
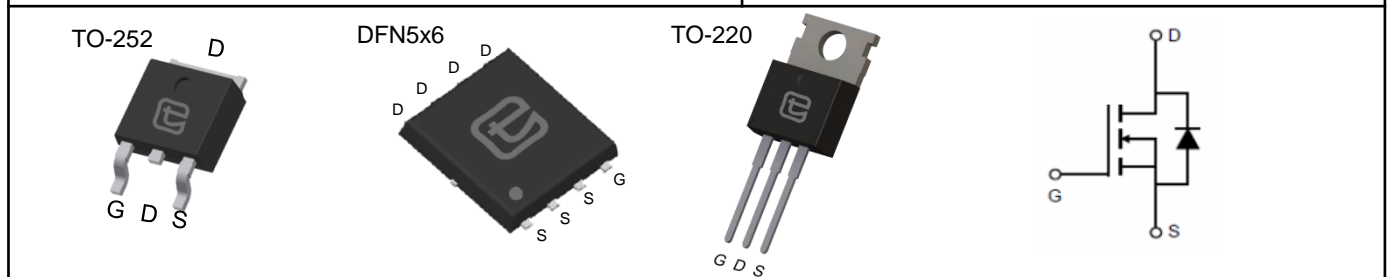




30V N-Channel Trench MOSFET

<p>Features</p> <ul style="list-style-type: none"> ● Trench Power Technology ● Low $R_{DS(ON)}$ ● Low Gate Charge ● Optimized for Fast-switching Applications <p>Applications</p> <ul style="list-style-type: none"> ● Synchronous Rectification in DC/DC and AC/DC Converters ● Isolated DC/DC Converters in Telecom and Industrial 	<p>Product Summary</p> <p>V_{DS} 30V</p> <p>$R_{DS(ON)}$ (at V_{GS}=10V) < 3.1mΩ</p> <p>$R_{DS(ON)}$ (at V_{GS}=4.5V) < 4.2mΩ</p> <p>I_D (at V_{GS}=10V) 130A</p> <p>100% UIS Tested</p> 
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Device	Package	Marking
TTD130N03GT	TO-252	130N03GT
TTG130N03GT	DFN5x6	130N03GT
TTP130N03GT	TO-220	130N03GT

Absolute Maximum Ratings T _C = 25°C, unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage (V _{GS} = 0V)	V _{DSS}	30	V
Continuous Drain Current	I _D	T _C = 25°C	130
		T _C = 100°C	76
Pulsed Drain Current (note1)	I _{DM}	520	A
Gate-Source Voltage	V _{GSS}	±20	V
Single Pulse Avalanche Energy (note2)	E _{AS}	135	mJ
Avalanche Current	I _{AS}	30	A
Power Dissipation (note3)	P _D	T _C = 25°C	121
		T _C = 100°C	60
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~+175	°C

Thermal Resistance			
Parameter	Symbol	Value	Unit
		TO-252, DFN5x6, TO-220	
Thermal Resistance, Junction-to-Case	R _{thJC}	1.24	°C/W
Thermal Resistance, Junction-to-Ambient	R _{thJA}	60	



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
		$V_{DS} = 30V, V_{GS} = 0V, T_J = 55^\circ\text{C}$	--	--	5	
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	1.7	2.4	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	--	2.4	3.1	$\text{m}\Omega$
		$V_{GS} = 4.5V, I_D = 20A$	--	3.2	4.2	$\text{m}\Omega$
Forward Transconductance (Note3)	g_{fs}	$V_{DS} = 10V, I_D = 20A$	20.8	--	--	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1.0\text{MHz}$	--	5471	--	pF
Output Capacitance	C_{oss}		--	1628	--	
Reverse Transfer Capacitance	C_{rss}		--	1026	--	
Total Gate Charge	Q_g	$V_{DD} = 15V, I_D = 50A,$ $V_{GS} = 10V$	--	98	--	nC
Gate-Source Charge	Q_{gs}		--	11	--	
Gate-Drain Charge	Q_{gd}		--	21	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15V, I_D = 50A,$ $R_G = 3\Omega$	--	17	--	ns
Turn-on Rise Time	t_r		--	41	--	
Turn-off Delay Time	$t_{d(off)}$		--	55	--	
Turn-off Fall Time	t_f		--	66	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	130	A
Pulsed Diode Forward Current	I_{SM}		--	--	520	
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}	$I_F = 30A,$ $di_F/dt = 100A/\mu\text{s}$	--	27	--	ns
Reverse Recovery Charge	Q_{rr}		--	25	--	nC

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. $V_{DD} = 30V, R_G = 25\Omega, L = 0.3\text{mH}$, 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

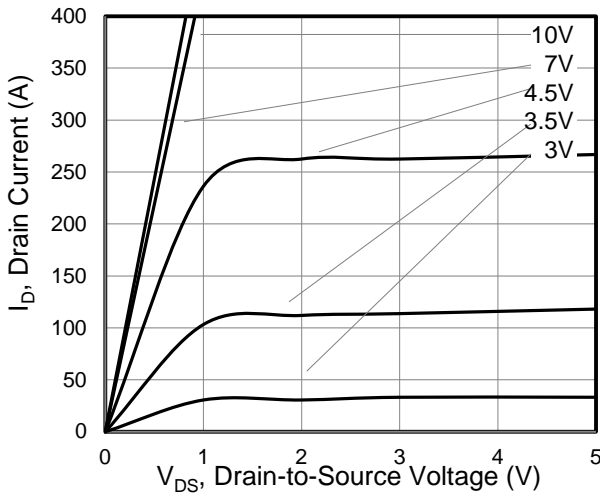


Figure 2. Transfer Characteristics

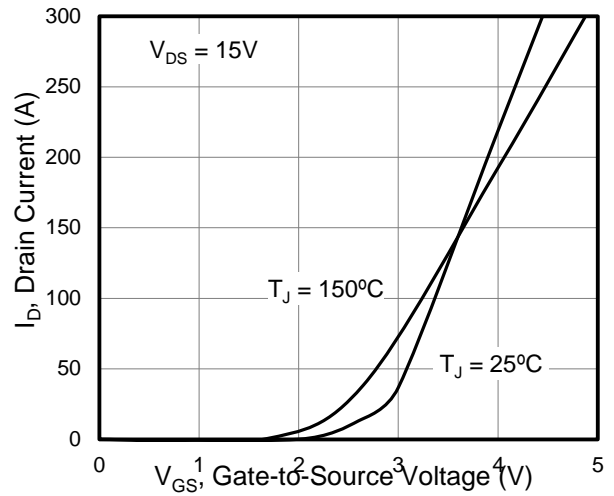


Figure 3. On-Resistance vs. Drain Current

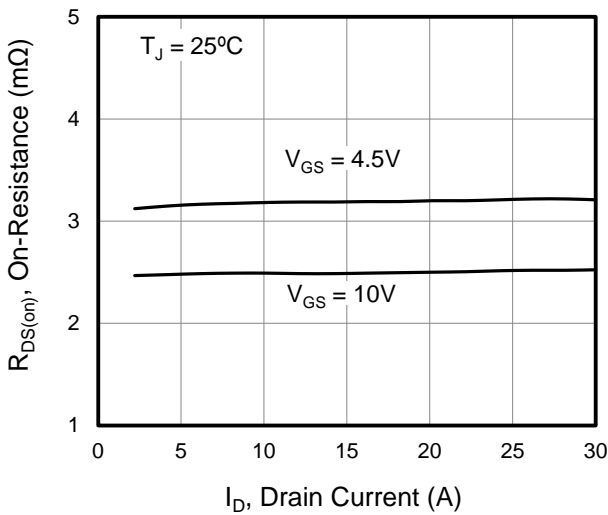


Figure 4. Capacitance

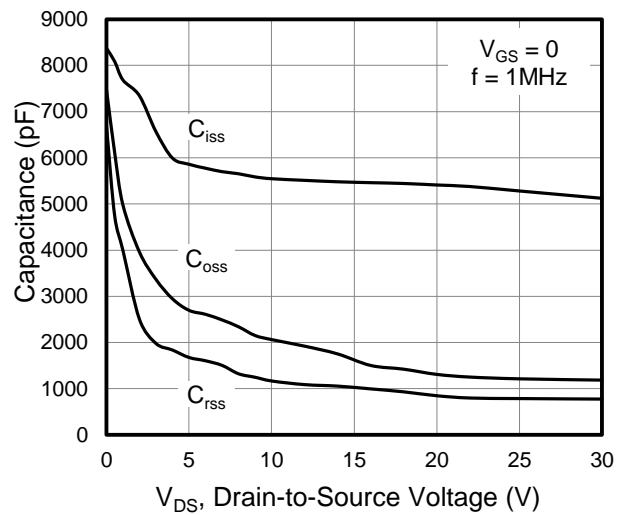


Figure 5. Gate Charge

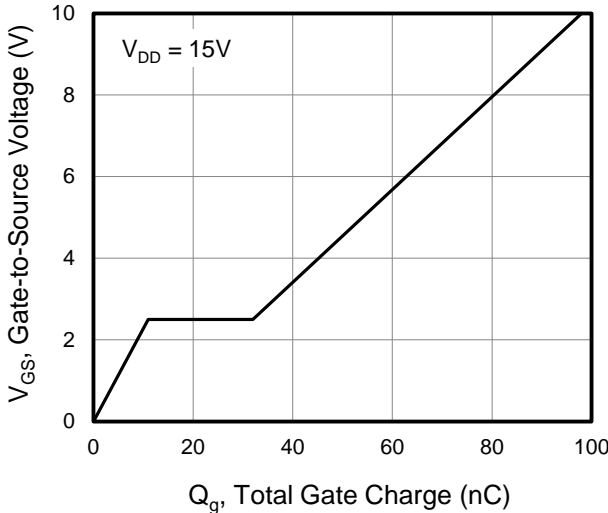
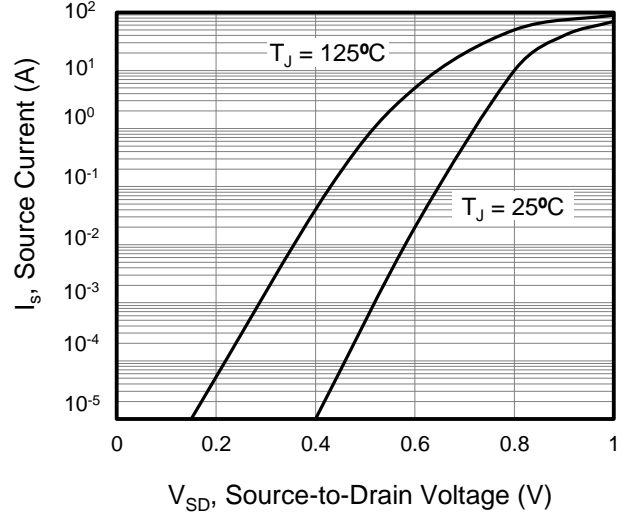


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Junction Temperature

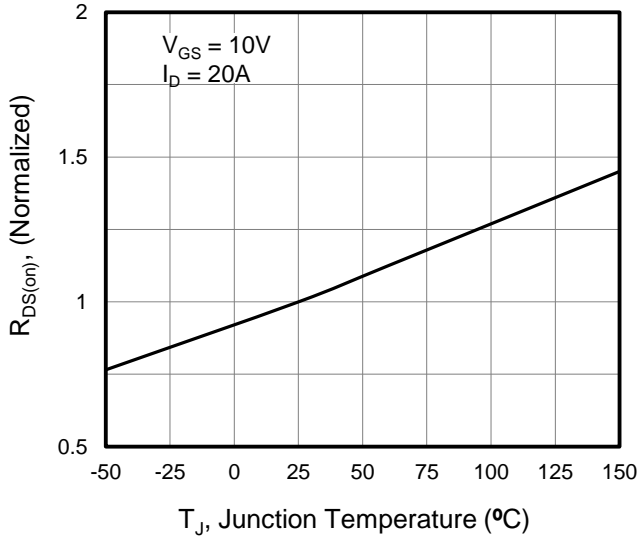


Figure 8. Threshold Voltage vs. Junction Temperature

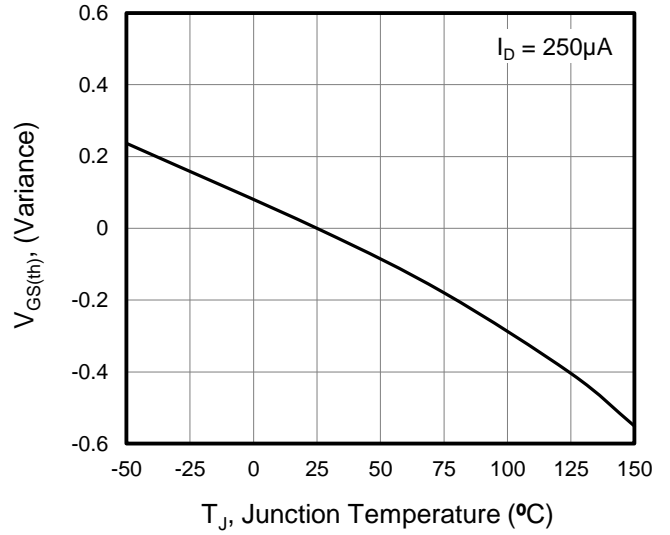


Figure 9. Transient Thermal Impedance

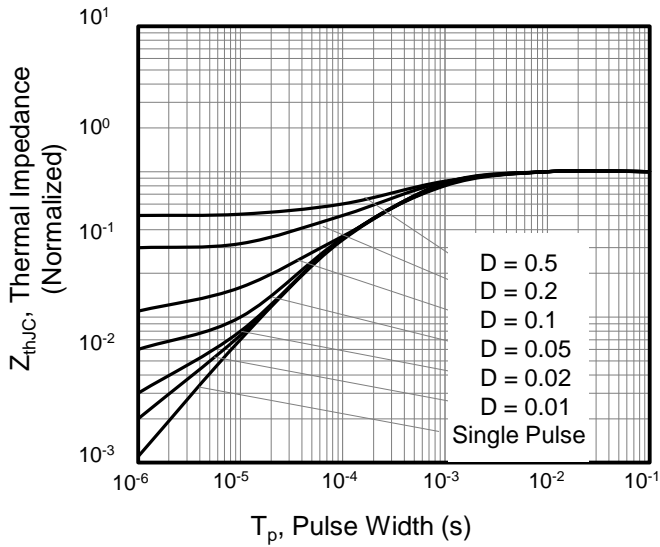


Figure 10. Safe operation area

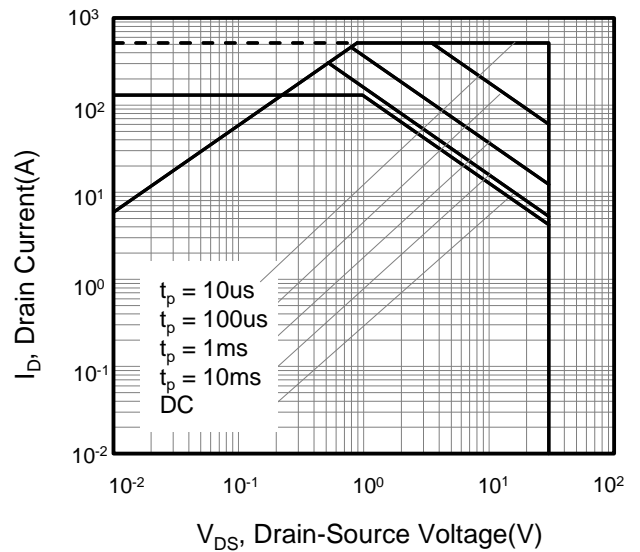




Figure A: Gate Charge Test Circuit and Waveform

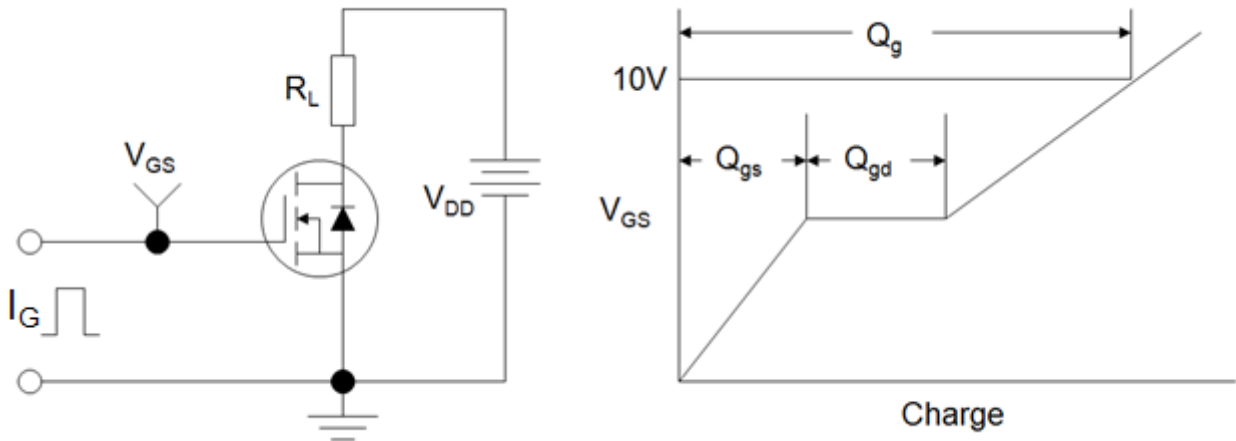


Figure B: Resistive Switching Test Circuit and Waveform

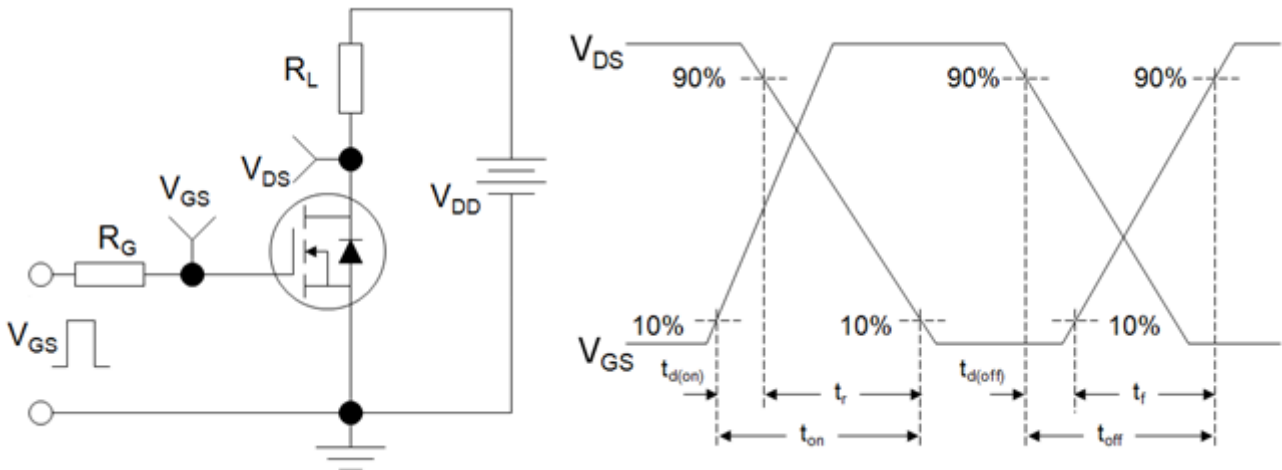
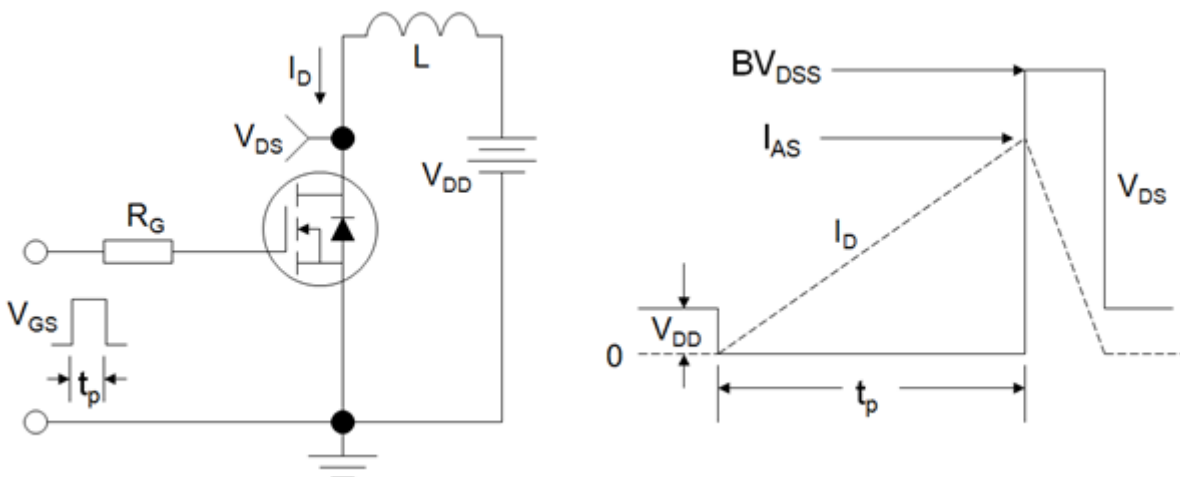
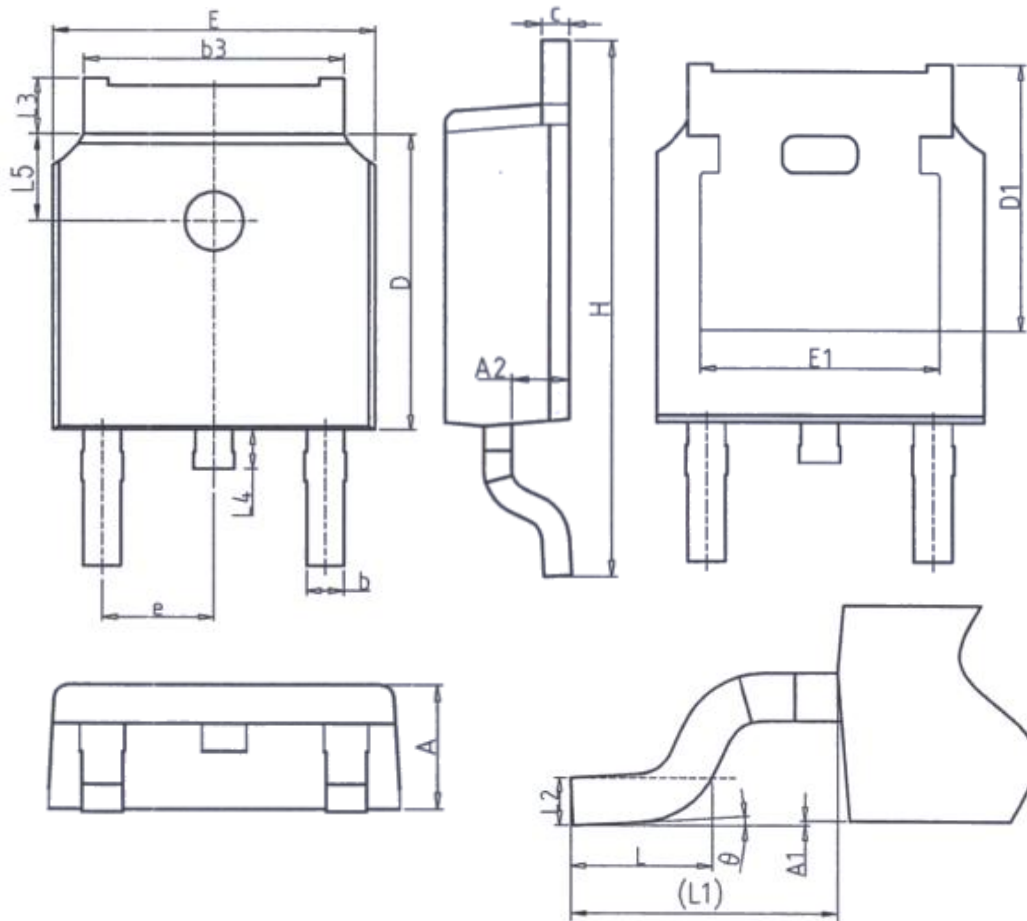


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





TO-252

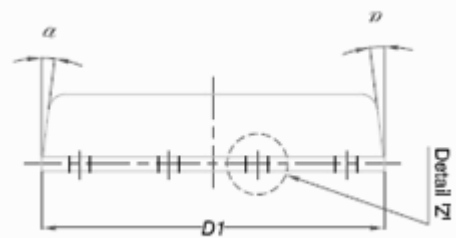
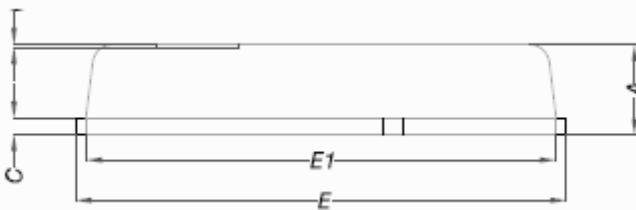
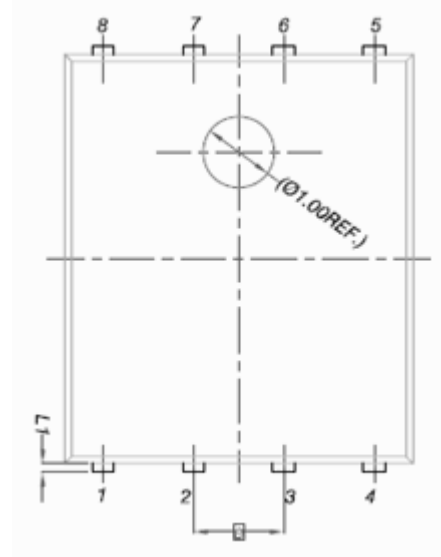
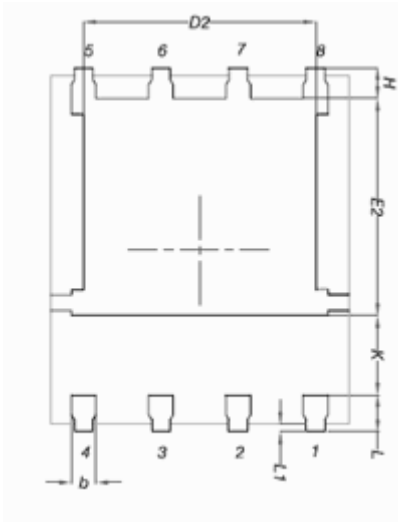


Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	-

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	-	1.00
L5	1.65	1.95
θ	0°	8°



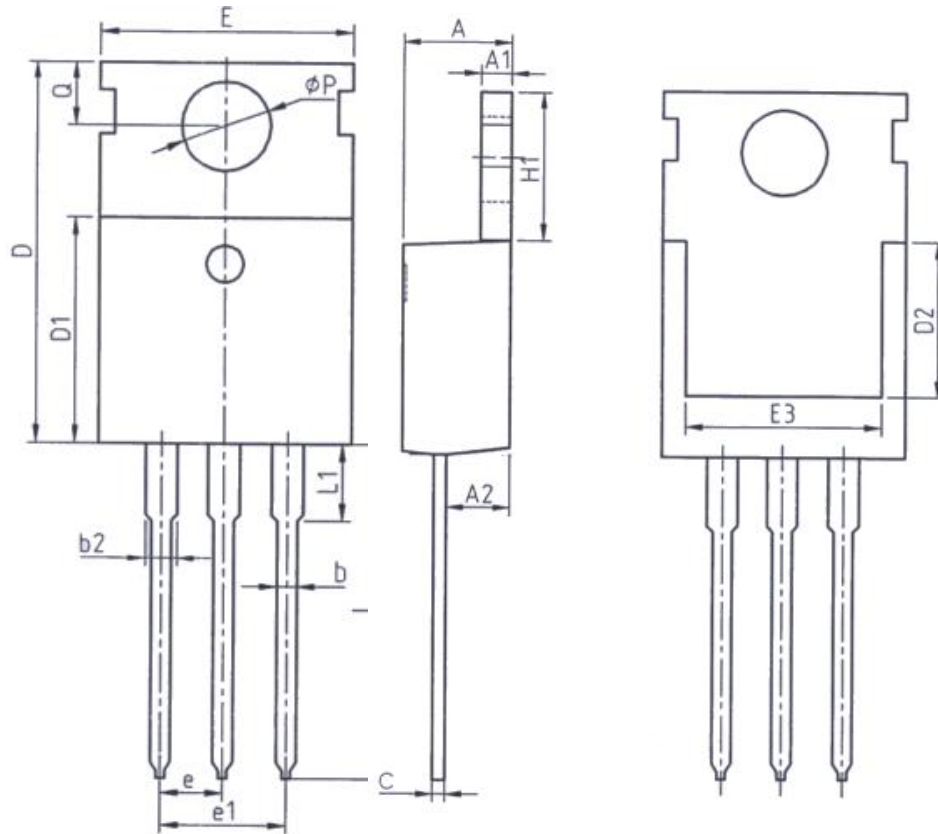
DFN5x6



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°



TO-220



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	-

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	-
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	-	3.40
P	3.40	3.80
Q	2.60	3.00



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