

N-Channel 40V MOSFET

E040N1P5OL1

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
40V	1.5 @ $V_{GS} = 10V$	145

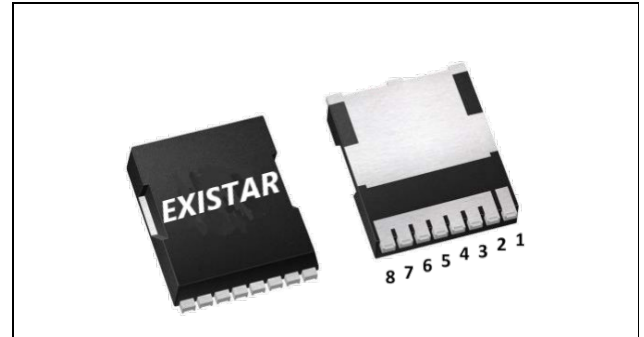
Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- PD charger
- Moto driver

TOLL-8



RoHS
COMPLIANT
HALOGEN
FREE

Package And Ordering Information

Ordering code	Package	Marking
E040N1P5OL1	TOLL	E040N1P5OL1

Ordering Information

Package	Units/ Reel	Reels/ Inner Box	Units/ Inner Box
TOLL	2000	1	2000

Key Performance Parameters

Parameter	Value	Unit
VDS, min @ Tj(max)	40	V
ID, pulse	870	A
RDS(ON), max @ VGS=10V	1.5	mΩ
Qg	127	nC

Absolute Maximum Ratings at Tj=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	I _D	T _C =25°C	145
		T _C =100°C	-
Pulsed drain current	I _{D,pulse}	870	A
Avalanche energy, single pulse	E _{AS}	900	mJ
Power dissipation	P _D	T _C =25°C	140
		T _A =25°C	2
Operating junction and storage temperature range	T _J , T _{stg}	-55 to 150	°C

Thermal Characteristics

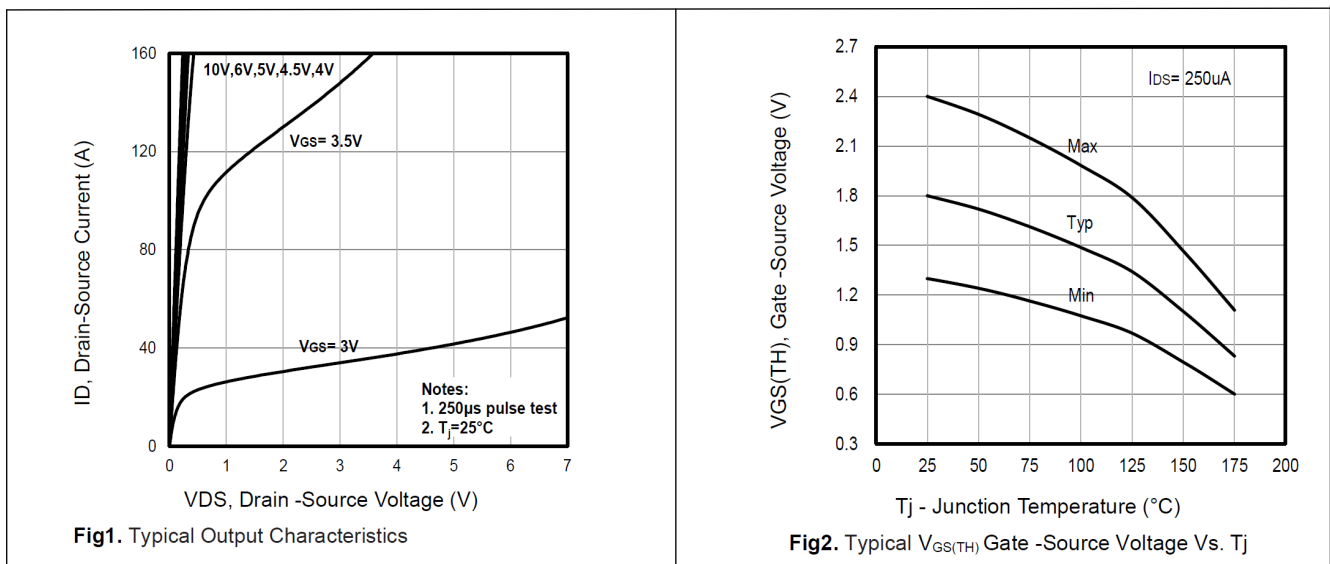
Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	R _{θJC}	1	°C/W
Thermal resistance, junction-to-ambient	R _{θJA}	40	

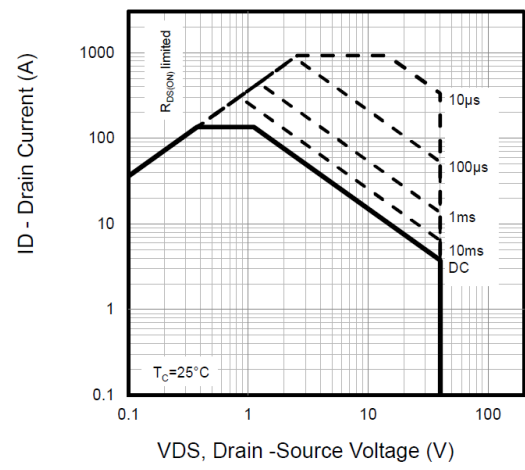
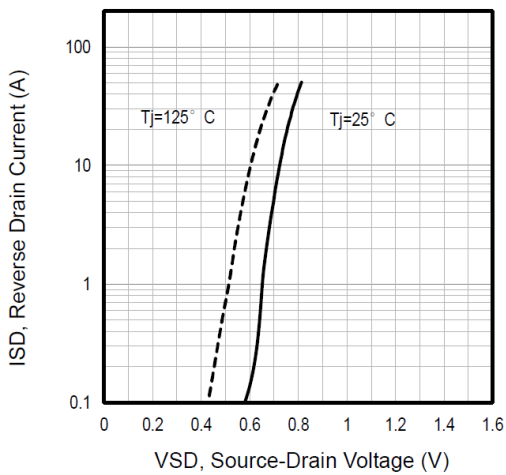
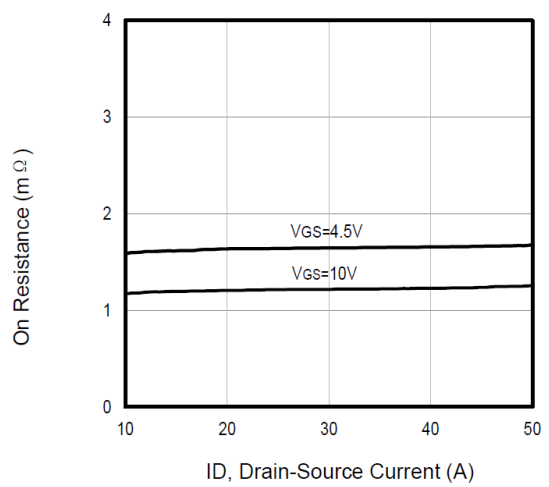
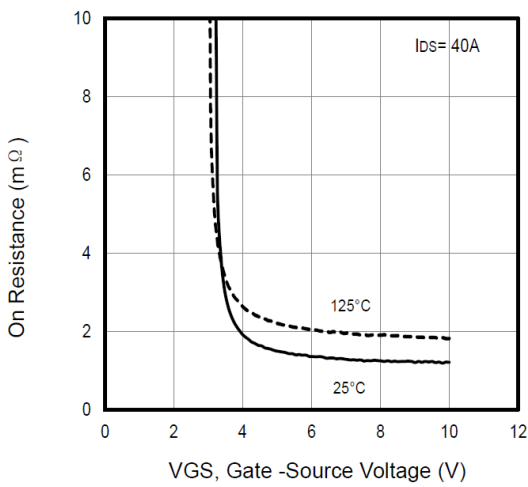
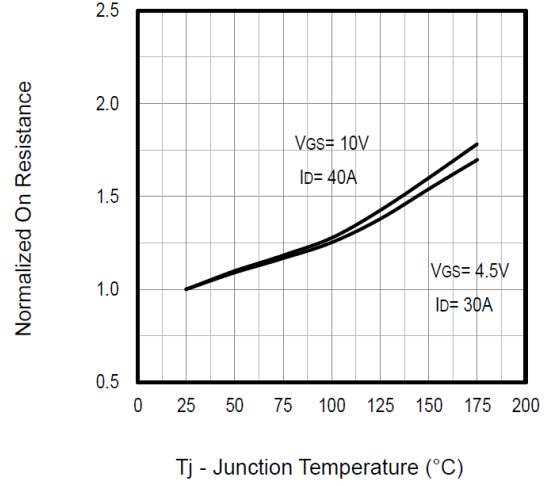
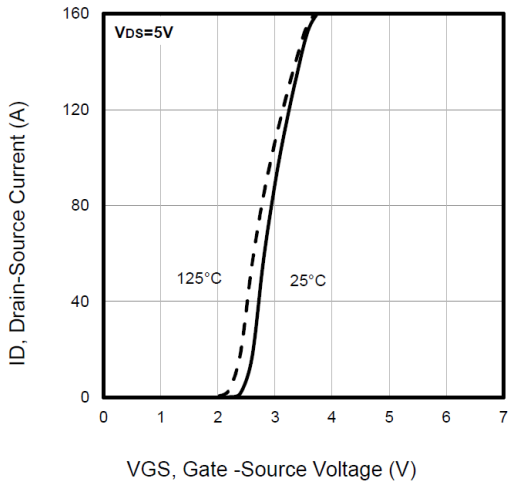
Electrical Characteristics at Tj=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	V _{(BR)DSS}	40			V	V _{GS} = 0, I _D = 250 μA
Gate-source threshold voltage	V _{GS(th)}	1.3		2.4	V	V _{DS} = V _{GS} , I _D = 250 μA
Gate-body leakage	I _{GSS}			±100	nA	V _{DS} = 0 V, V _{GS} = ±20 V
Zero gate voltage drain current	I _{DSS}			1	μA	V _{DS} = 32 V, V _{GS} = 0 V
Drain-source on-resistance	R _{DS(on)}		1.13	1.5	mΩ	V _{GS} = 10 V, I _D = 40 A
Drain-source on-resistance	R _{DS(on)}		1.55	1.9	mΩ	V _{GS} = 4.5 V, I _D = 30 A

Forward transconductance	g_{fs}		-		S	$V_{DS} = 5\text{ V}, I_D = 30\text{ A}$
Gate resistance	R_g		3.3		Ω	$f = 1\text{ MHz}$
Gate Charge						
Total gate charge	Q_g		124		nC	$V_{DS} = 20\text{ V}, I_D = 40\text{ A}, V_{GS} = 10\text{ V}$
Gate-source charge	Q_{gs}		25			
Gate-drain charge	Q_{gd}		18			
Dynamic						
Turn-on delay time	$t_{d(on)}$		11		ns	$V_{DS} = 20\text{ V}, I_D = 40\text{ A}, V_{GS} = 10\text{ V}, R_{GEN} = 3\ \Omega$
Rise time	t_r		93			
Turn-off delay time	$t_{d(off)}$		144			
Fall time	t_f		90			
Input capacitance	C_{iss}		9000		pF	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$
Output capacitance	C_{oss}		2045			
Reverse transfer capacitance	C_{rss}		1100			
Body Diode						
Diode forward voltage	V_{SD}			1.2	V	$V_{GS} = 0\text{ V}, I_F = 40\text{ A}$
Reverse recovery time	t_{rr}		57		ns	$V_R = 20\text{ V}, I_S = 40\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		58		nC	

Electrical Characteristics Diagrams





Test circuits and waveforms

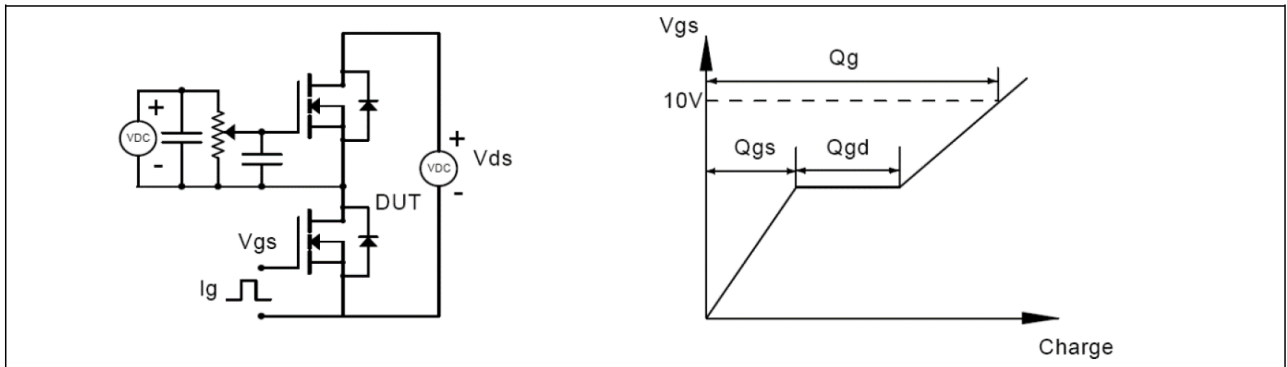


Figure 1. Gate charge test circuit & waveform

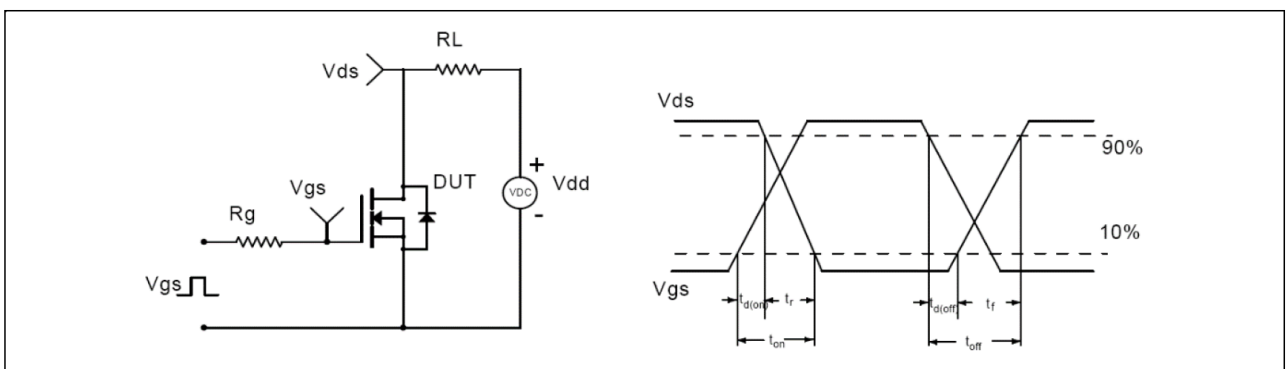


Figure 2. Switching time test circuit & waveforms

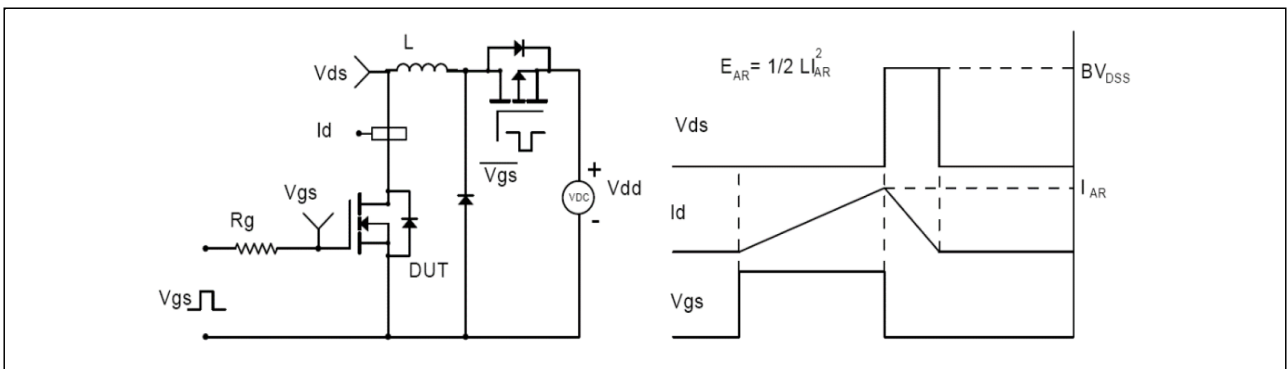


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

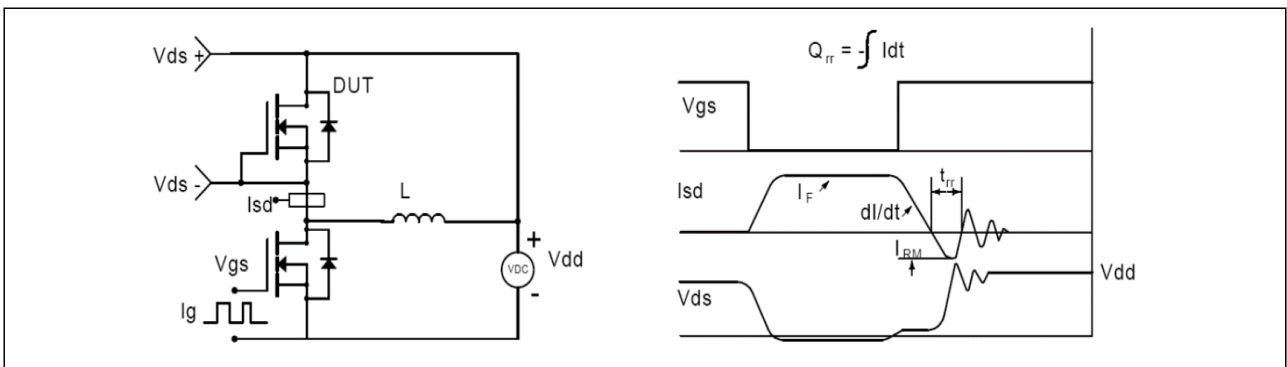
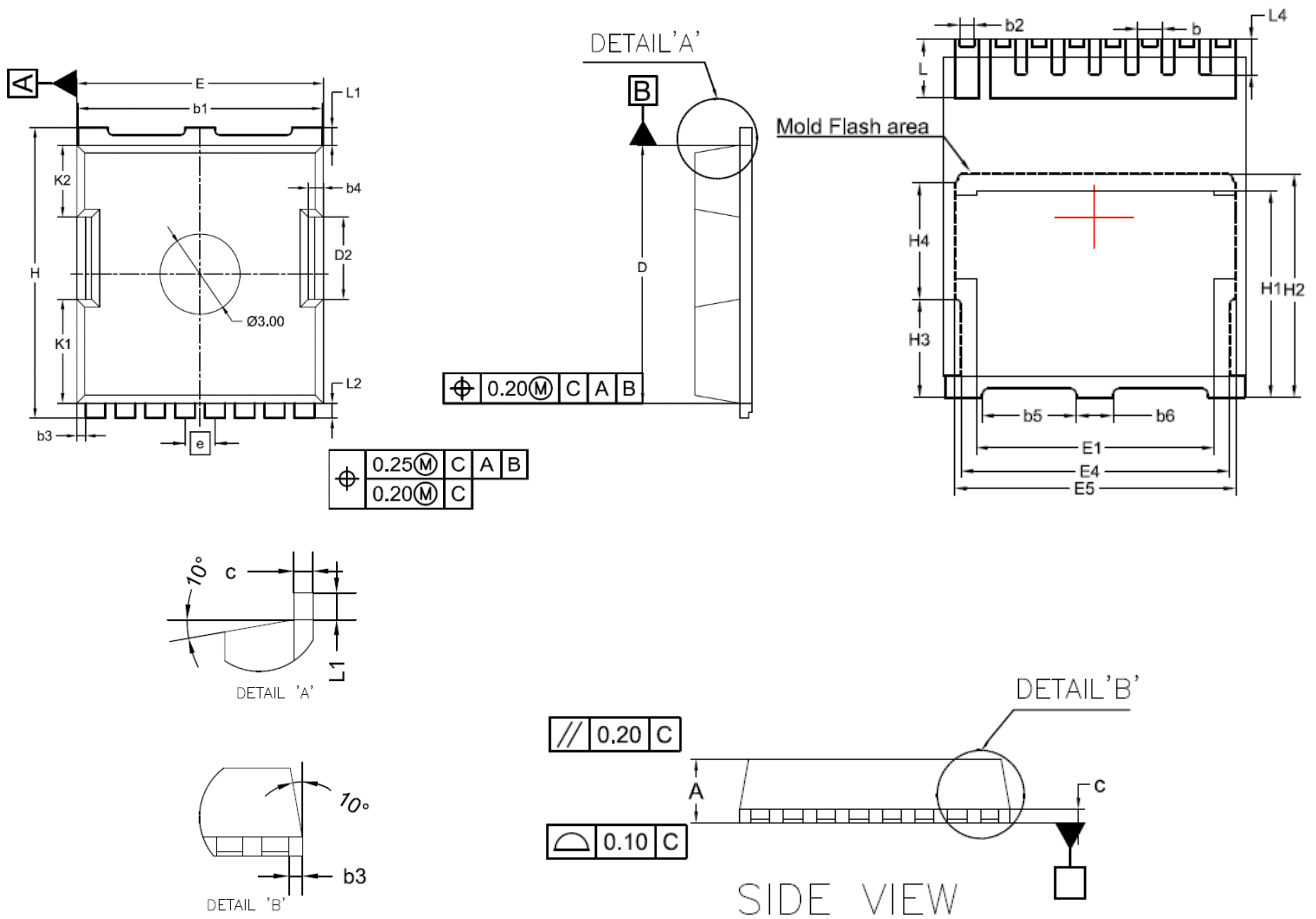


Figure 4. Diode reverse recovery test circuit & waveforms



Package Outline Dimensions


SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
* A	2.200	2.300	2.400	0.087	0.091	0.094
c	0.492	0.500	0.508	0.019	0.020	0.020
* D	10.280	10.380	10.480	0.405	0.409	0.413
* E	9.800	9.900	10.000	0.386	0.390	0.394
e	1.20 BSC			0.047 BSC		
* H	11.580	11.680	11.780	0.456	0.460	0.464
H1	6.650	6.750	6.850	0.262	0.266	0.270
H2	7.300			0.287		
H3	3.200			0.126		
H4	3.800			0.150		
K1	4.180			0.165		
K2	2.900			0.114		
* D2	3.300			0.130		
b	0.700	0.800	0.900	0.028	0.031	0.035
b1	9.700	9.800	9.900	0.382	0.386	0.390
b2	0.420	0.460	0.500	0.017	0.018	0.020
b3	0.350			0.014		
b4	0.600			0.024		
b5	3.100			0.122		
b6	1.200			0.047		
L	1.700	1.900	2.100	0.067	0.075	0.083
L1	0.700			0.028		
L2	0.600			0.024		
L4	1.050	1.150	1.250	0.041	0.045	0.049
L5	0.500	0.600	0.700	0.020	0.024	0.028
E1	7.800			0.31		
E4	8.800			0.35		
E5	9.200			0.36		

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