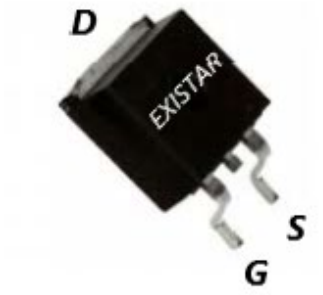
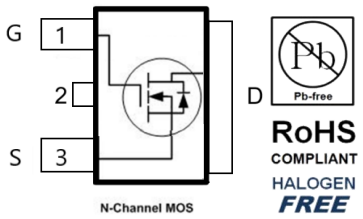
N-Channel 60V MOSFET

E060N8P5CL1

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
60V	8.5@ V_{GS} = 10V	64

TO252





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

Package And Ordering Information

Ordering code	Package	Marking
E060N8P5CL1	TO252	E060N8P5CL1

Ordering Information

Package	Units/ Reel	Reels/ Inner Box	Units/ Inner Box
TO252	2500	2	5000

Key Performance Parameters

Parameter	Value	Unit
VDS, min @ Tj(max)	60	V
ID, pulse	256	A
RDS(ON), max @ VGS=10V	8.5	mΩ
Qg	12	nC

Absolute Maximum Ratings at Tj=25°C Unless Otherwise Noted

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	60	V
Gate-source voltage		V_{GS}	±20	
Continuous drain current	T_C=25°C	I_D	64	A
	T_C=100°C		-	
Pulsed drain current		$I_{D,pulse}$	256	
Avalanche energy, single pulse		E_{AS}	80	mJ
Power dissipation	T_C=25°C	P_D	63	W
	T_A=25°C		-	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	℃

Thermal Characteristics

Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	2	°C/W
Thermal resistance, junction-to-ambient	Steady state	$R_{\theta JA}$	62	

Electrical Characteristics at Tj=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Static						
Drain to source breakdown voltage	$V_{(BR)DSS}$	60			V	V_{GS} = 0, I_D = 250 μA
Gate-source threshold voltage	$V_{GS(th)}$	1.0		2.5	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} = 60 V, V_{GS} = 0 V
Drain-source on-resistance	$R_{DS(on)}$		7.5	8.5	mΩ	V_{GS} = 10 V, I_D = 12 A
Drain-source on-resistance	$R_{DS(on)}$		9.7	11	mΩ	V_{GS} = 4.5 V, I_D = 9 A

Forward transconductance	gfs		-		S	V_{DS} = 5 V, I_D = 20 A
Gate resistance	Rg		3.5		Ω	f=1MHz
Gate Charge						
Total gate charge	Qg		12		nC	V_{DS} = 30 V, I_D = 20 A, V_{GS} = 10 V
Gate-source charge	Qgs		3			
Gate-drain charge	Qgd		2.2			
Dynamic						
Turn-on delay time	$t_{d(on)}$		15		ns	V_{DS} = 30 V, I_D =25 A, V_{GS} = 10 V, R_{GEN} = 2 Ω
Rise time	t_r		3			
Turn-off delay time	$t_{d(off)}$		28.2			
Fall time	t_f		3.1			
Input capacitance	C_{iss}		968		pF	V_{DS} =30 V, V_{GS} = 0 V, f = 100kHz
Output capacitance	C_{oss}		277			
Reverse transfer capacitance	C_{rss}		13.2			
Body Diode						
Diode forward voltage	V_{SD}			1.3	V	V_{GS} = 0 V, I_F = 20 A
Reverse recovery time	t_{rr}		36.2		ns	V_R= 30 V, I_S =25 A, di/dt = 100 A/μs
Reverse recovery charge	Q_{rr}		18.6		nC	

Electrical Characteristics Diagrams

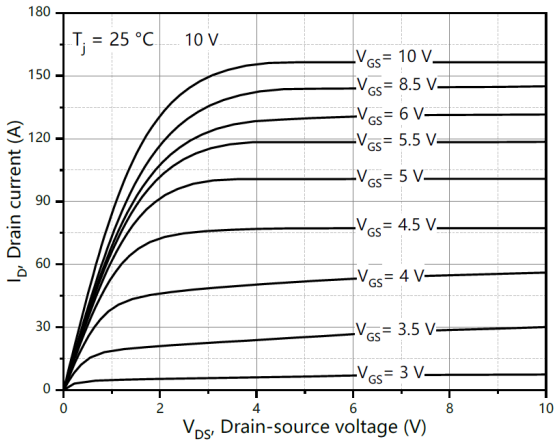


Figure 1. Typ. output characteristics

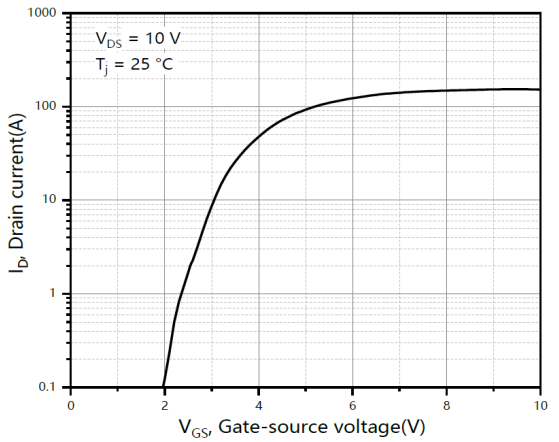


Figure 2. Typ. transfer characteristics

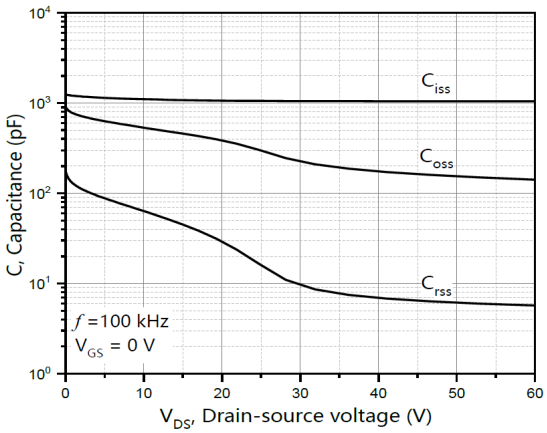


Figure 3. Typ. capacitances

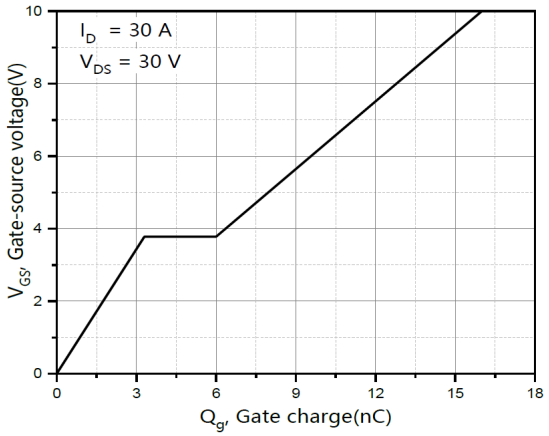


Figure 4. Typ. gate charge

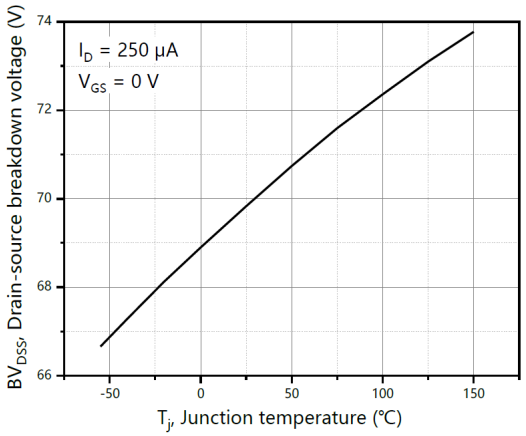


Figure 5. Drain-source breakdown voltage

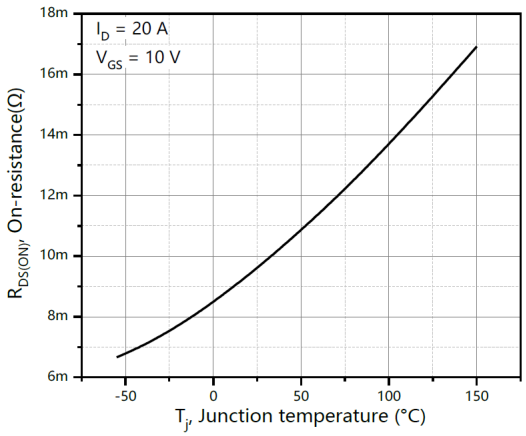


Figure 6. Drain-source on-state resistance

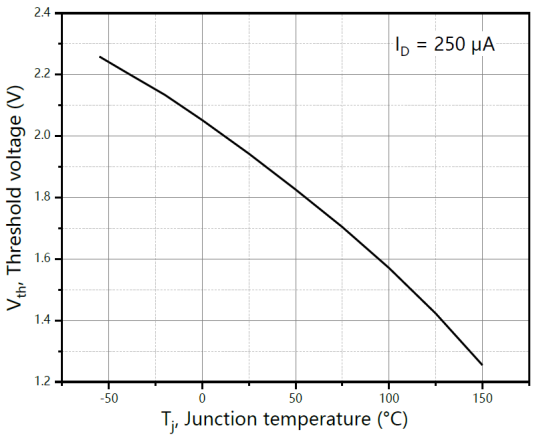


Figure 7. Threshold voltage

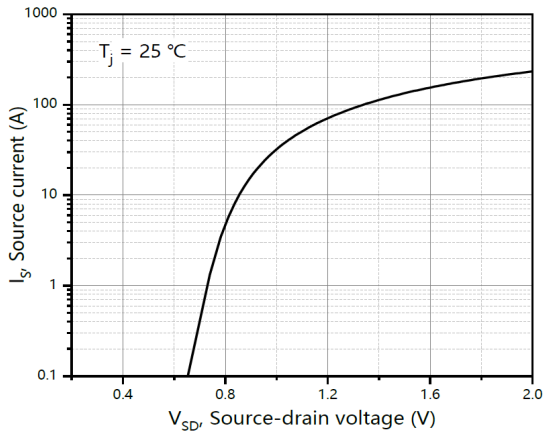


Figure 8. Forward characteristic of body diode

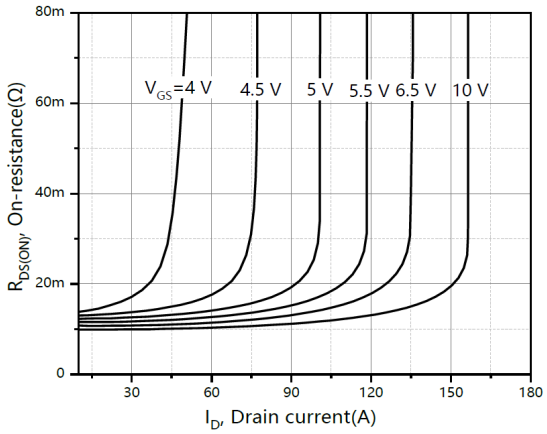


Figure 9. Drain-source on-state resistance

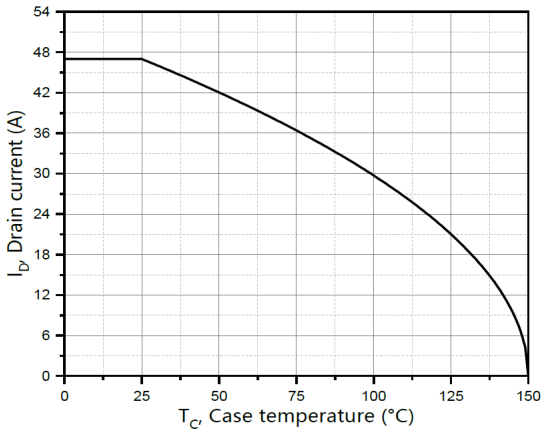


Figure 10. Drain current

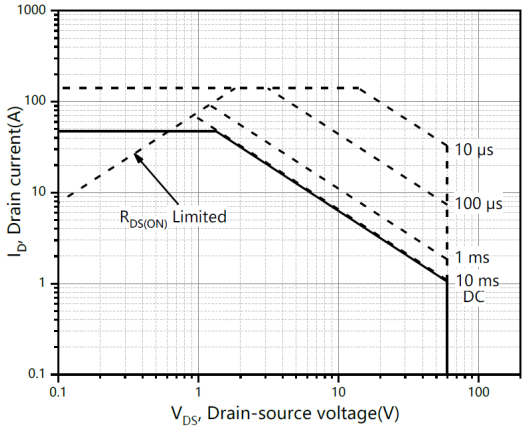


Figure 11. Safe operation area T_C=25 ℃

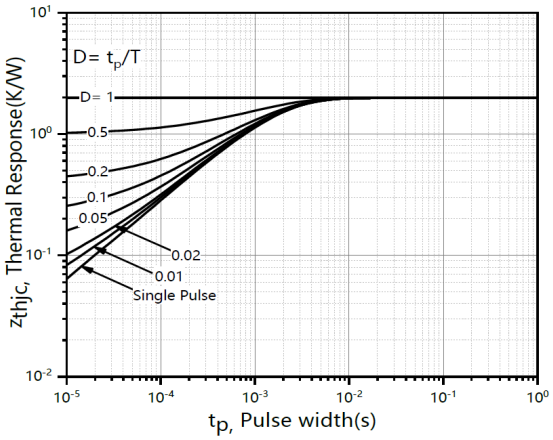


Figure 12. Max. transient thermal impedance

Test circuits and waveforms

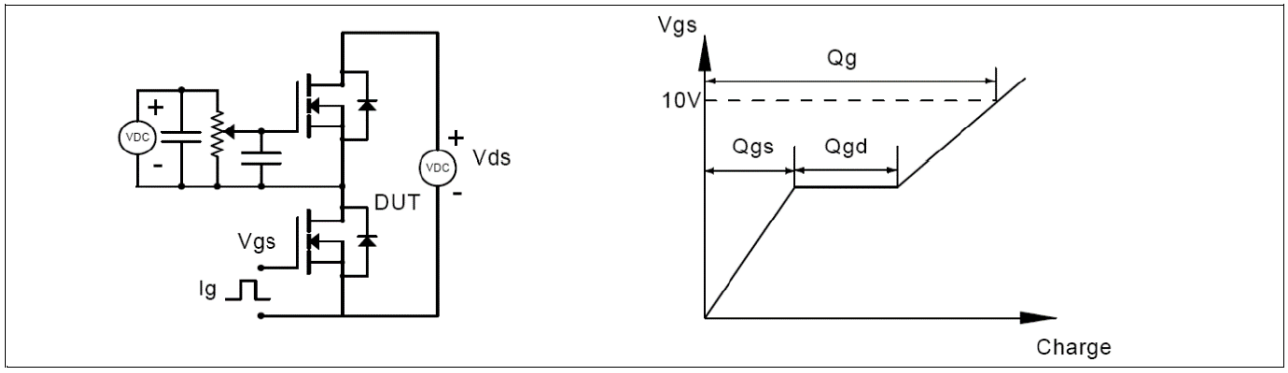


Figure 1. Gate charge test circuit & waveform

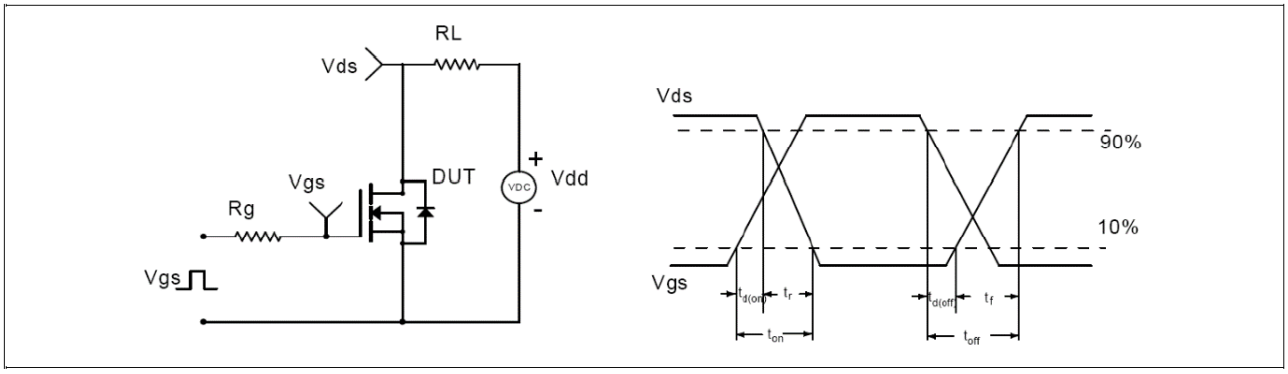


Figure 2. Switching time test circuit & waveforms

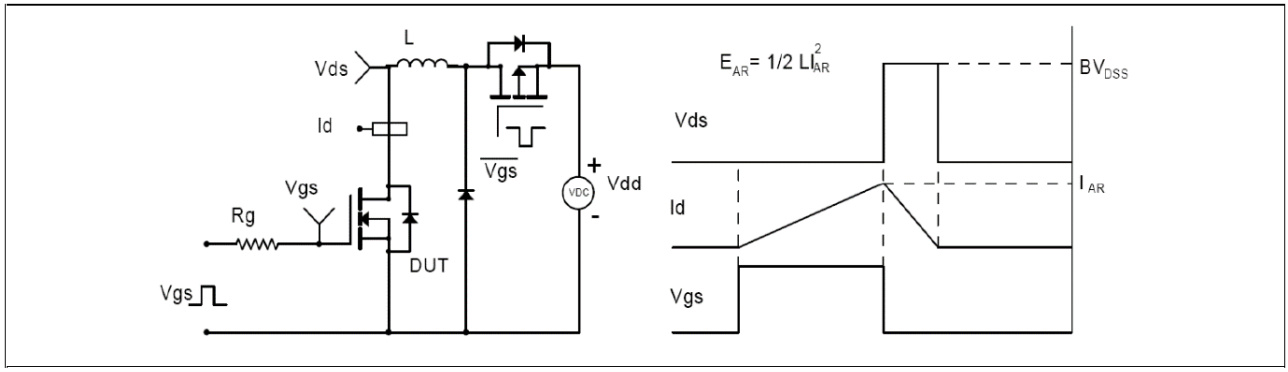


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

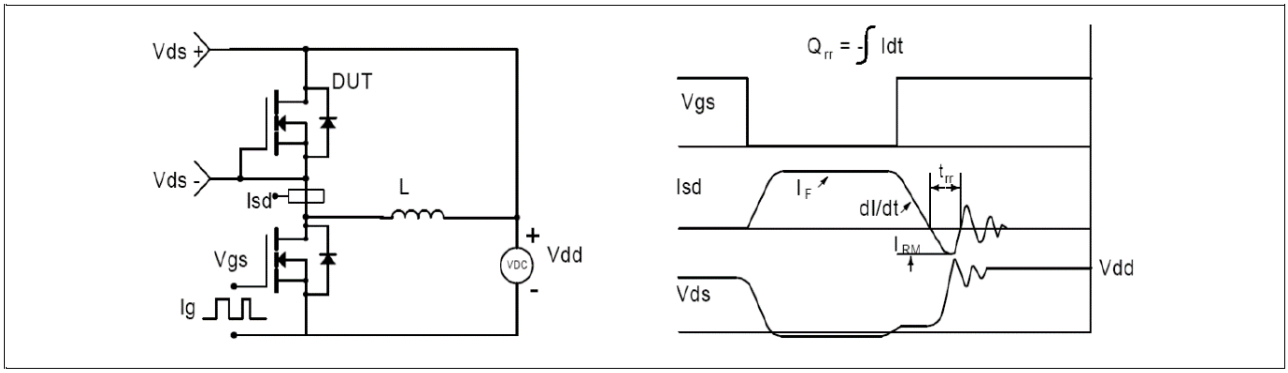
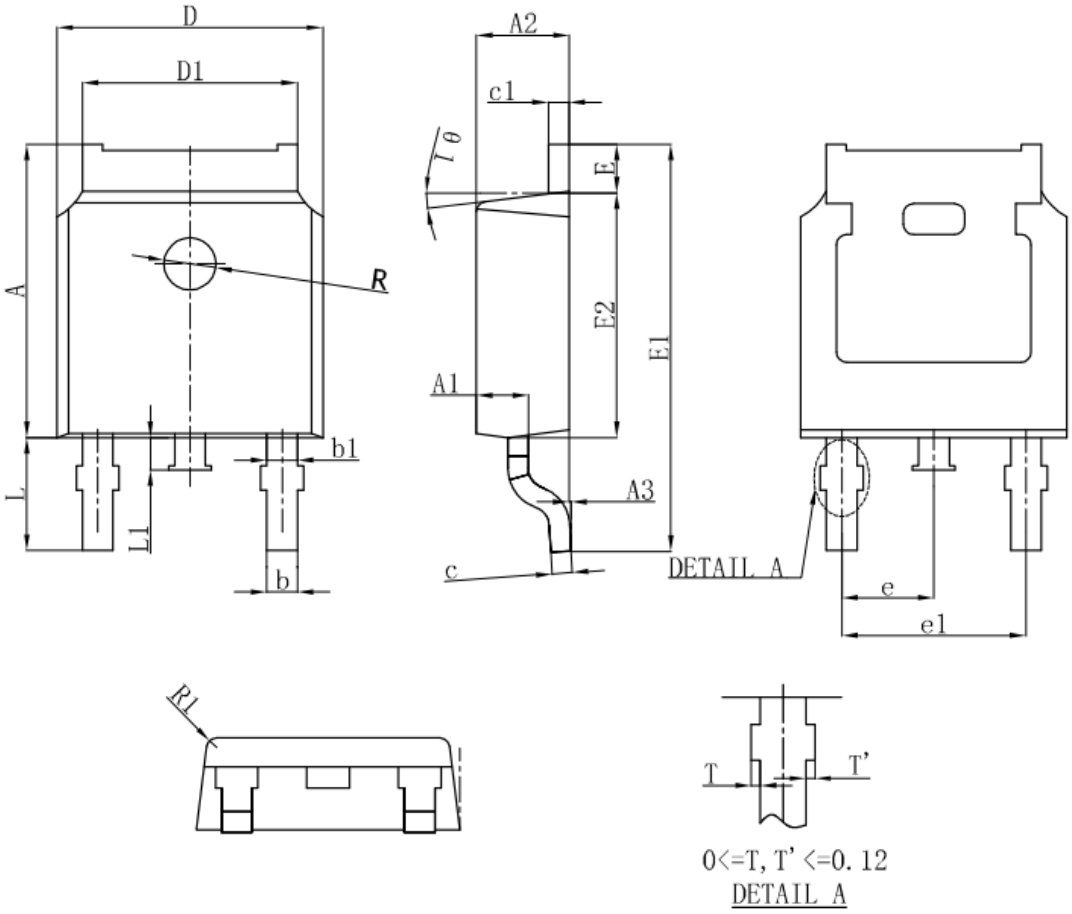


Figure 4. Diode reverse recovery test circuit & waveforms

Package Outline Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	7.050	7.100	7.150
A1	0.960	1.010	1.060
A2	2.250	2.300	2.350
A3	0.000	0.050	0.100
b		0.760REF.	
b1		1.000REF.	
c		0.508REF.	
c1		0.508REF.	
D	6.550	6.600	6.650
D1	5.220	5.320	5.420
E	0.950	1.000	1.050
E1	9.700	9.900	10.100
E2	6.050	6.100	6.150
e		2.286BSC	
e1		4.572REF.	
L	2.650	2.800	2.950
L1	0.700	0.800	0.900
θ1		7° REF.	
R		0.250REF.	

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