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M s e m i t e k

RoHS LEAD FREE

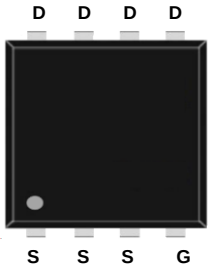
SLM160N03T
30V N -Channel MOSFET

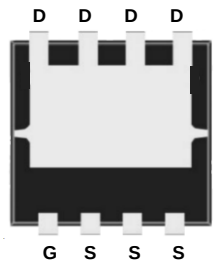
General Description

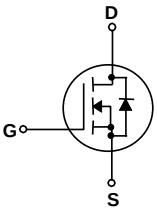
This Power MOSFET is produced using Msemitek's advanced Shielding Gate MOSFET technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for low voltage applications such as DC/DC converters and high efficiency switching for power management in portable and battery operated products.

Features

- N-Channel:30V 160A
  $R_{DS(on)Typ}$= 1.5 mΩ@V_{GS} = 10V
  $R_{DS(on)Typ}$= 2.2 mΩ@V_{GS} = 4.5V
- Very Low On-resistance $R_{DS(ON)}$
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability







Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter	SLM160N03T	Units
V_{DSS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous (T_C = 25℃)	160	A
	Drain Current - Continuous (T_C = 100℃)	104	A
I_{DM}	Drain Current - Pulsed (Note 1)	640	A
V_{GSS}	Gate-Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy	870	mJ
P_D	Power Dissipation (T_C = 25℃)	50	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.5	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	℃

* Drain current limited by maximum junction temperature.

Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLM160N03T	SLM160N03T	DFN5*6	Tape & Reel	5000	50000

Electrical Characteristics

T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30 V, V_{GS} = 0 V	--	--	1	uA
		V_{DS} = 24V, T_C = 125℃	--	--	50	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.0	1.6	2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} =10 V, I_D = 20A	--	1.5	2.0	mΩ
		V_{GS} =4.5 V, I_D = 15A	--	2.2	3.0	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 30 V, V_{GS} = 0 V, f = 1.0 MHz	--	7710	--	pF
C_{oss}	Output Capacitance		--	845	--	pF
C_{rss}	Reverse Transfer Capacitance		--	838	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=30 V, R_G = 1.8 Ω ,I_D=30A	--	18	--	ns
t_r	Turn-On Rise Time		--	10	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	64	--	ns
t_f	Turn-Off Fall Time		--	16	--	ns
Q_g	Total Gate Charge	V_{DS} = 30 V, I_D =30A, V_{GS} = 10V	--	142	--	nC
Q_{gs}	Gate-Source Charge		--	92	--	nC
Q_{gd}	Gate-Drain Charge		--	18	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	160	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	640	A
V_{SD}	Drain to Source Diode Forward Voltage,V_{GS} = 0V, I_{SD} =20A,T_J = 25℃		--	--	1.2	V
T_{rr}	Reverse recovery time,I_F =20A dI/dt=100A/μs			30		ns
Q_{rr}	Reverse recovery charge,I_F =20A dI/dt=100A//μs			22		nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: T_J =25℃, V_{DD} =15V, V_G =10V, R_G =25Ω, L=0.5mH,
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

N- Channel Typical Characteristics

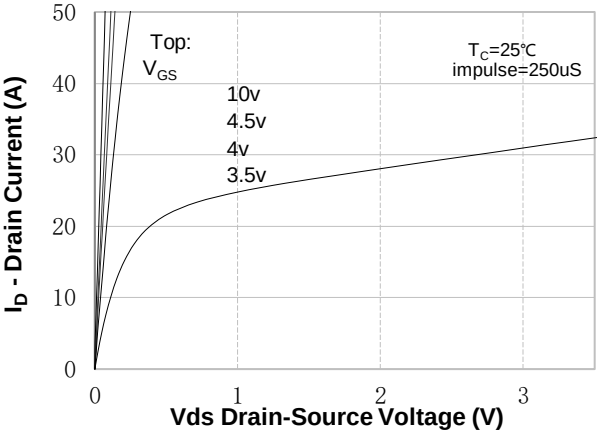


Figure 1. On-Region Characteristics

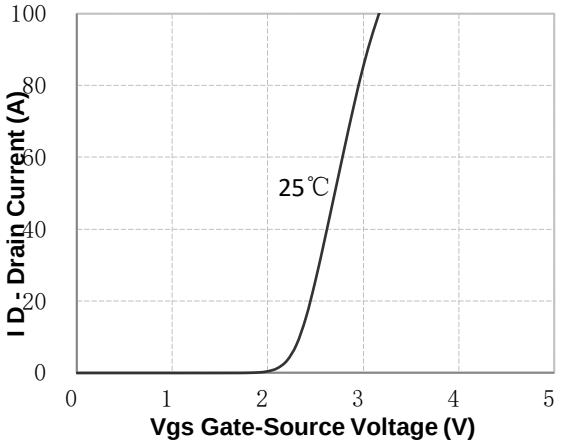


Figure 2. Transfer Characteristics

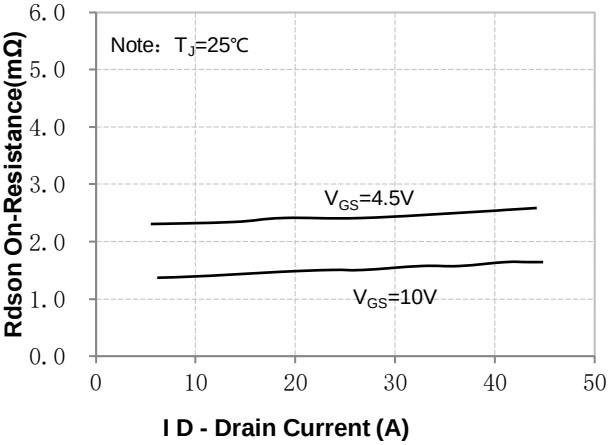


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

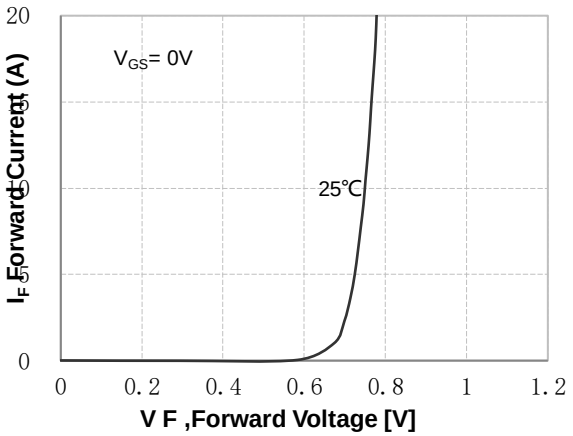


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

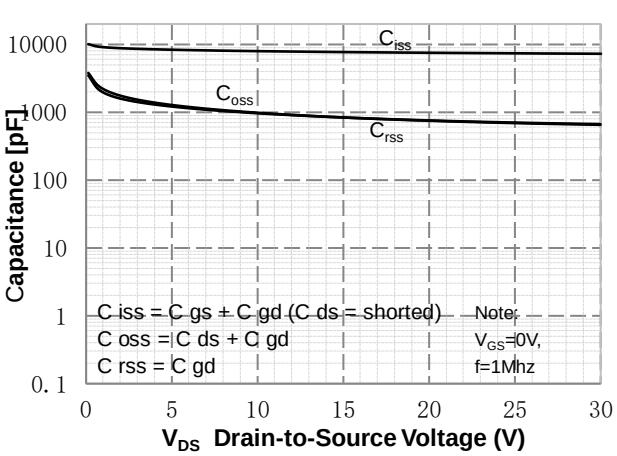


Figure 5. Capacitance Characteristics

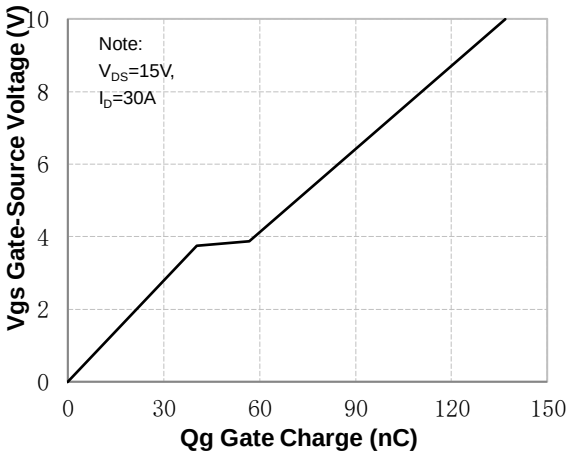


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

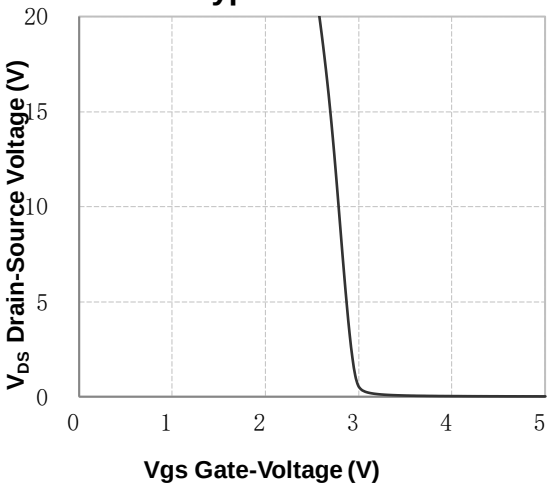


Figure 7. V_{DS} Drain-Source Voltage vs Gate Voltage

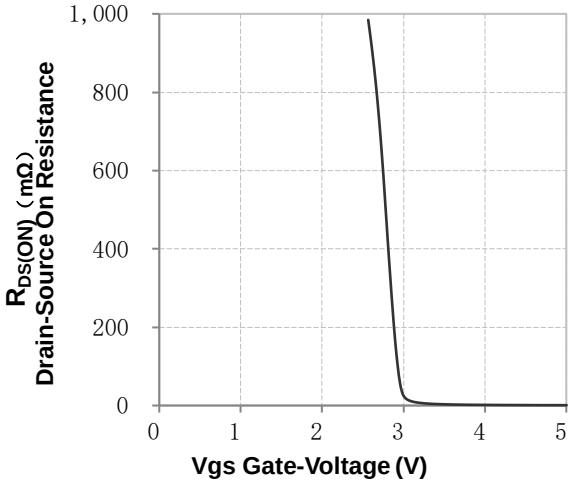


Figure 8. On-Resistance vs Gate Voltage

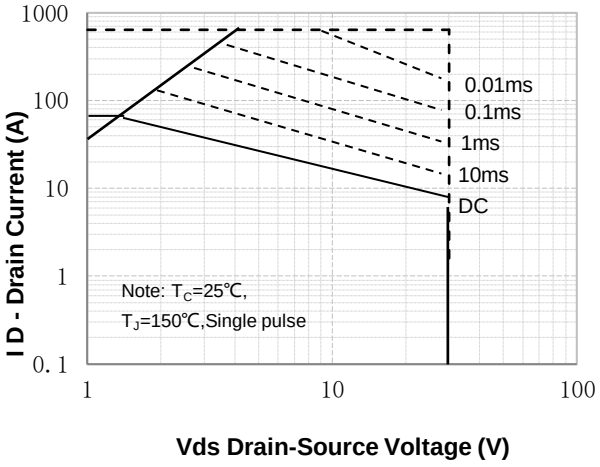


Figure 9. Maximum Safe Operating Area

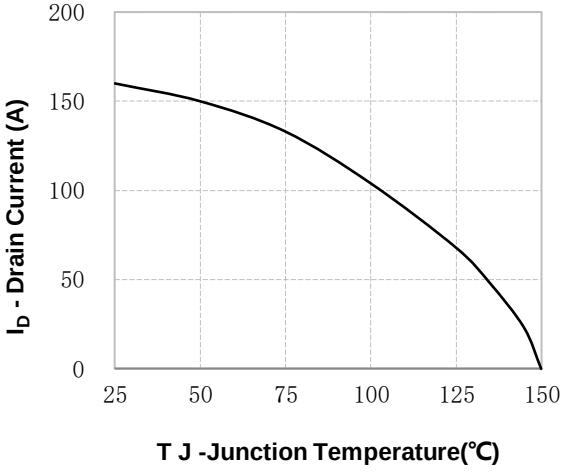


Figure 10. Maximum Continuous Drain Current vs Temperature

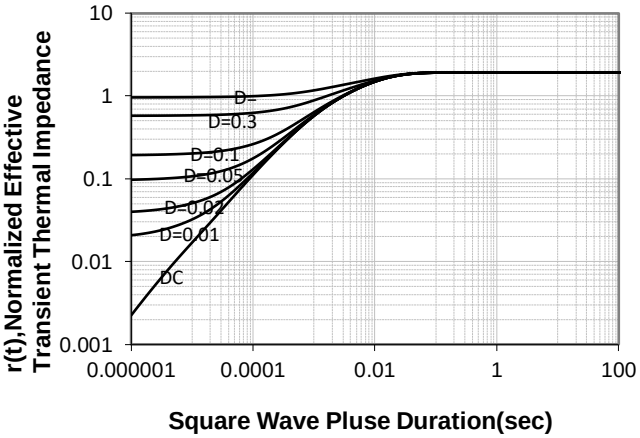
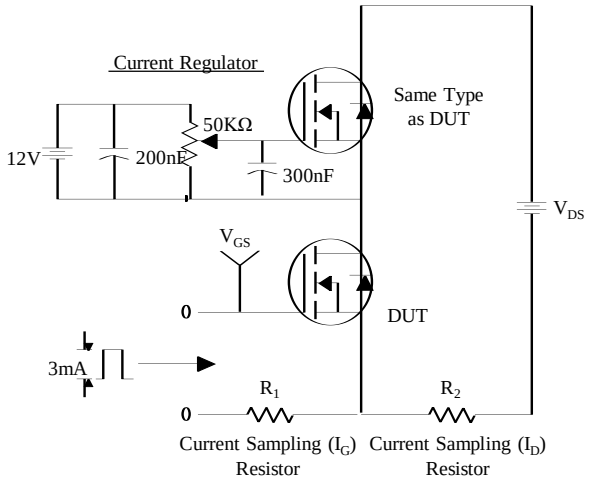
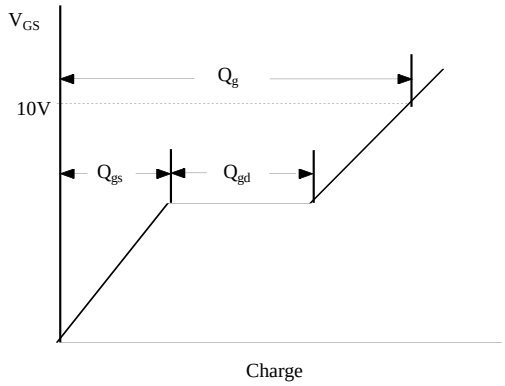


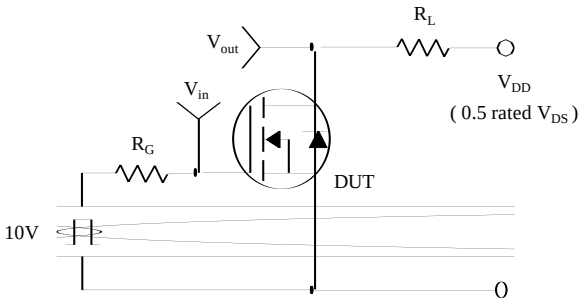
Figure 11. Transient Thermal Response Curve

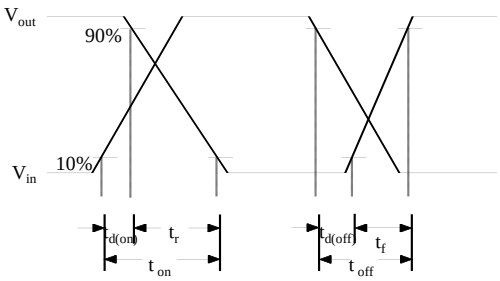
Gate Charge Test Circuit & Waveform



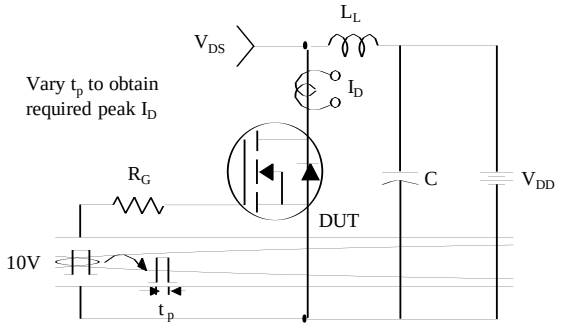


Resistive Switching Test Circuit & Waveforms

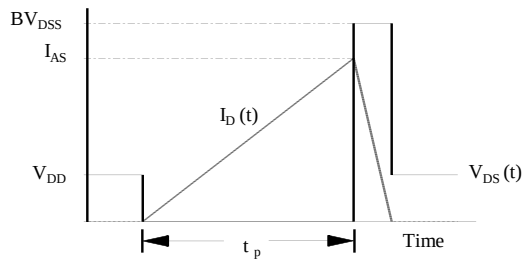




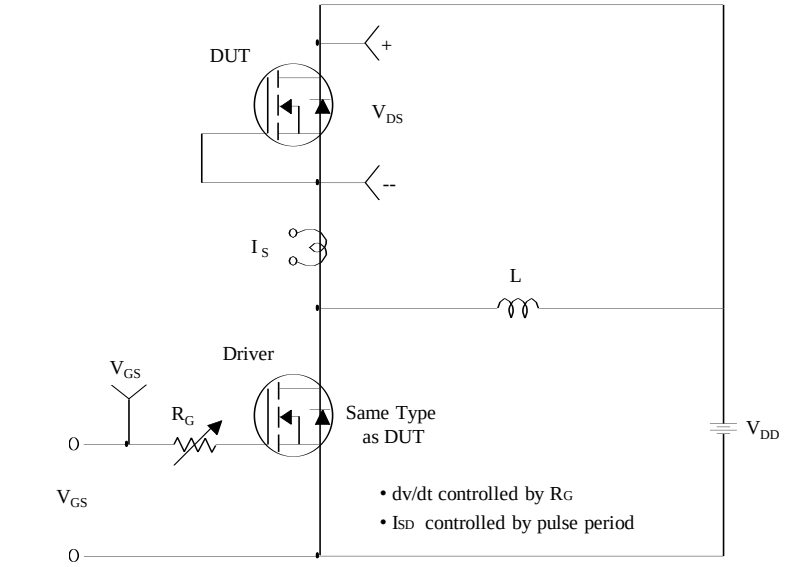
Unclamped Inductive Switching Test Circuit & Waveforms

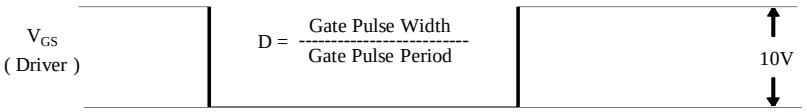


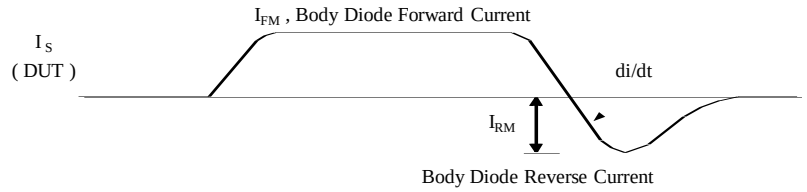
$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$

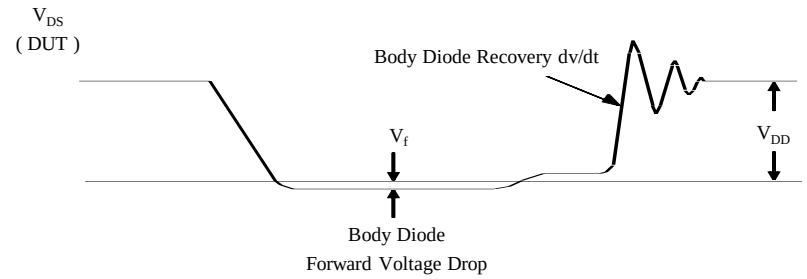


Peak Diode Recovery dv/dt Test Circuit & Waveforms

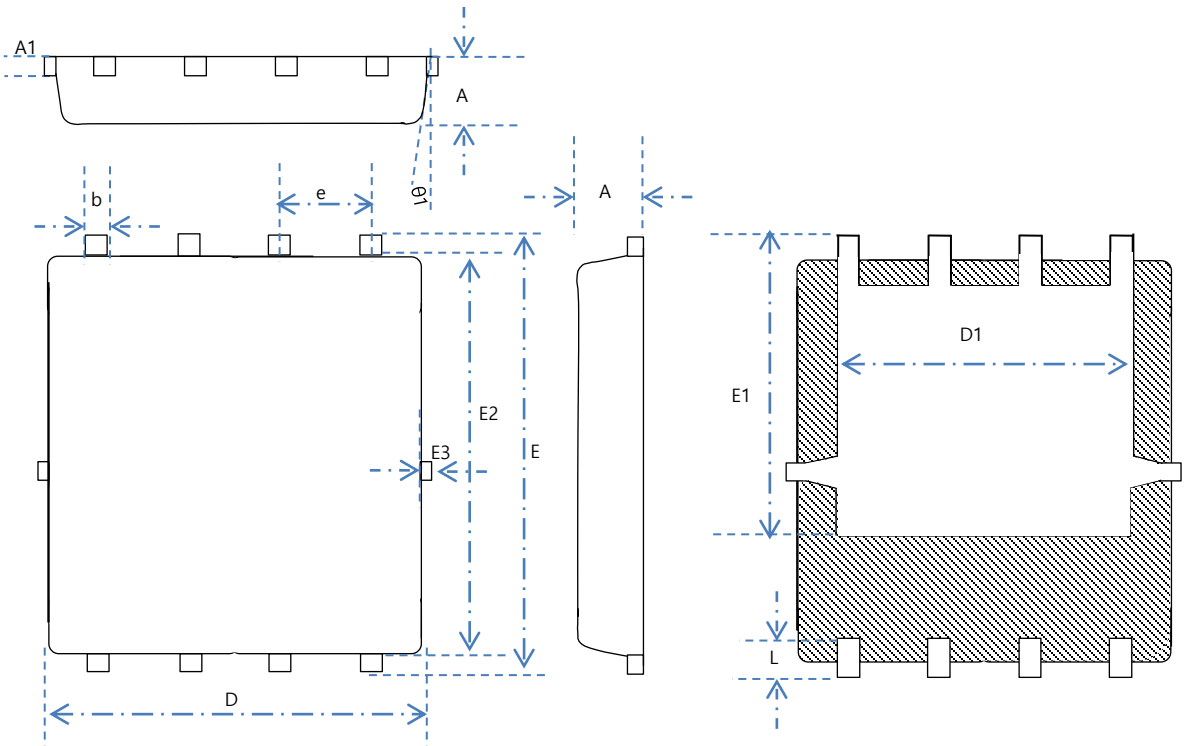








DFN 5*6 OUTLINE



SYMBOL	Mechanical Dimensions/mm			SYMBOL	Mechanical Dimensions/mm		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.85	0.95	1.05	D	4.90	5.20	5.35
A1	0.254 REF			e	1.270 TYPE		
b	-	0.30	-	D1	3.90	4.0	4.10
E	5.85	6.05	6.25	L	0.54	0.64	0.74
E1	3.90	4.10	4.30				
E2	5.45	5.55	5.65	θ1	8^0	10^0	12^0
E3	-	-	0.15				

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