

N-Channel Enhancement Mode Power MOSFET

Description

The RM80N30LD uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

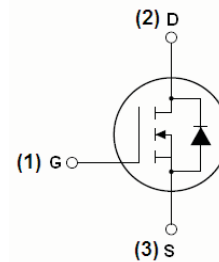
General Features

- $V_{DS} = 30V, I_D = 80A$
 $R_{DS(ON)} < 6.5m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 10m\Omega @ V_{GS}=5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

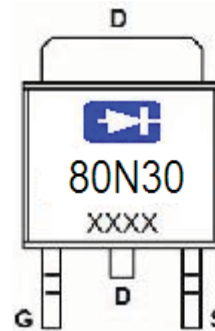
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

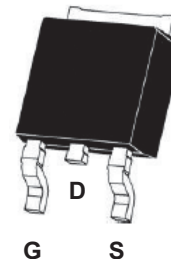
100% UIS TESTED!



Schematic diagram



Marking and pin assignment



TO-252-2L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
80N30	RM80N30LD	TO-252-2L	-	-	-

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	50	A
Pulsed Drain Current	I_{DM}	170	A
Maximum Power Dissipation	P_D	83	W
Derating factor		0.56	W/ $^\circ C$
Single pulse avalanche energy ^(Note 5)	E_{AS}	306	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.8	$^{\circ}\text{C/W}$
--	-----------------	-----	----------------------

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

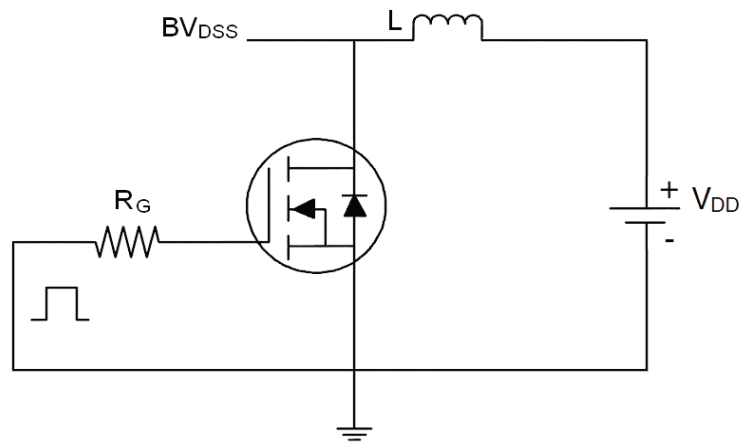
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	-	5.5	6.5	m Ω
		$V_{GS}=5V, I_D=24A$	-	7.5	10	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=24A$	20	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	2330	-	PF
Output Capacitance	C_{OSS}		-	460	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	230	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=30A$ $V_{GS}=10V, R_{GEN}=2.7\Omega$	-	20	-	nS
Turn-on Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	60	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=30A,$ $V_{GS}=10V$	-	51	-	nC
Gate-Source Charge	Q_{gs}		-	14	-	nC
Gate-Drain Charge	Q_{gd}		-	11	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=24A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	80	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 80A$ $di/dt = 100A/\mu s$ ^(Note 3)	-	32	50	nS
Reverse Recovery Charge	Q_{rr}		-	12	20	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

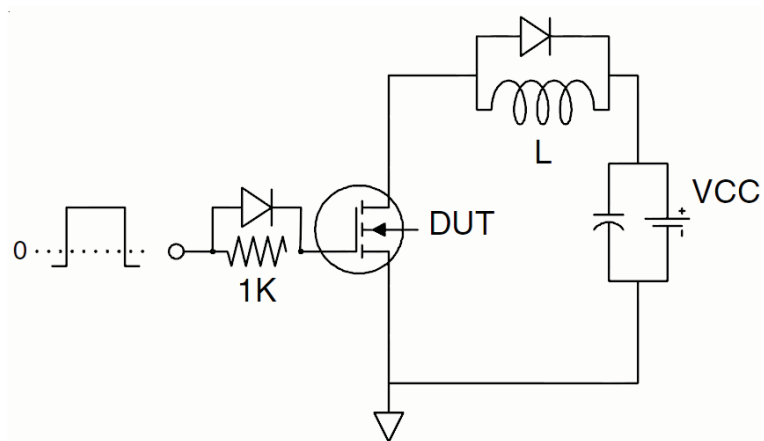
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega, I_{AS}=35A$

Test Circuit

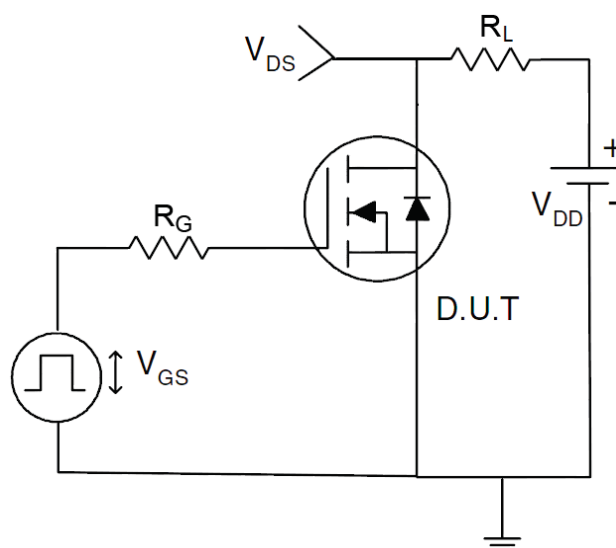
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



RATING AND CHARACTERISTICS CURVES (RM80N30LD)

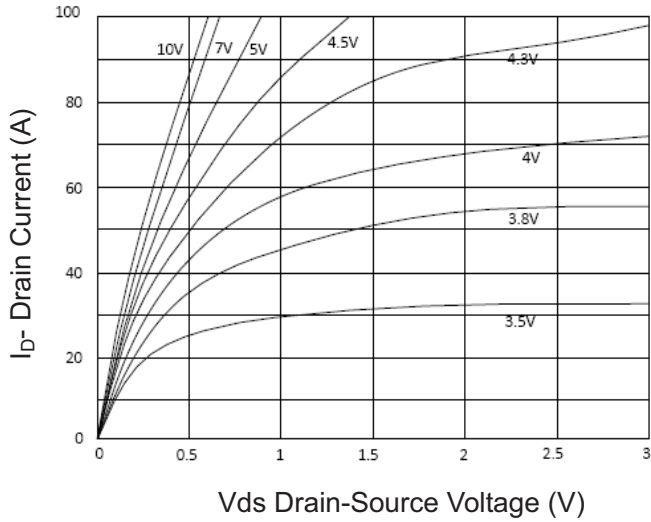


Figure 1 Output Characteristics

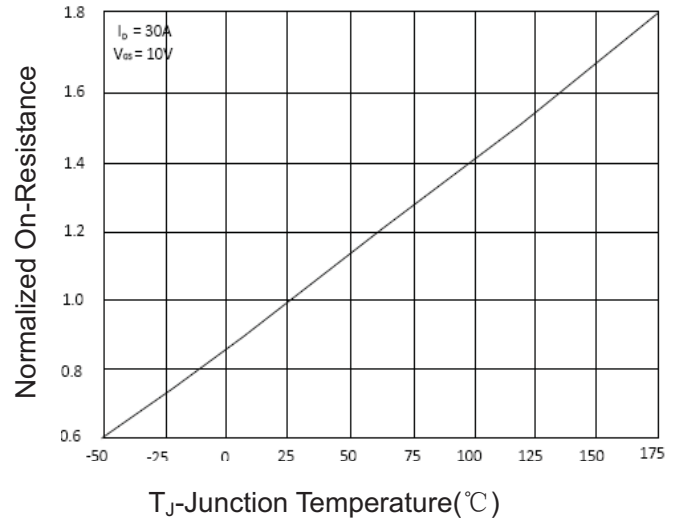


Figure 4 R_{dson} -Junction Temperature

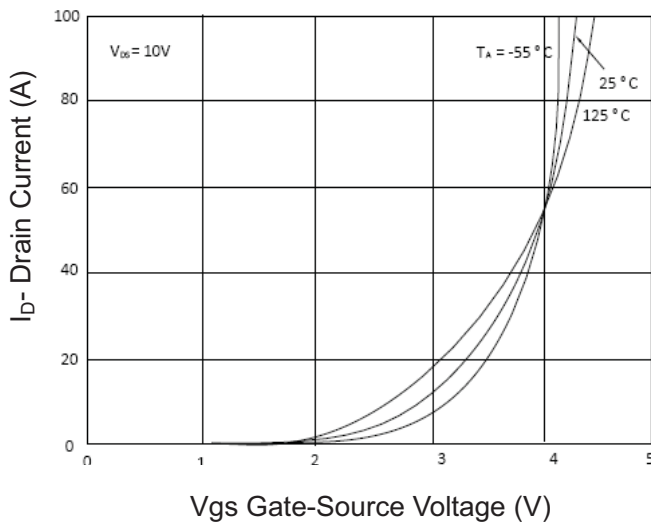


Figure 2 Transfer Characteristics

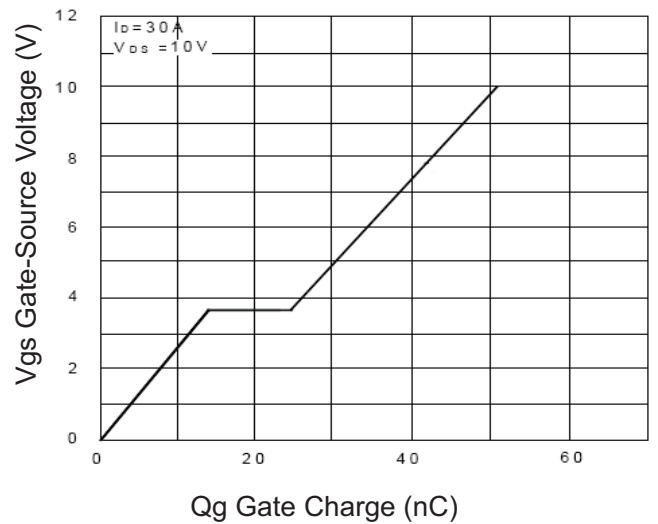


Figure 5 Gate Charge

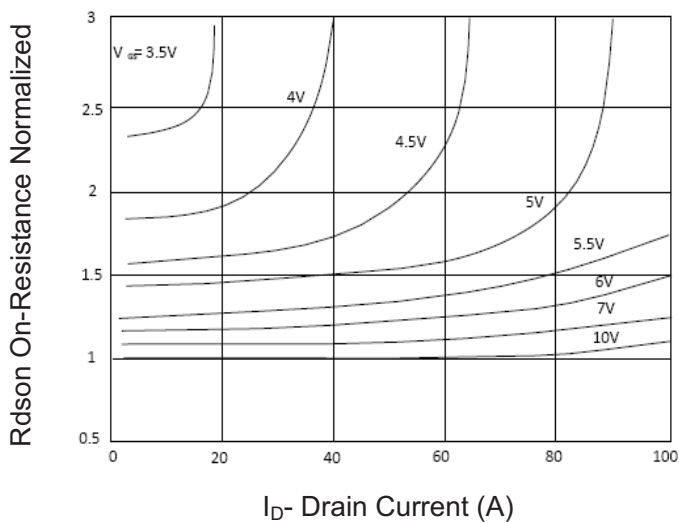


Figure 3 R_{dson} - Drain Current

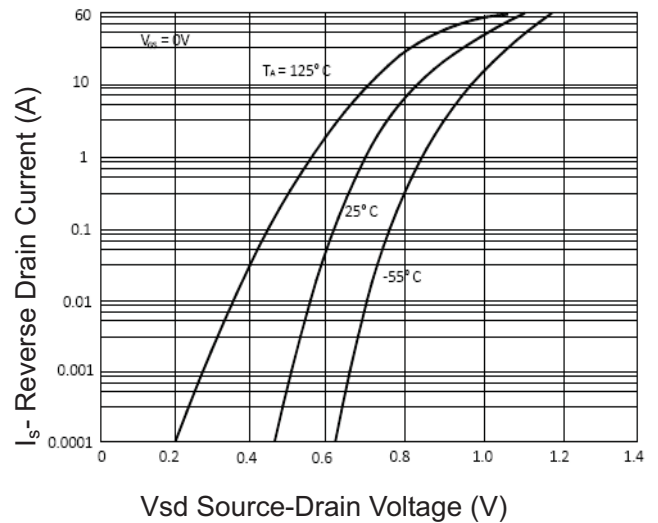
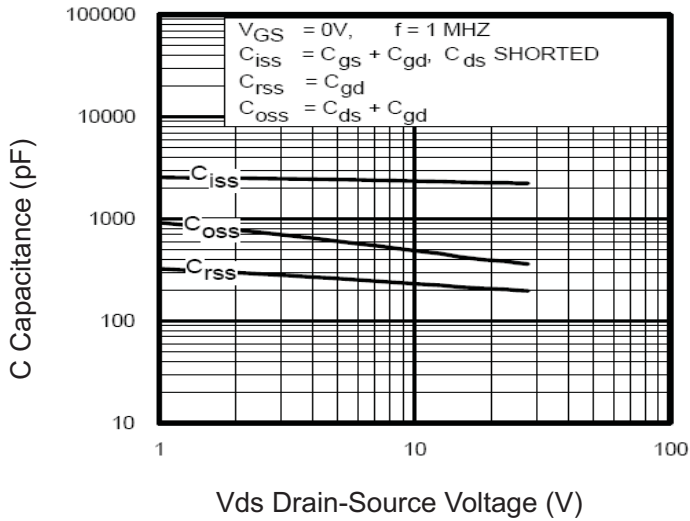
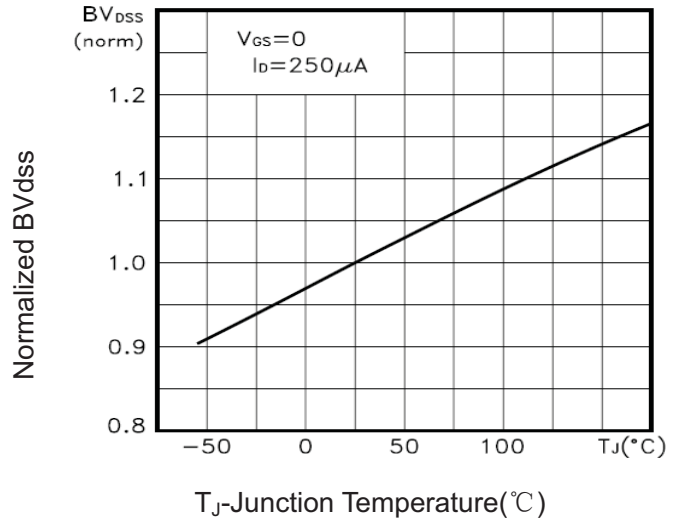


Figure 6 Source- Drain Diode Forward

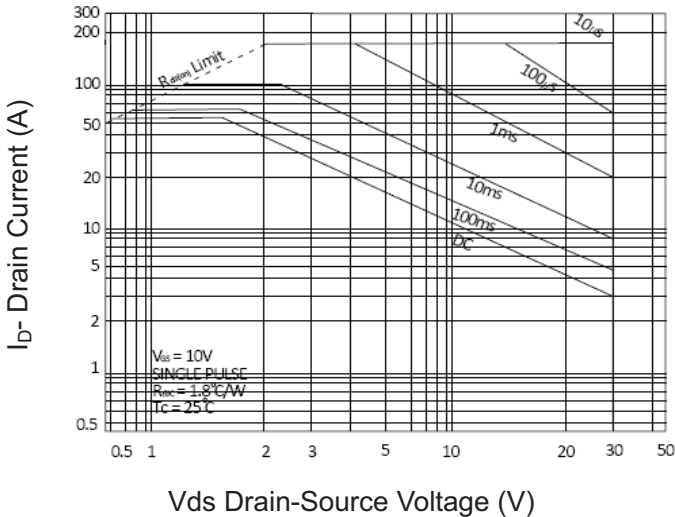
RATING AND CHARACTERISTICS CURVES (RM80N30LD)



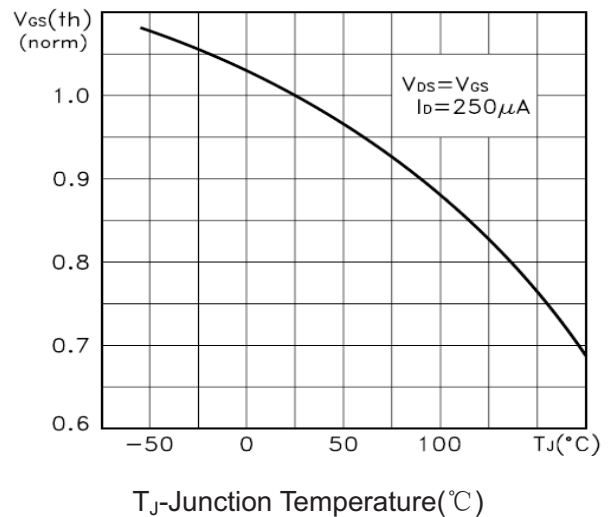
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



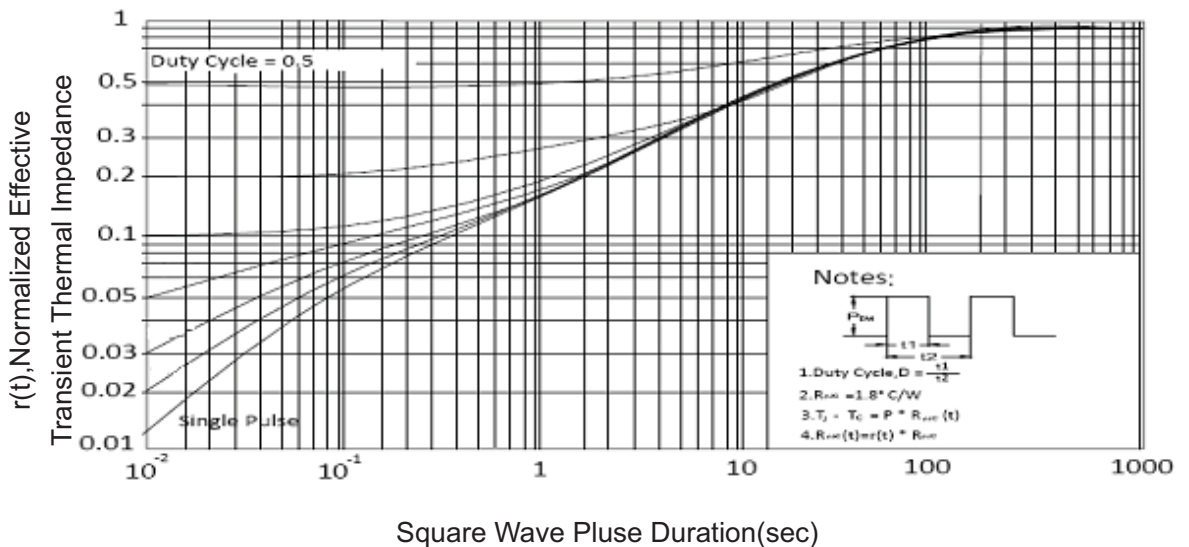
T_J-Junction Temperature(°C)
Figure 9 BV_{DSS} vs Junction Temperature



Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area

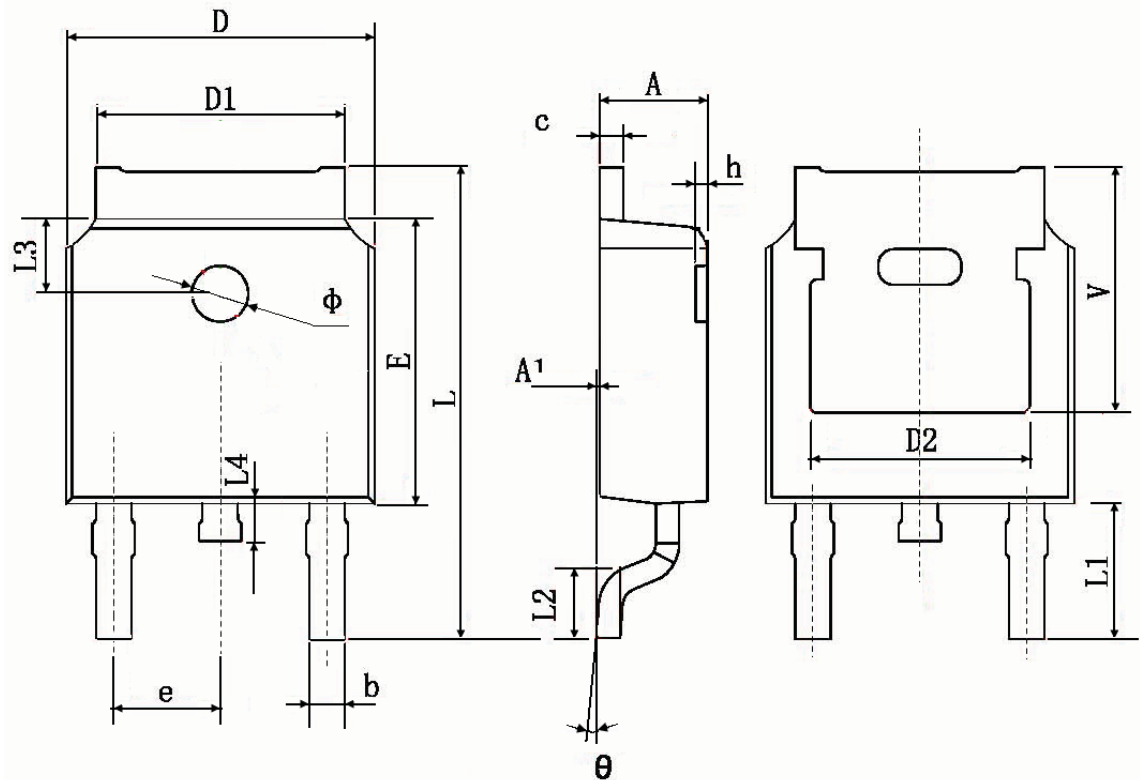


T_J-Junction Temperature(°C)
Figure 10 V_{GS(th)} vs Junction Temperature



Square Wave Pulse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.