
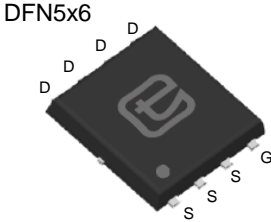
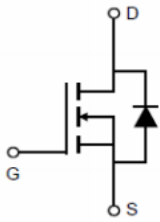




30V N-Channel Trench MOSFET(Preliminary)

Features <ul style="list-style-type: none"> ● Trench Power Technology ● Low $R_{DS(ON)}$ ● Low Gate Charge ● Optimized for Fast-switching Applications 		Product Summary	
Applications <ul style="list-style-type: none"> ● Synchronous Rectification in DC/DC and AC/DC Converters ● Isolated DC/DC Converters in Telecom and Industrial 		V_{DS}	30V
		$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 5m Ω
		$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	< 7m Ω
		I_D (at $V_{GS}=10V$)	90A
		100% UIS Tested	
			
 			
Device	Package	Marking	
TTG90N03AT	DFN5x6	90N03AT	

Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	30	V
Continuous Drain Current ^B	I_D	$T_C = 25^\circ C$	51
		$T_C = 100^\circ C$	51
Pulsed Drain Current ^A	I_{DM}	270	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy $L = 0.3mH$ ^A	E_{AS}	72	mJ
Avalanche Current ^A	I_{AS}	22	A
Power Dissipation ^C	P_D	$T_C = 25^\circ C$	108
		$T_C = 100^\circ C$	82
Operating Junction and Storage Temperature Range	T_J, T_{SGT}	-55~+175	$^\circ C$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.45	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	100	



Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	30	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	μA
		$V_{DS} = 30V, V_{GS} = 0V, T_J = 100^\circ\text{C}$	--	--	25	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1.0	1.7	2.4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	--	3.6	5.0	$\text{m}\Omega$
		$V_{GS} = 4.5V, I_D = 30A$	--	5	7.0	$\text{m}\Omega$
Forward Transconductance	g_{fs}	$V_{DS} = 10V, I_D = 20A$	17.3	--	--	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1.0\text{MHz}$	--	1608	--	pF
Output Capacitance	C_{oss}		--	513	--	
Reverse Transfer Capacitance	C_{rss}		--	297	--	
Total Gate Charge	Q_g	$V_{DD} = 15V, I_D = 50A,$ $V_{GS} = 10V$	--	62	--	nC
Gate-Source Charge	Q_{gs}		--	7	--	
Gate-Drain Charge	Q_{gd}		--	13	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 50A,$ $R_G = 3\Omega$	--	13	--	ns
Turn-on Rise Time	t_r		--	17	--	
Turn-off Delay Time	$t_{d(off)}$		--	42	--	
Turn-off Fall Time	t_f		--	13	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current ^B	I_S	$T_C = 25^\circ\text{C}$	--	--	46	A
Pulsed Diode Forward Current ^A	I_{SM}		--	--	270	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 30A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 30A,$ $di_F/dt = 100A/\mu\text{s}$	--	40	--	ns
Reverse Recovery Charge	Q_{rr}		--	88	--	nC

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. $V_{DD} = 30V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

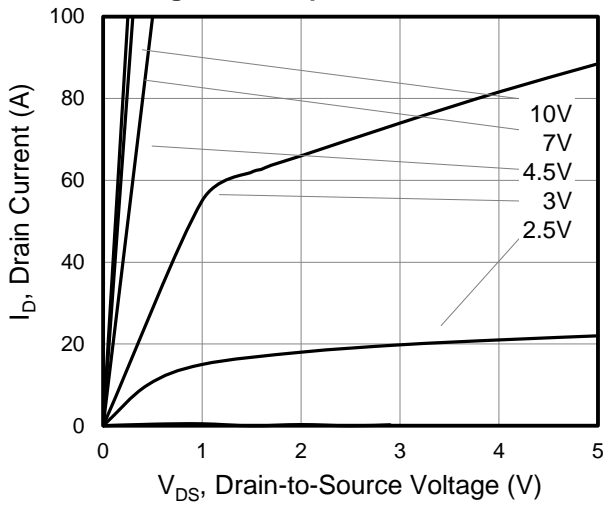


Figure 2. Transfer Characteristics

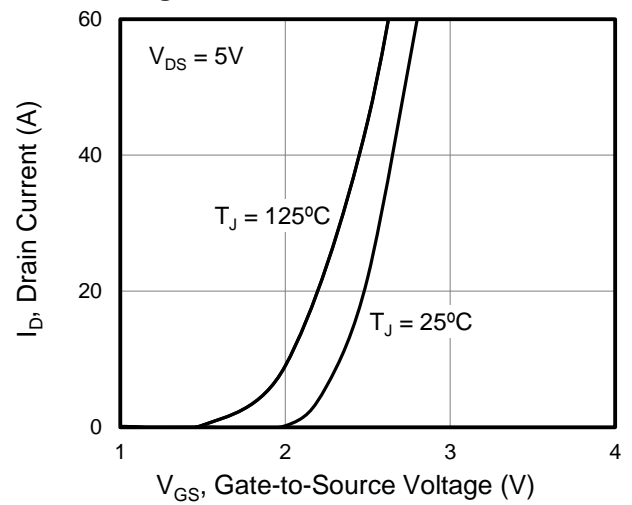


Figure 3. On-Resistance vs. Drain Current

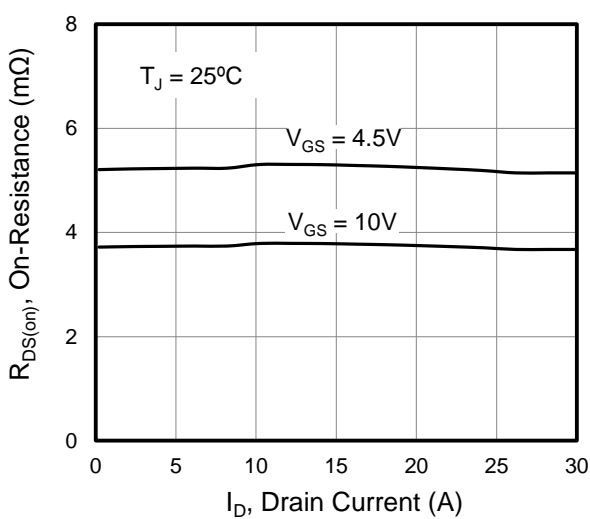


Figure 4. Capacitance

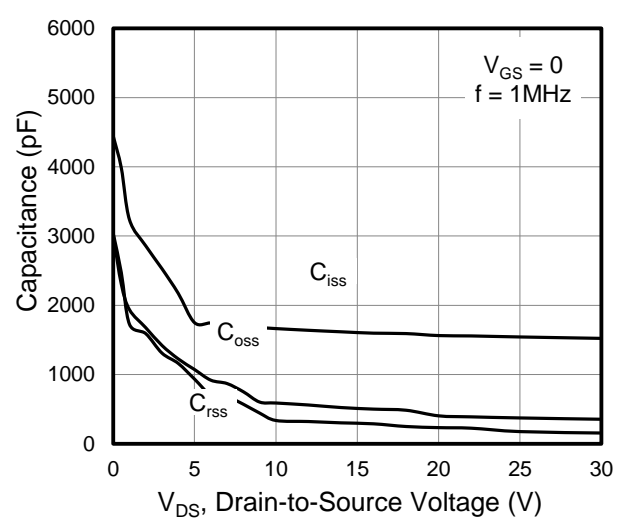


Figure 5. Gate Charge

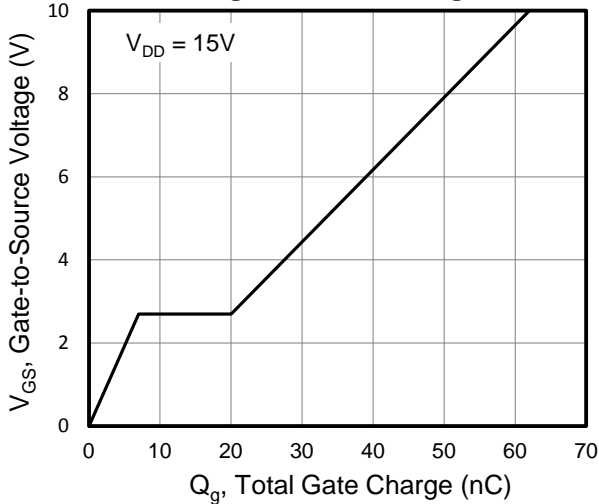
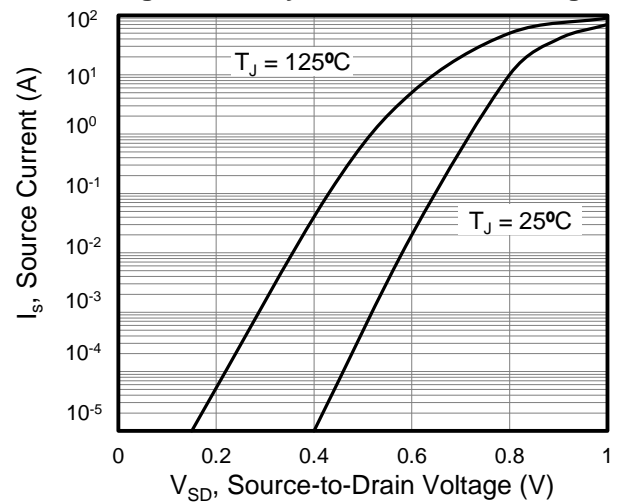


Figure 6. Body Diode Forward Voltage





Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. On-Resistance vs. Junction Temperature

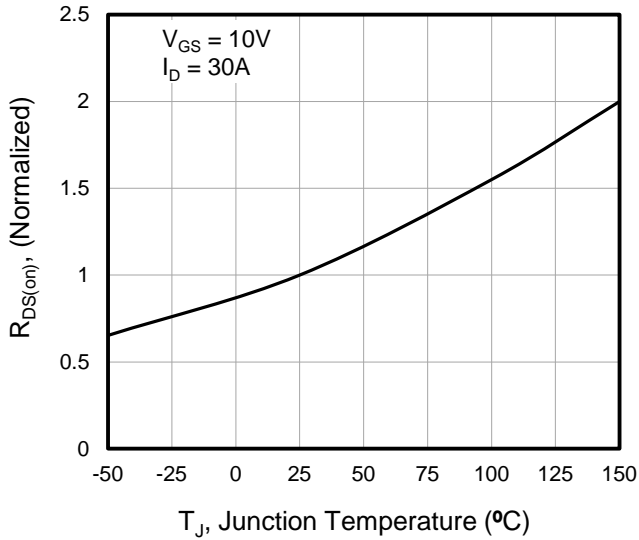


Figure 8. Threshold Voltage vs. Junction Temperature

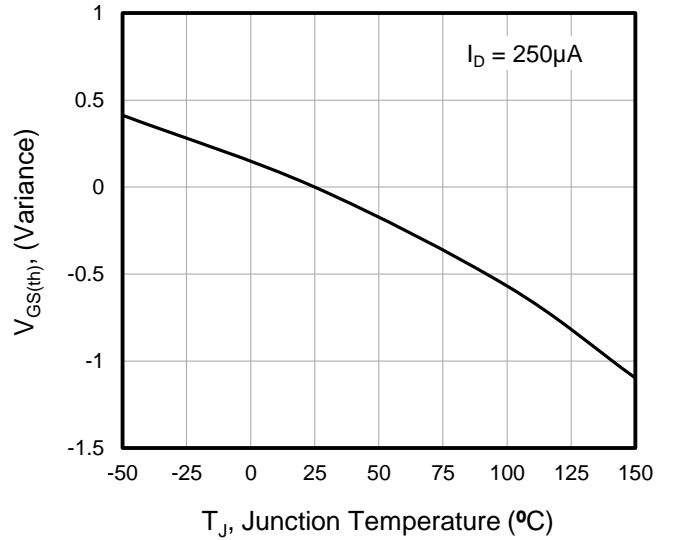


Figure 9. Transient Thermal Impedance

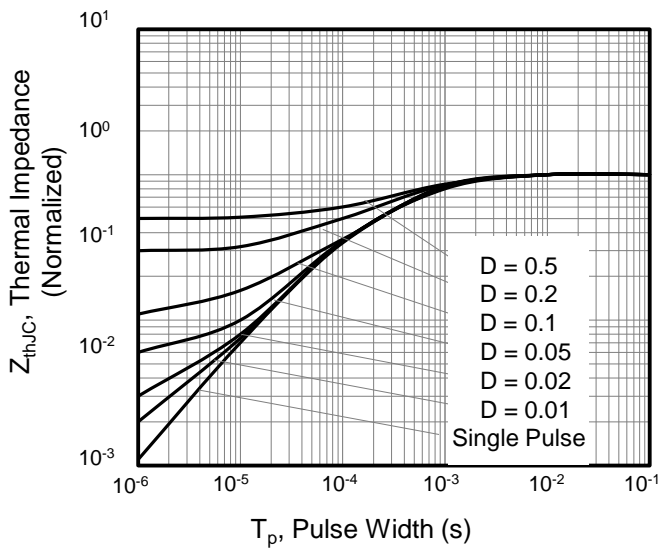


Figure 10. Safe operation area

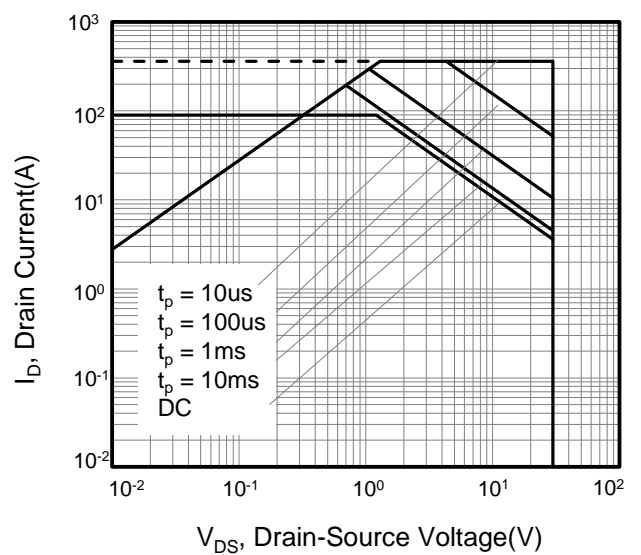




Figure A: Gate Charge Test Circuit and Waveform

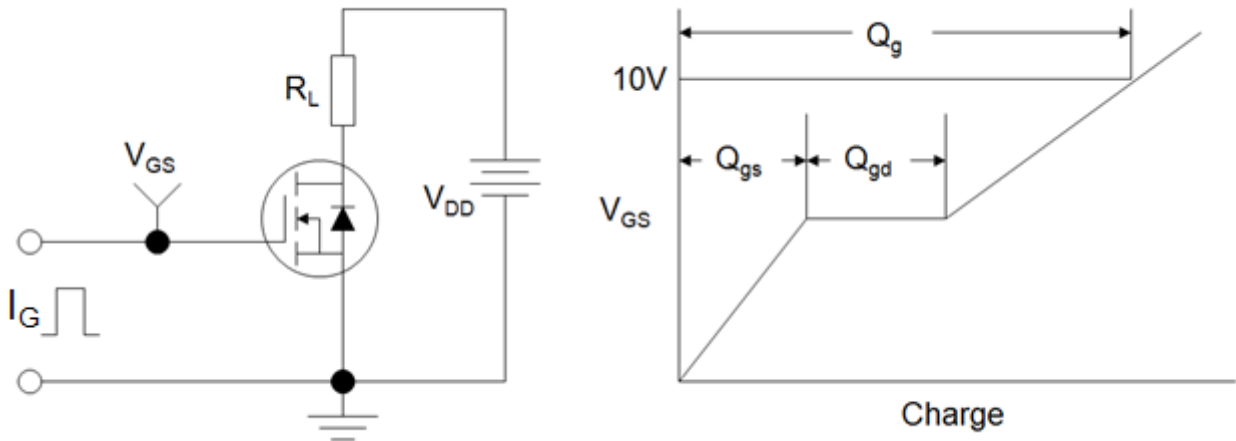


Figure B: Resistive Switching Test Circuit and Waveform

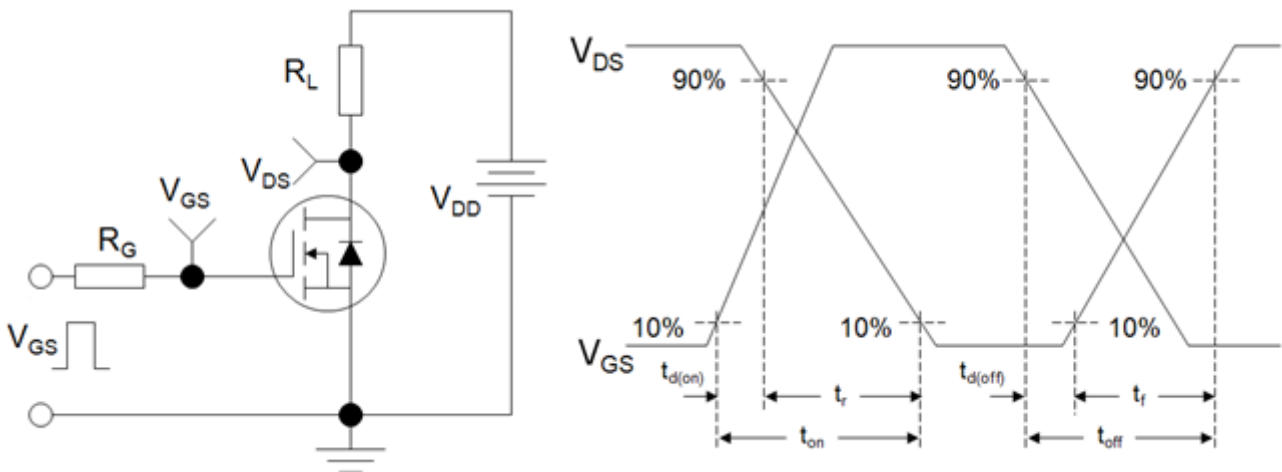
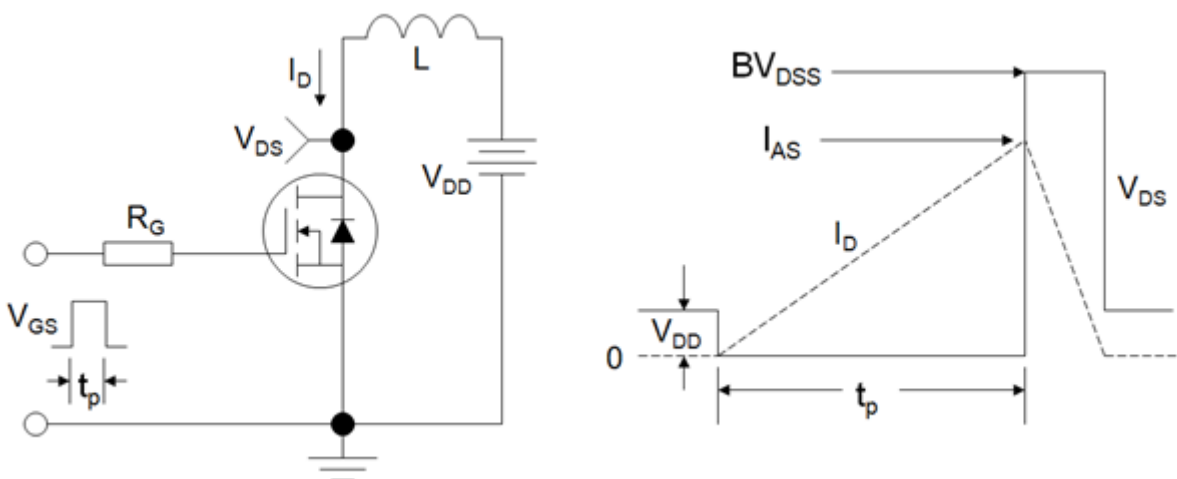
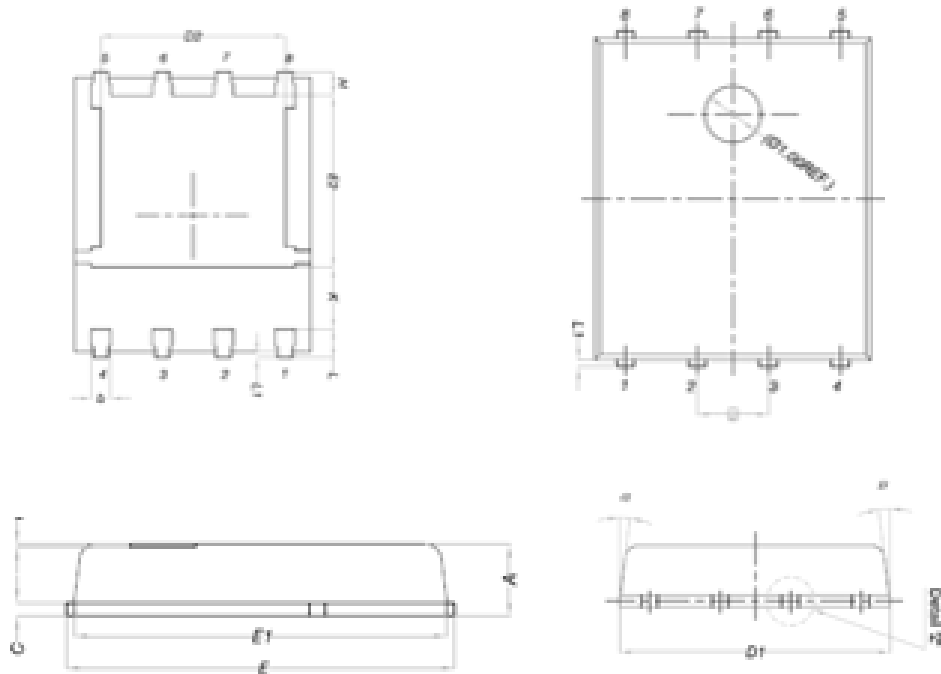


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





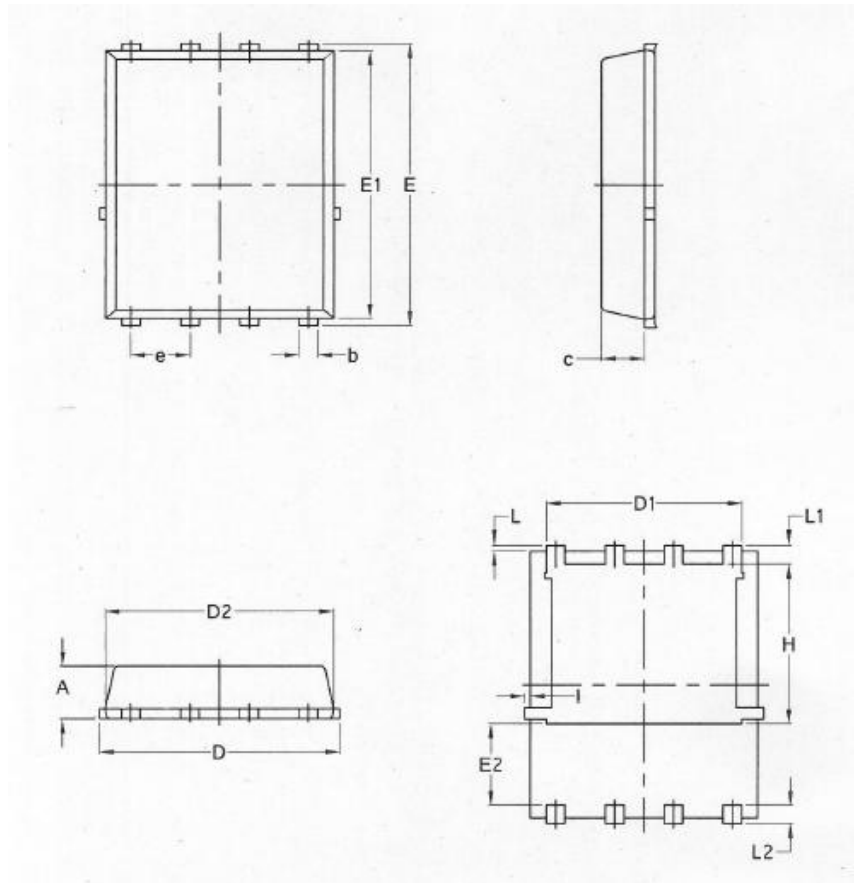
DFN5x6(M)



DIM.	MILLIMETERS			DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	0.90	1.00	1.10	E	5.90	6.00	6.10
A1	0	-	0.05	E1	5.70	5.75	5.80
b	0.33	0.41	0.51	E2	3.38	3.58	3.78
C	0.20	0.25	0.30	e	1.27 BSC		
D1	4.80	4.90	5.00	H	0.41	0.51	0.61
D2	3.61	3.81	3.96	K	1.10	-	-
				L	0.51	0.61	0.71
				L1	0.06	0.13	0.20
				α	0°	-	12°



DFN5x6(V)



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
△ D	4.80	5.40	0.1890	0.2126
△ D1	4.11	4.31	0.1618	0.1697
△ D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	—	0.0630	—
e	1.27 BSC		0.05 BSC	
△ L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
△ H	3.30	3.50	0.1299	0.1378
I	—	0.18	—	0.0070



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