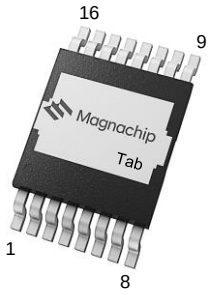
MDLT080N017RH

Single N-channel Trench MOSFET 80V 1.7mΩ 298A

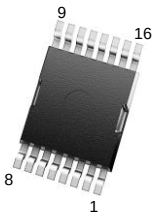
FEATURES

- **Trench power MOSFET technology**
- **Single N-channel trench, normal level**
- **Enhanced avalanche ruggedness**
- **100% Avalanche tested**
- **Maximum 175°C junction temperature**



Top View

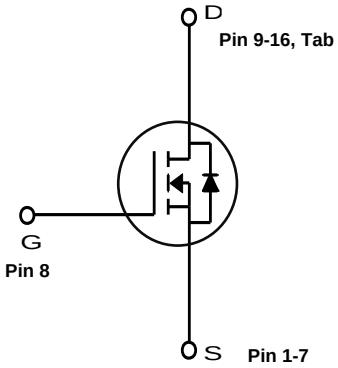
TOLT



Bottom View

PRODUCT VALIDATION

- **Qualified according to JEDEC Standard**



KEY PERFORMANCE PARAMETERS

V_{DS}	**80**	V
$R_{DS(on),\ typ.}$	**0.0013**	Ω
I_D	**298**	A
Q_G	**183**	nC
Junction temperature$_{,\ max}$	**175**	℃

RoHS Compliant
HALOGEN-FREE

Ordering information

Type / Ordering Code	Package	Marking	Packing	RoHS Status
MDLT080N017RH	TOLT	080N017	Tape & Reel	Halogen Free

http://www.magnachip.com

ABSOLUTE MAXIMUM RATINGS, at T_C = 25°C, unless otherwise specified

PARAMETER		SYMBOL	RATING	UNIT
Drain-source Voltage		V_{DS}	80	V
Gate-source Voltage		V_{GS}	± 20	
Drain current	Tc=25°C	I_D	298	A
	Tc=100°C		211	
[1] Pulsed drain current	Tc=25°C	I_{DM}	1192	
Total power dissipation	Tc=25°C	P_{tot}	300	W
	Tc=100°C		150	
[2] Avalanche energy, single pulse		E_{AS}	578	mJ
Operating and storage temperature		T_j, T_{stg}	- 55 ~ 175	℃

THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	RATING	UNIT
Thermal resistance, junction - case	$R_{\theta JC}$	0.5	℃/W
[3] Thermal resistance, junction - ambient	$R_{\theta JA}$	40	

ELECTRICAL CHARACTERISTICS (T_J = 25°C)

STATIC CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Drain-source breakdown voltage	$V_{(BR)DSS}$	80	-	-	V	V_{GS}=0 V, I_D=250 μA
Breakdown voltage temperature coefficient	$\Delta BV_{DSS} / \Delta T_J$	-	0.07	-	V/°C	I_D=250 μA, referenced to 25°C
Gate threshold voltage	$V_{GS(th)}$	2.4	-	3.8	V	V_{DS}=V_{GS}, I_D=250 μA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=80 V, V_{GS}=0 V
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	V_{GS}=±20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	-	1.3	1.7	mΩ	V_{GS}=10 V, I_D=100 A
		-	1.4	2.0		V_{GS}=8 V, I_D=75 A
Gate resistance	R_G	-	3.0	-	Ω	f=1 MHz
[4] Transconductance	g_{fs}	-	120	-	S	V_{DS}=10 V, I_D=100 A

[4] DYNAMIC CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Input capacitance	C_{iss}	-	12,684	-	pF	V_{GS}=0 V, V_{DS}=40 V, f=1 MHz
Output capacitance	C_{oss}	-	2,338	-		
Reverse transfer capacitance	C_{rss}	-	65	-		
Turn-on delay time	$t_{d(on)}$	-	35	-	ns	V_{DD}=40 V, V_{GS}=10 V, I_D=100 A, $R_{G,ext}$=3 Ω
Rise time	t_r	-	27	-		
Turn-off delay time	$t_{d(off)}$	-	132	-		
Fall time	t_f	-	67	-		

[4] GATE CHARGE CHARACTERISTICS

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
Gate to source charge	Q_{gs}	-	57	-	nC	V_{DD}=40 V, I_D=100 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{gs(th)}$	-	36	-		
Gate to drain charge	Q_{gd}	-	40	-		
Switching charge	Q_{sw}	-	61	-		
Gate charge total	Q_g	-	183	-		
Gate plateau voltage	$V_{plateau}$	-	4.7	-	V	

SOURCE-DRAIN DIODE

PARAMETER	Symbol	Min.	Typ.	Max.	Unit	Conditions / Note
[4] Diode continous forward current	I_S	-	-	298	A	-
[4] Diode pulse current	$I_{S,pulse}$	-	-	954		pulsed; tp ≤ 10 μs
Diode forward voltage	V_{SD}	-	1.0	1.2	V	V_{GS}=0 V, I_F=100 A
[4] Reverse recovery time	t_{rr}	-	151	-	ns	I_F=100 A, d_{iF}/dt=100 A/μs
[4] Reverse recovery charge	Q_{rr}	-	497	-	nC	I_F=100 A, d_{iF}/dt=100 A/μs

Notes

1. Pulse width limited by Tjmax
2. Starting T_j=25°C, L=1mH, I_{AS}=34A, V_{DD}=50V, V_{GS}=10V
3. Surface mounted FR-4 board by JEDEC (jesd51-7)
4. The parameter is not subject to production testing - guaranteed by design.

ELECTRICAL CHARACTERISTICS DIAGRAMS

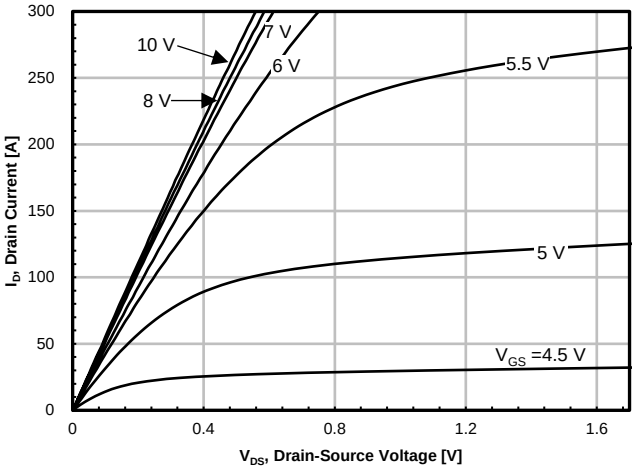


Fig. 1. On-Region Characteristics

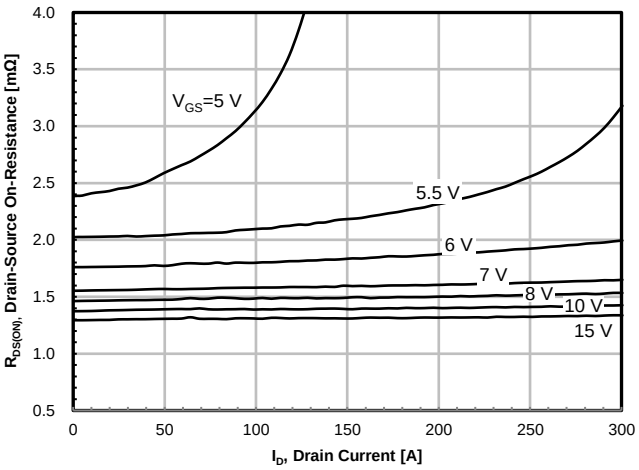


Fig. 2. On-Resistance vs. Drain Current and Gate Voltage

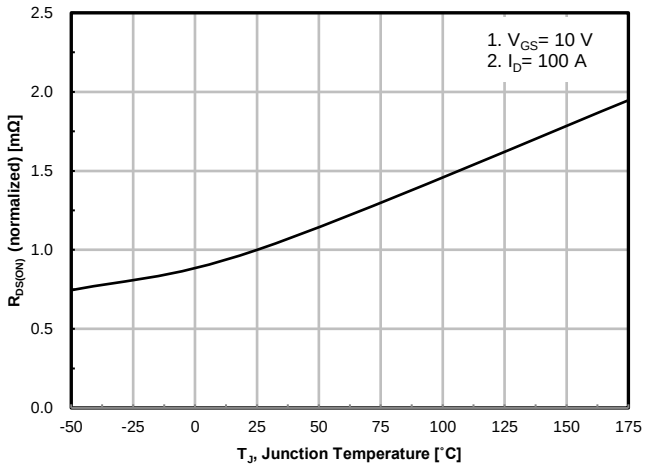


Fig. 3. On-Resistance vs. Junction Temperature

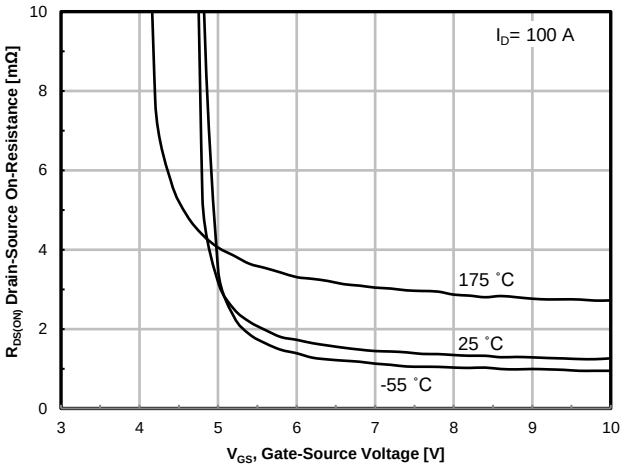


Fig. 4. On-Resistance vs. Gate-Source Voltage

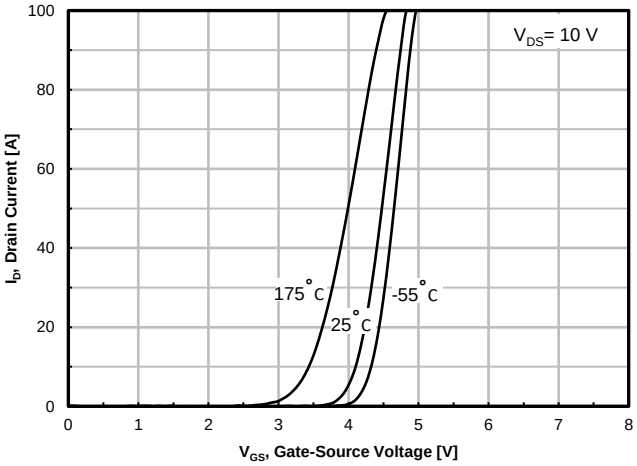


Fig. 5. Transfer Characteristics

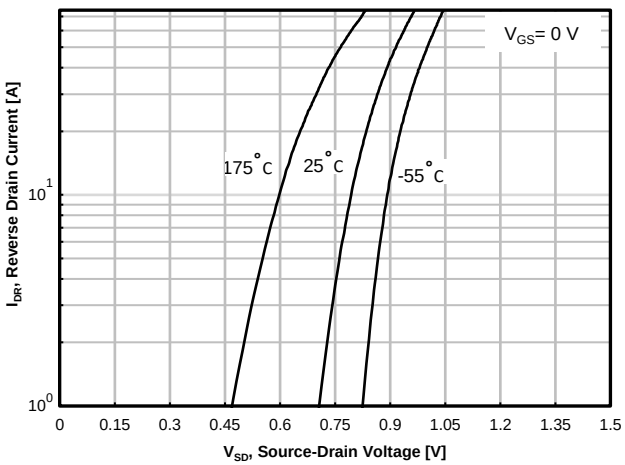


Fig. 6. Source-Drain Diode Forward Voltage

ELECTRICAL CHARACTERISTICS DIAGRAMS

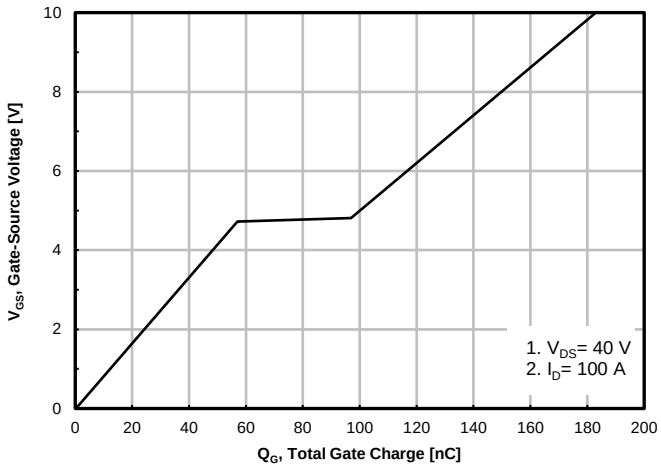


Fig. 7. Gate Charge

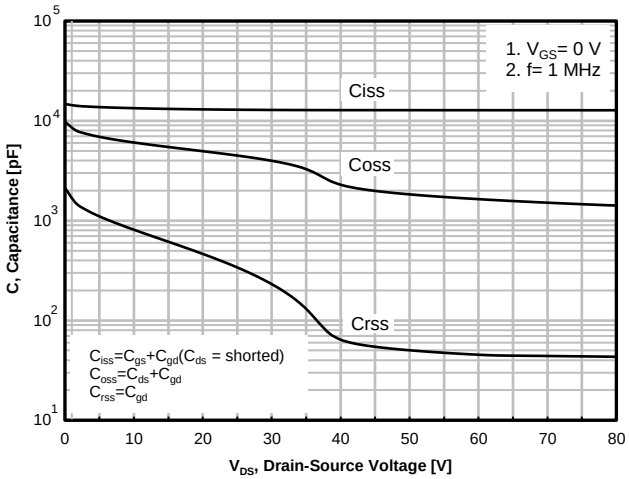


Fig. 8. Capacitance

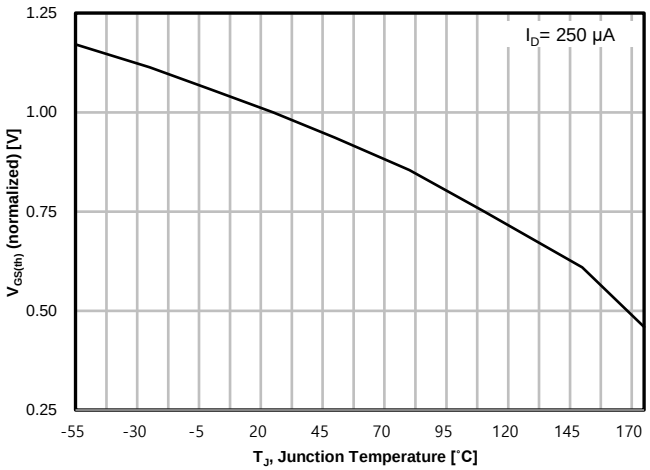


Fig.9 $V_{GS(th)}$ Variation with Temprature (Nomalized)

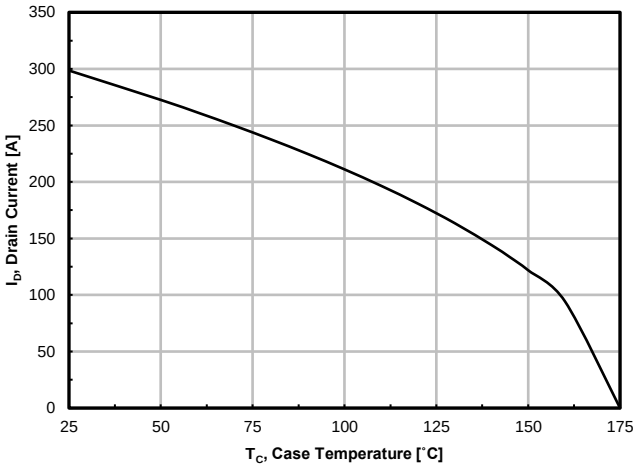


Fig. 10. Maximum Drain vs. Case Temperature

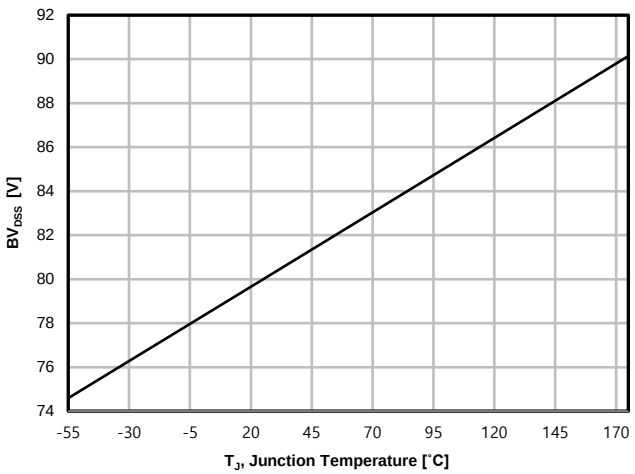


Fig. 11. BV_{DSS} Variation with Temprature

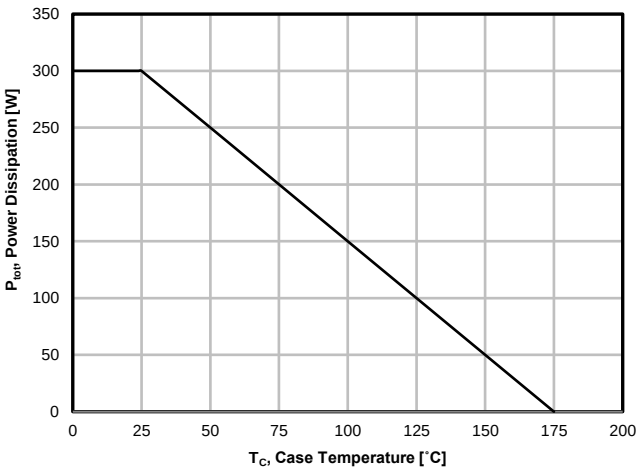


Fig. 12. Power Dissipation with Temprature

ELECTRICAL CHARACTERISTICS DIAGRAMS

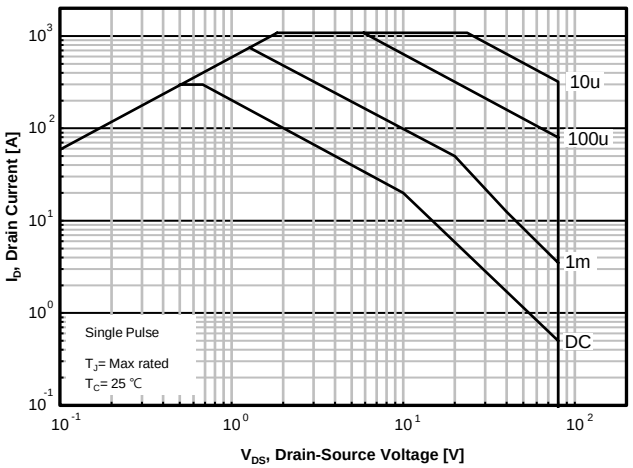


Fig. 13. Safe Operating Area, Junction-to-Ambient

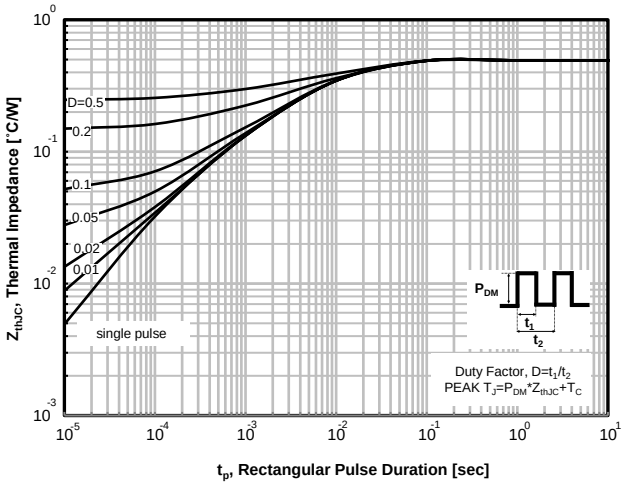


Fig. 14. Thermal Transient Impedance

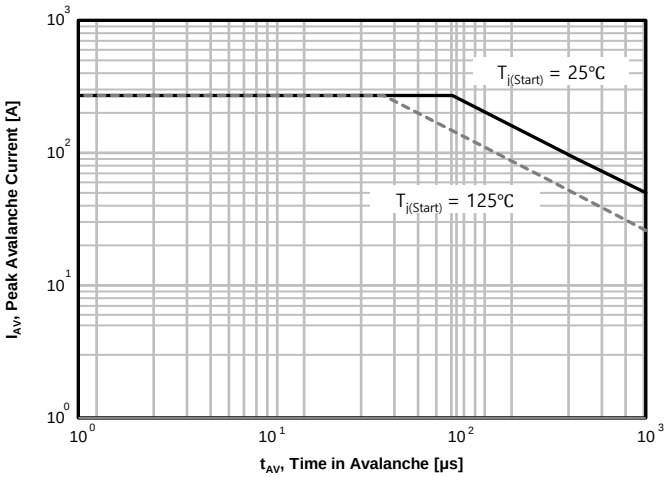
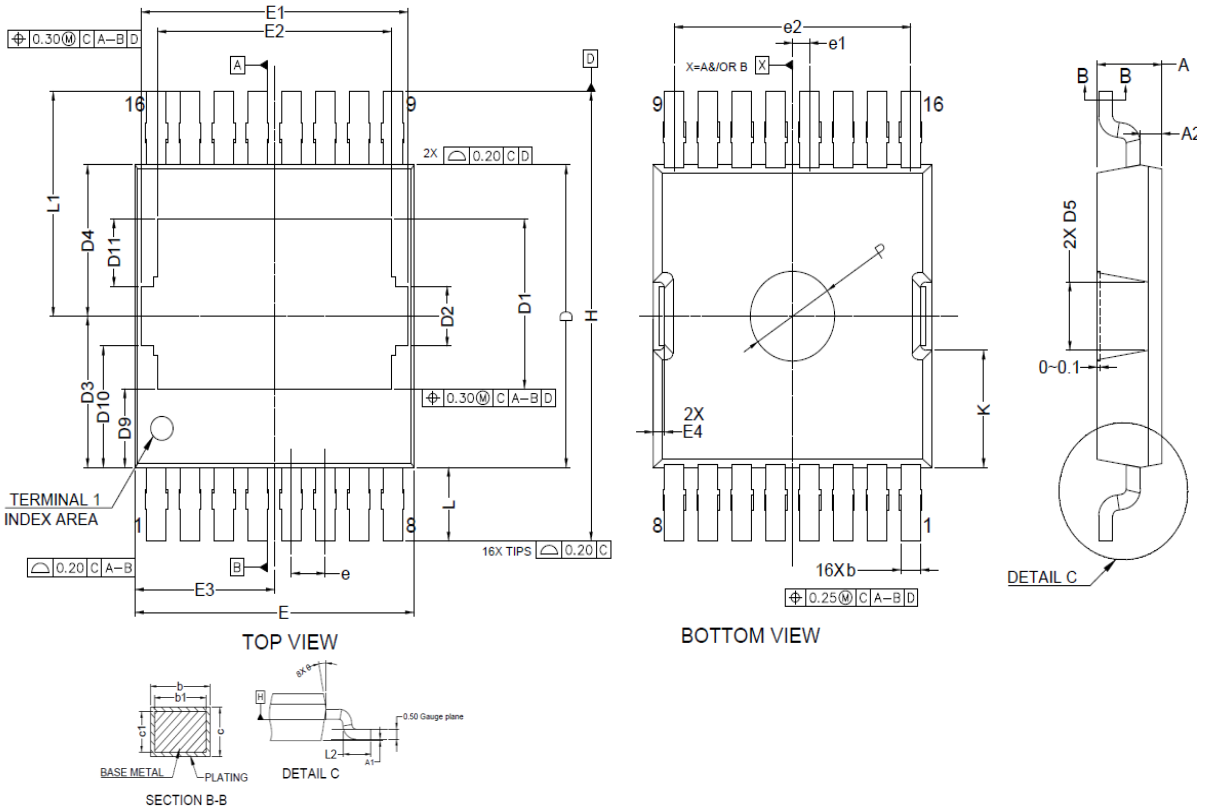


Fig. 15. Avalanche Characteristics

Package Outlines

TOLT



Symbol	Dimension (mm)		Symbol	Dimension (mm)	
	Min	Max		Min	Max
A	2.20	2.35	E	9.70	10.10
A1	0.01	0.11	E1	9.26	9.66
A2	0.56	0.96	E2	8.10	8.50
b	0.60	0.85	E3	4.75	5.15
b1	0.60	0.80	E4	0.20	0.60
c	0.45	0.65	e	1.20 BSC	
c1	0.45	0.60	e1	0.60 BSC	
D	10.00	10.30	e2	8.40 BSC	
D1	5.47	5.87	H	14.80	15.20
D2	1.80	2.20	K	3.71	4.11
D3	4.85	5.25	L	2.25	2.65
D4	5.00	5.13	L1	7.30	7.70
D5	2.08	2.48	L2	1.30	1.70
D9	2.42	2.82	R	0.07	-
D10	3.85	4.25	P	2.90	3.10
D11	2.04	2.44	Θ	4°	10°

Notes

Package body size, length and width do not include mold flash, protrusions and gate burrs.

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