N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a]	Q_g (Typ.)
40	1.6 at V_{GS}= 10 V	135	52 nC
	2.8 at V_{GS} = 4.5 V		

FEATURES

- DT-Trench Power MOSFET
- Improved dv/dt Capability
- Fast switching
- Green Device Available

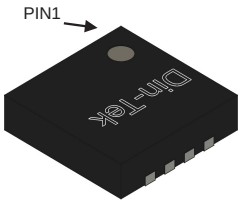
RoHS COMPLIANT

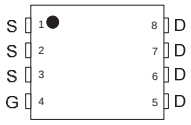
APPLICATIONS

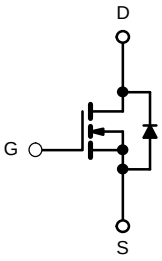
- Motor Drive
- Power Tools
- LED Lighting
- Quick Charger

DFN3.3X3.3-8L Pin Configuration

Top View







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)[a]	T_C = 25 °C	I_D	135	A
	T_C = 100 °C		99	
Pulsed Drain Current[b]		I_{DM}	520	
Single Avalanche Energy		E_{AS}	259	mJ
Maximum Power Dissipation[c]	T_C = 25 °C	P_D	95	W
	T_C = 100 °C		38	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to +150	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction-to-Ambient (PCB Mount)[d]	R_{thJA}	62	°C/W
Junction-to-Case (Drain)	R_{thJC}	1.3	

Notes

a. Calculated continuous current based on maximum allowablejunction temperature.
b. Repetitive rating; pulse width limited by max. junction temperature.
c. Pd is based on max. junction temperature, using junction-case thermal resistance.
d. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper,in a still air environment with Ta=25 °C.

SPECIFICATIONS (T_C = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.2	-	2.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	µA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 32 V, V_{GS} = 0 V, T_J = 100 °C	-	-	10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	135	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A	-	1.6	2.05	mΩ
		V_{GS} = 4.5 V, I_D = 15 A	-	2.8	3.6	
Forward Transconductance [a]	g_{fs}	V_{DS} = 10 V, I_D = 3 A	-	15	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 20 V, f = 1 MHz	-	2950	-	pF
Output Capacitance	C_{oss}		-	1100	-	
Reverse Transfer Capacitance	C_{rss}		-	58	-	
Total Gate Charge [c]	Q_g	V_{DS} = 20 V, V_{GS} = 10 V, I_D = 65 A	-	52	-	nC
Gate-Source Charge [c]	Q_{gs}		-	8.3	-	
Gate-Drain Charge [c]	Q_{gd}		-	14	-	
Gate Resistance	R_g	f = 1 MHz	-	0.9	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 20 V, I_D = 65 A, R_g = 6 Ω, V_{GS} = 10 V	-	10	-	ns
Rise Time [c]	t_r		-	15	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	20	-	
Fall Time [c]	t_f		-	30	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-	-	135	A
Pulsed Current	I_{SM}		-	-	520	A
Forward Voltage [a]	V_{SD}	I_F = 1 A, V_{GS} = 0 V	-	-	1	V
Reverse Recovery Time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs	-	70	-	ns
Reverse Recovery Charge	Q_{rr}		-	100	-	nC

Notes

a. Pulse test; pulse width ≤ 200 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

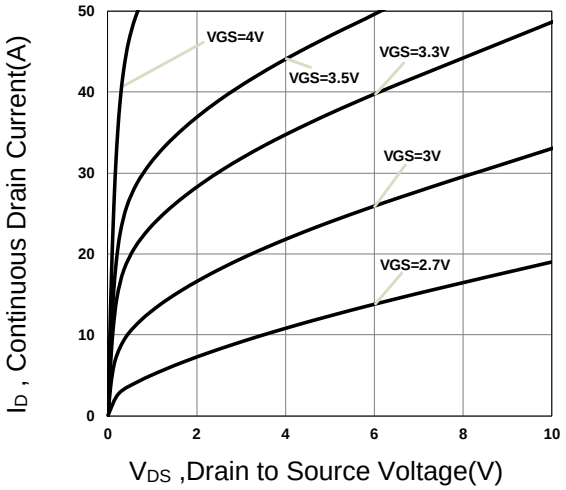


Fig.1 Typical Output Characteristics

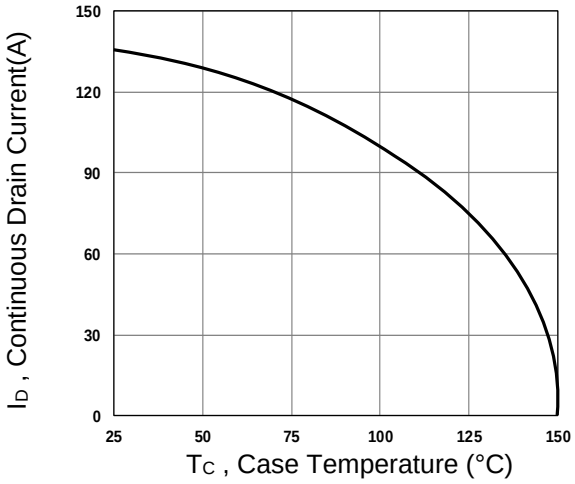


Fig.2 Continuous Drain Current vs. T_C

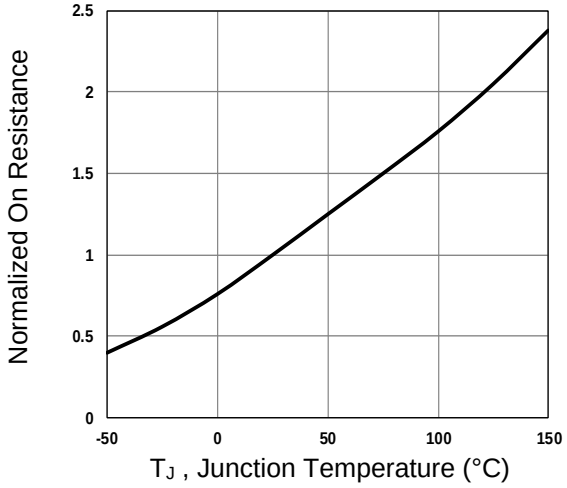


Fig. 3 Normalized RDSON vs. T_J

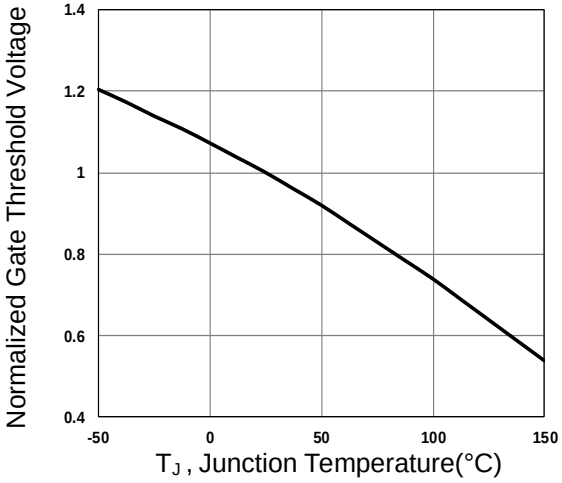


Fig. 4 Normalized V_{th} vs. T_J

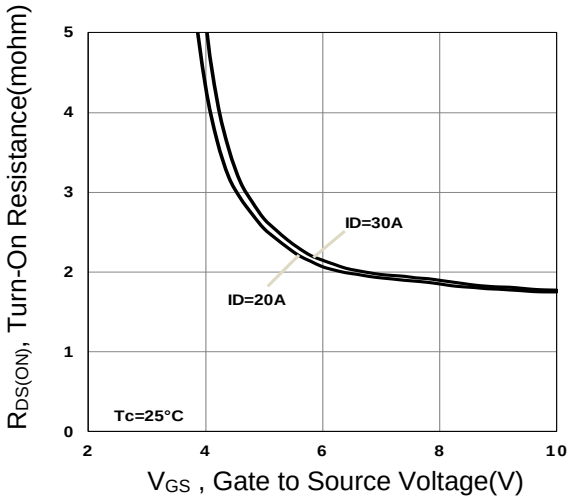


Fig. 5 Turn-On Resistance vs. V_{GS}

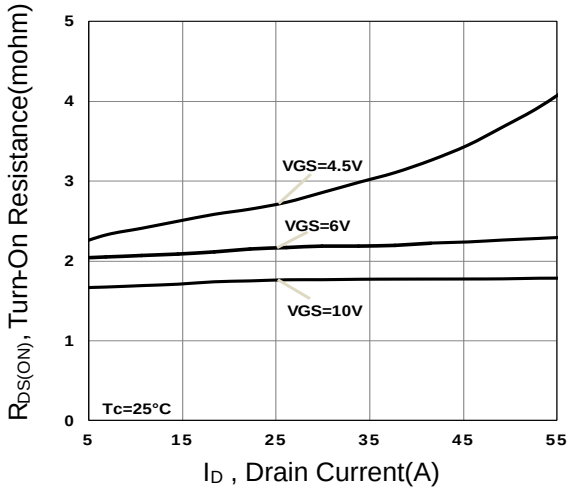


Fig. 6 Turn-On Resistance vs. I_D

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

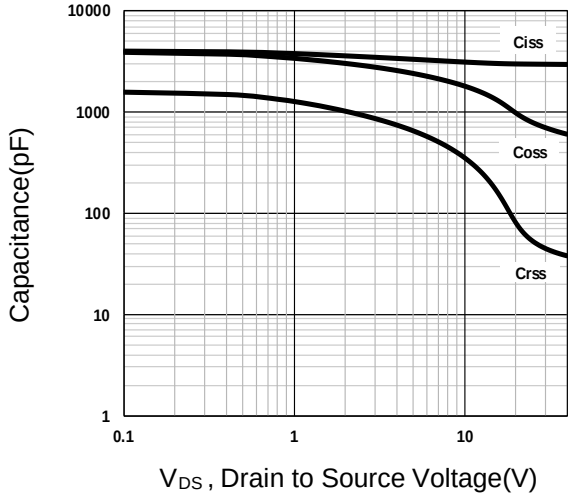


Fig. 7 Capacitance Characteristics

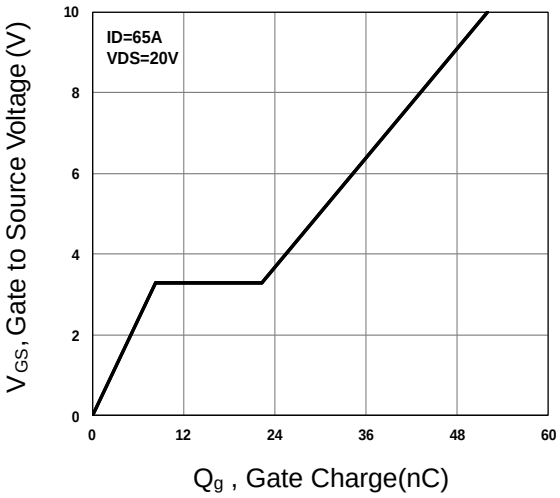


Fig. 8 Gate Charge Characteristics

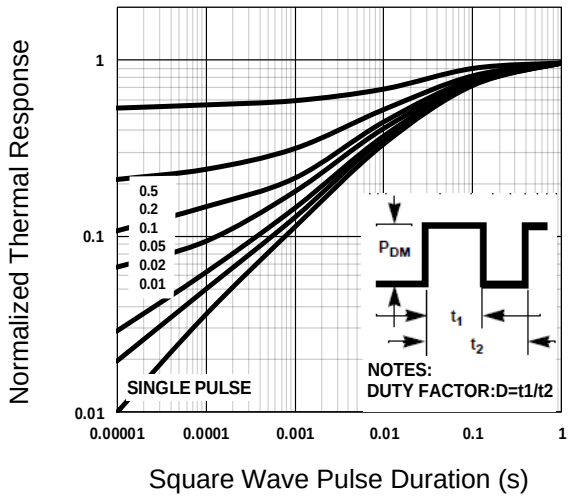


Fig. 9 Normalized Transient Impedance

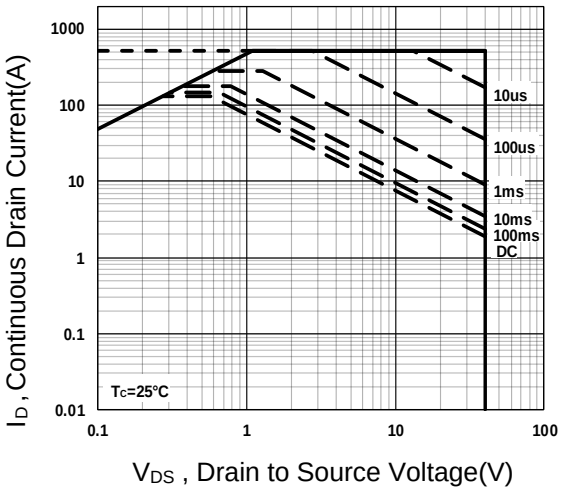


Fig. 10 Maximum Safe Operation Area

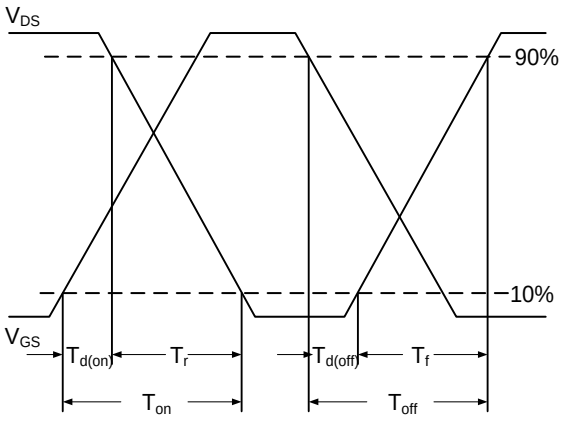


Fig. 11 Switching Time Waveform

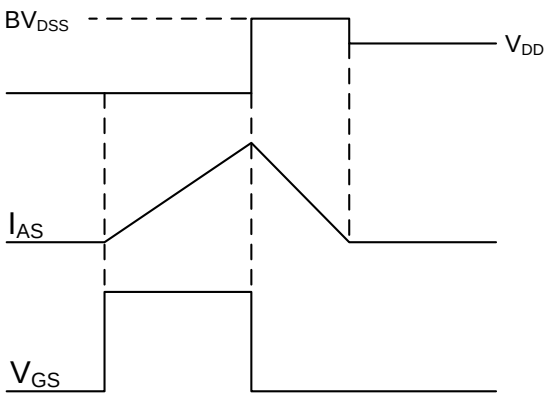
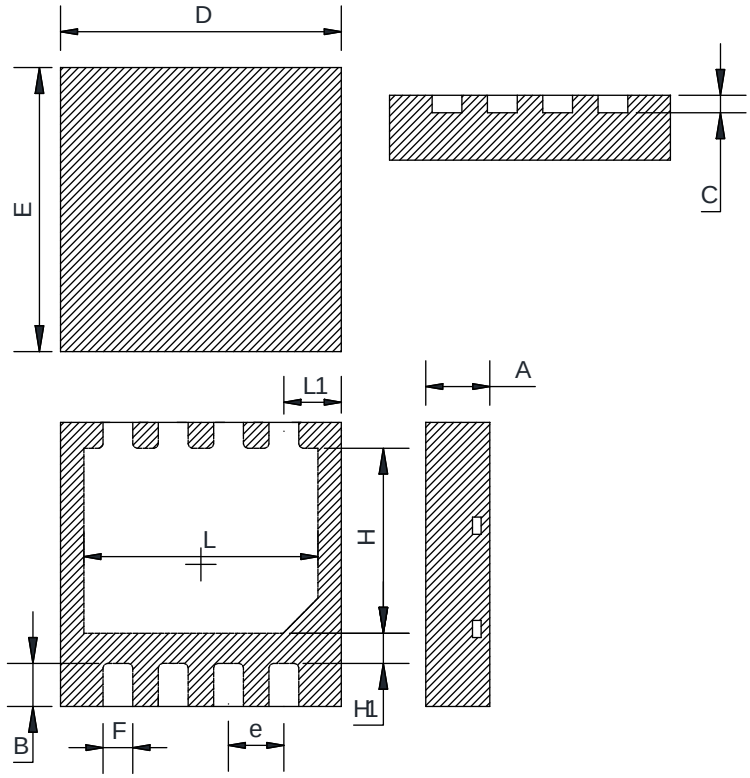


Fig. 12 EAS Waveform

DFN3.3X3.3-8L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	0.60	0.75	0.90
B	0.30	0.50	0.70
C	0.143	0.203	0.263
D	3.15	3.30	3.45
E	3.15	3.30	3.45
e	0.50	0.65	0.80
F	0.25	0.35	0.45
H	1.85	2.15	2.45
H1	0.20	0.35	0.50
L	2.35	2.75	3.15
L1	0.475	0.675	0.875

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