A

FEATURES

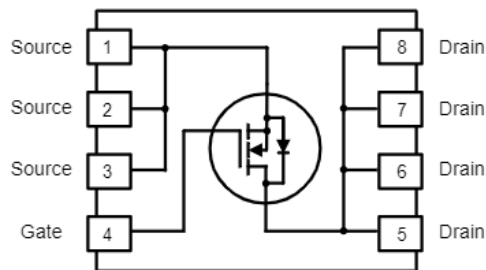
- High switching speed
- Low reverse transfer capacitance
- EU RoHS Compliant

APPLICATIONS

- DC Motor
- General-purpose inverter
- DC Switching power supply

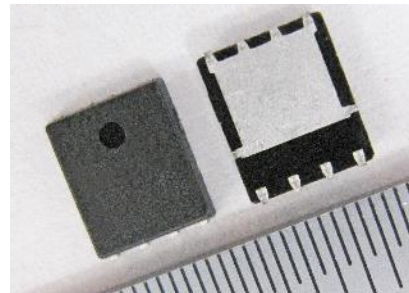
V_{DSS}	100V
$R_{DS(ON)}$ (MAX.)	9.4mΩ@ $V_{GS}=10V$
I_D	59A
Q_g (TYP.)	19nC

EQUIVALENT CIRCUIT



PIN CONFIGURATION

- DFN5060-8L



PRODUCT NAME

PRODUCT NAME	PACKAGE	ORDER UNIT
XPJ102N09N8R-G	DFN5060-8L	6,000pcs/2reel

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNITS	
Drain-Source Voltage	V_{DSS}	100	V	
Gate-Source Voltage	V_{GSS}	±20	V	
Drain Current (DC) ^{(*)1}	I_D	$T_C=25^\circ\text{C}$	59.2	A
		$T_C=100^\circ\text{C}$	37.4	A
Drain Current (Pulse) ^{(*)2}	I_{DM}	236	A	
Single Pulse Avalanche Current ^{(*)3}	I_{AS}	28	A	
Single Pulse Avalanche Energy ^{(*)3}	E_{AS}	98	mJ	
Power Dissipation	P_d	$T_C=25^\circ\text{C}$	62.5	W
		$T_C=100^\circ\text{C}$	25	W
Junction Temperature	T_J	150	°C	
Storage Temperature	T_{stg}	-55 ~ 150	°C	

(*)1 The maximum drain current calculated by maximum junction temperature and thermal impedance.

It can be varied by application and environment.

(*)2 Pulse width < 300μs, Duty cycle < 2%

(*)3 E_{AS} is calculated based on the condition of $L=1.0\text{mH}$, $I_{AS}=14\text{A}$, $V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$. 100% test at $L=0.1\text{mH}$, $I_{AS}=28\text{A}$ in production.

XPJ102N09N8R-G

THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNITS
Thermal Resistance	Junction-to-Case (Bottom)	R_{thJC}	-	1.3	2.0	°C/W
	Junction-to-Ambient (*4)	R_{thJA}	-	37.4	50	°C/W

(*4) R_{thJA} is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz.square pad of copper.

ELECTRICAL CHARACTERISTICS

T_j=25°C

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=115\mu A$	1.8	2.8	3.8	
Drain-Source On-State Resistance (*2)	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	8.4	9.4	mΩ
		$V_{GS}=6V, I_D=15A$	-	11.0	14.3	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±100	nA
Transfer Characteristics (*2)	g_{fs}	$V_{DS}=10V, I_D=30A$	-	45	-	S
Dynamic Characteristics (*6)						
Total Gate Charge	Q_g	$V_{DS}=50V, I_D=30A, V_{GS}=10V$	-	19	25	nC
Gate-Source Charge	Q_{gs}		-	7.6	-	
Gate-Drain Charge	Q_{gd}		-	3.0	-	
Gate Plateau Voltage	$V_{plateau}$		-	5.4	-	V
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, f=250kHz$	-	1370	1780	pF
Output Capacitance	C_{oss}		-	460	600	
Reverse Transfer Capacitance	C_{rss}		-	10	-	
Output Charge	Q_{oss}	$V_{DS}=50V, V_{GS}=0V$	-	34	44	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=30A, V_{GS}=10V, R_G=3.0\Omega$ (*5)	-	6.2	-	ns
Rise Time	t_r		-	3.3	-	
Turn-Off Delay Time	$t_{d(off)}$		-	10.4	-	
Fall Time	t_f		-	3.3	-	
Gate Resistance	R_g	$f=1.0MHz$	-	1.1	2.2	Ω
Source-Drain Diode						
Diode Forward Voltage	V_{SD}	$I_S=30A, V_{GS}=0V$	-	0.9	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F=30A, V_{DD}=50V$	-	45	-	nC
Reverse Recovery Time	t_{rr}	$di/dt=100A/\mu s$	-	41	-	ns

(*2) Pulse width < 300μs, Duty cycle < 2%

(*5) Essentially independent of operating temperature typical characteristics.

(*6) Guaranteed by design, not subject to production testing.

■NOTES ON USE

1. Please use this IC within the absolute maximum ratings.

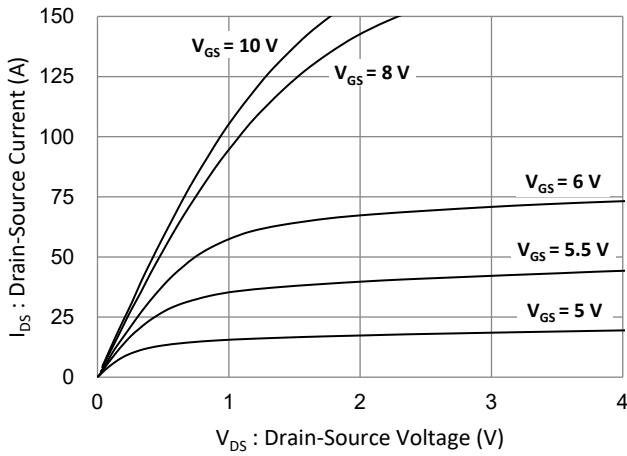
Even within the ratings, in case of high load use continuously such as high temperature, high voltage, high current and thermal stress may cause reliability degradation of the IC.

2. Torex places an importance on improving our products and their reliability.

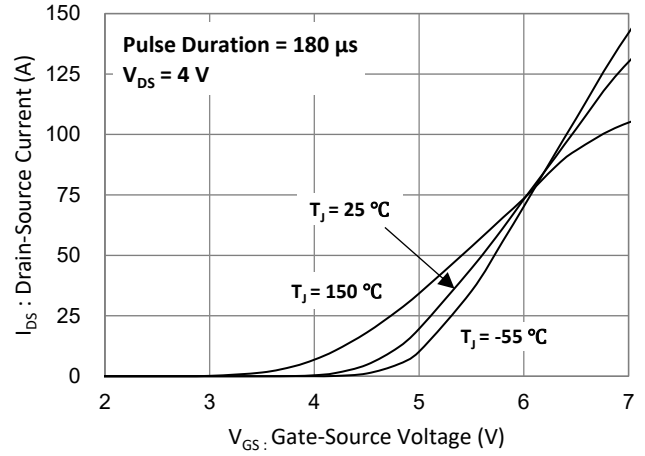
We request that users incorporate fail-safe designs and post-aging protection treatment when using Torex products in their systems.

TYPICAL PERFORMANCE CHARACTERISTICS

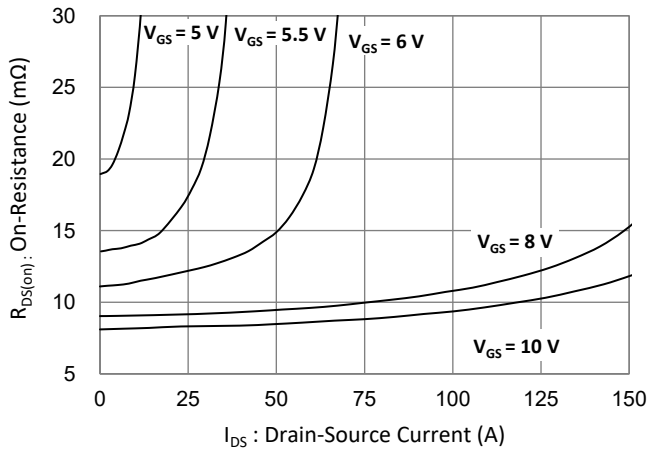
(1) Drain-Source Current vs. Drain-Source Voltage



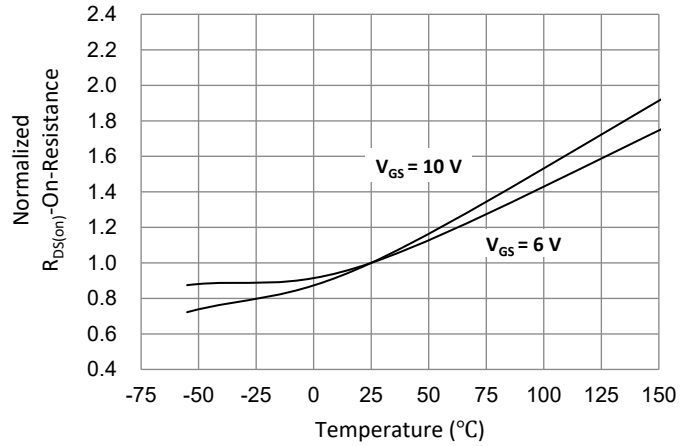
(2) Drain-Source Current vs. Gate-Source Voltage



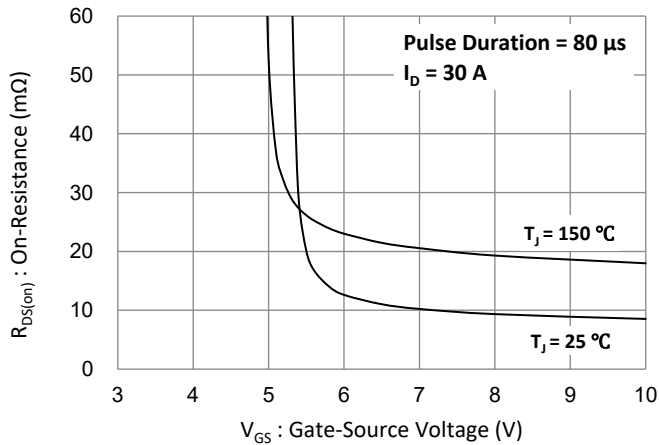
(3) Drain-Source On-State Resistance vs. Drain-Source Current



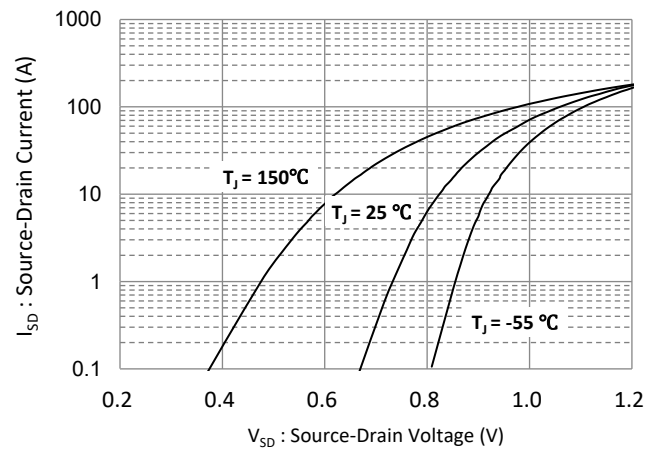
(4) Normalized Drain-Source On-State Resistance



(5) Drain-Source On-State Resistance vs. Gate-Source Voltage

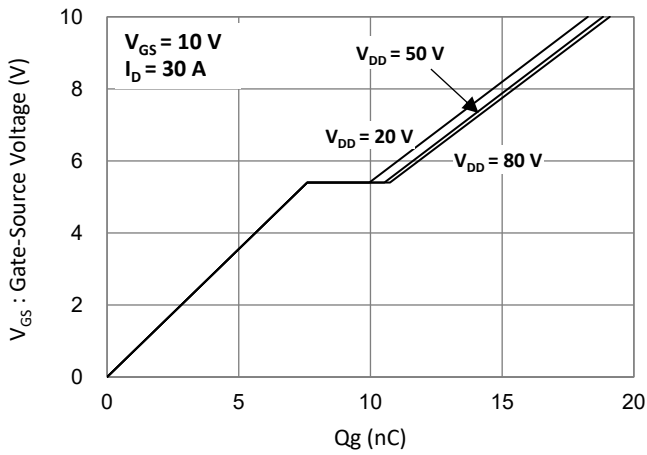


(6) Source - Drain Diode Characteristics

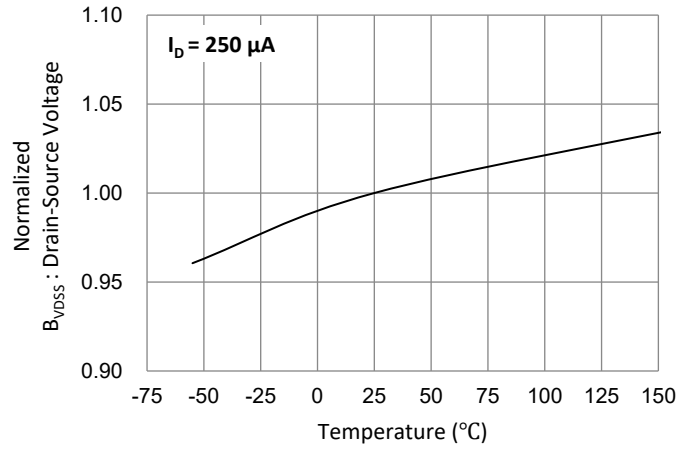


TYPICAL PERFORMANCE CHARACTERISTICS

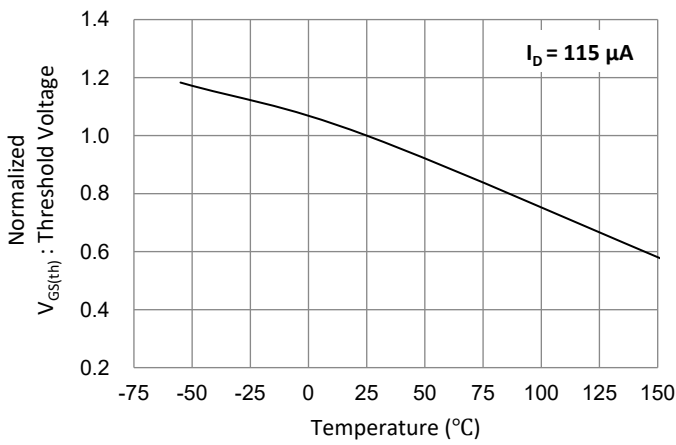
(7) Gate-Charge Characteristics



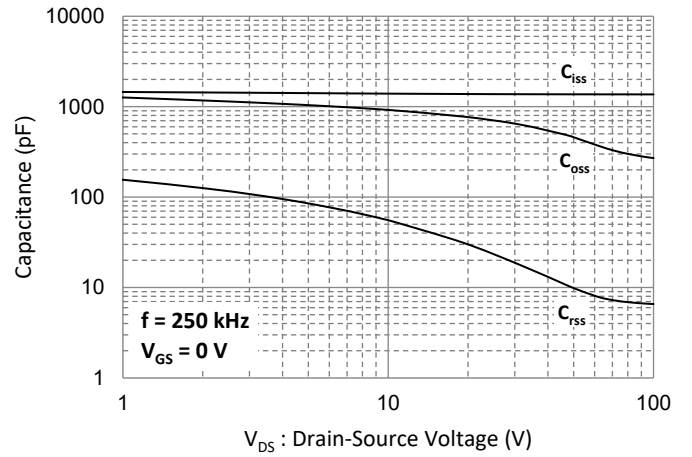
(8) Normalized Drain-Source Breakdown Voltage



(9) Normalized Gate Threshold Voltage

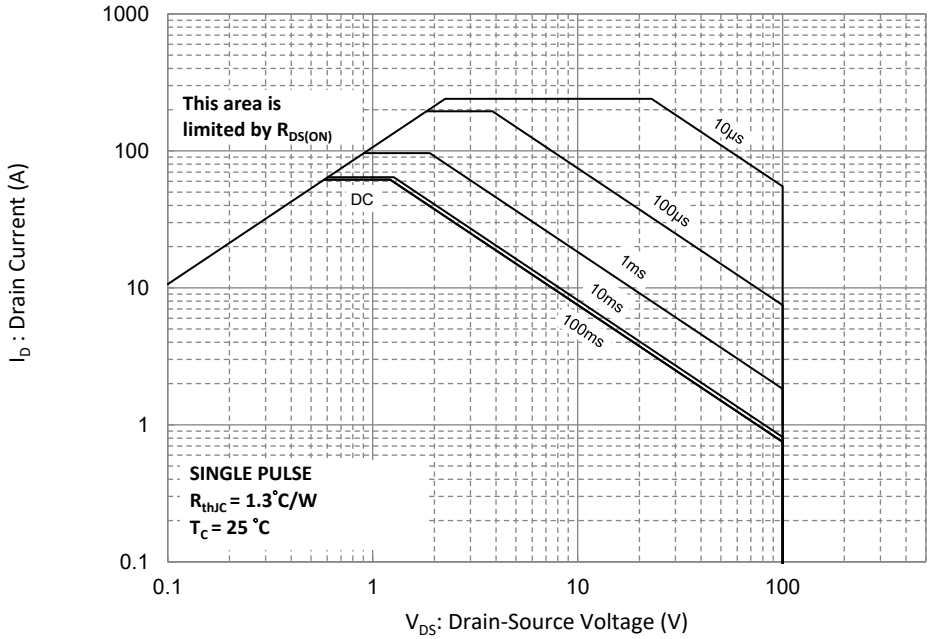


(10) Capacitance vs. Drain-Source Voltage

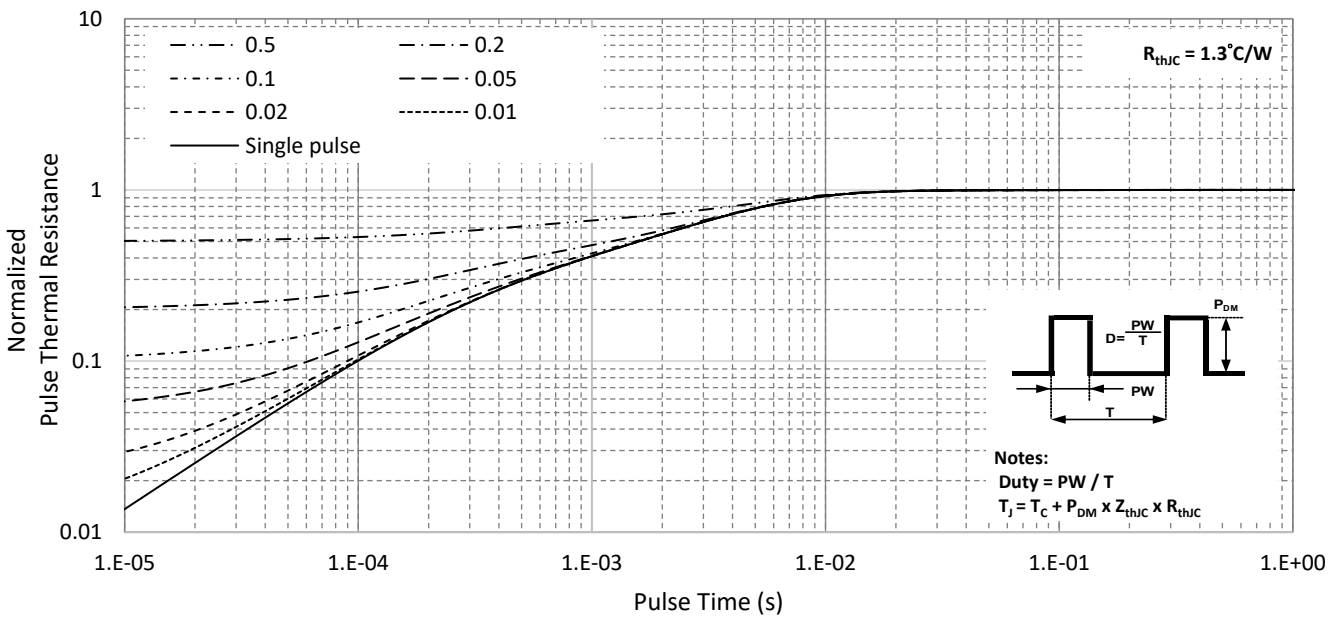


TYPICAL PERFORMANCE CHARACTERISTICS

(11) Maximum Safe Operating Area



(12) Normalized Transient Thermal Resistance



■ PACKAGING INFORMATION

For the latest package information go to, www.torexsemi.com/technical-support/packages

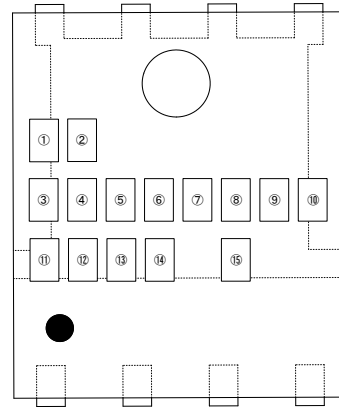
PACKAGE	OUTLINE / LAND PATTERN	THERMAL CHARACTERISTICS
DFN5060-8L	DFN5060-8L PKG	-

MARKING RULE

①②③④⑤⑥⑦⑧⑨⑩ represents products series

	MARK
①②	PJ
③④⑤⑥⑦⑧⑨⑩	094N10NS

⑪⑫⑬⑭⑮ represents production lot number



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