Dual N-Channel Enhancement Mode MOSFET TDM3514

DESCRIPTION

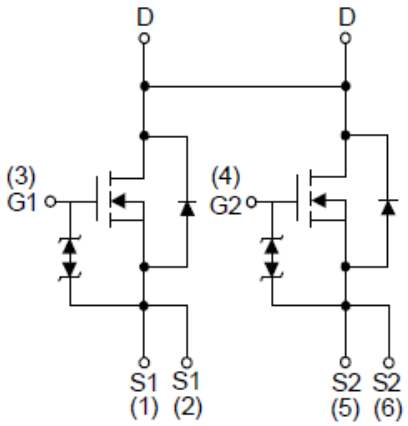
The TDM3514 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

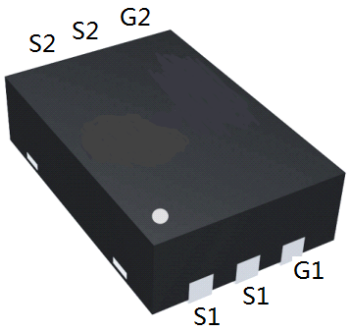
- 20V/9.7A,
  RDS(ON) < 9.9mΩ @ VGS=2.5V
  RDS(ON) < 8.7mΩ @ VGS=3.1V
  RDS(ON) < 8.2mΩ @ VGS=3.7V
  RDS(ON) < 7.9mΩ @ VGS=4.0V
  RDS(ON) < 7.5mΩ @ VGS=4.0V
- ESD protection
- Lead free product is available
- DFN2X3A-6_EP package

Application

- PWM applications
- One Cell Li-ion Battery Park
- Power management



N-Channel MOSFET



Top of view of DFN2X3A-6_EP

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Diode Continuous Forward Current	I_S(T_A=25℃)	2	A
Drain Current @ Continuous	I_D（T_A=25℃）	9.7	A
	I_D（T_A=70℃）	7.5	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM}（T_A=25℃）	38	A
Maximum Power Dissipation	P_D(T_A=25℃)	1.0	W
	P_D(T_A=70℃)	0.6	
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (t<10s)	$R_{\theta JA}$	80	℃/W
Thermal Resistance,Junction-to-Ambient Steady State		127	

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

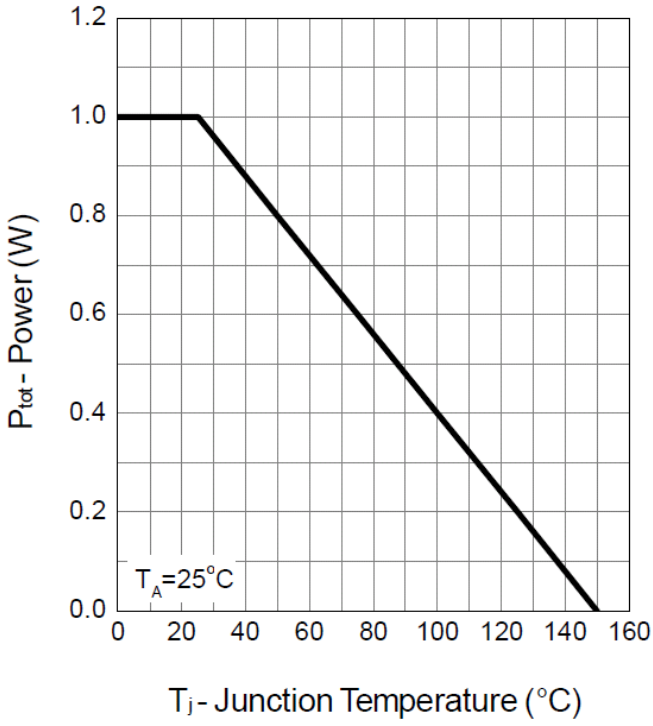
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±10	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=2.5V, I_D=5.5A	-	7.4	9.9	mΩ
		V_{GS}=3.1V, I_D=5.5A	-	6.7	8.7	
		V_{GS}=3.7V, I_D=5.5A	-	6.4	8.2	
		V_{GS}=4.0V, I_D=5.5A	-	6.3	7.9	
		V_{GS}=4.5V, I_D=5.5A	-	6.1	7.5	
DYNAMIC CHARACTERISTICS (Note4)						
Gate Resistance	R_G	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	11	-	Ω
Input Capacitance	C_{iss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	-	1470	1920	PF
Output Capacitance	C_{oss}		-	256	-	PF
Reverse Transfer Capacitance	C_{rss}		-	200	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=10V, R_L=10Ω, V_{GEN}=10V,R_G=1Ω	-	8	15	nS
Turn-on Rise Time	t_r	I_D=1A	-	20	36	nS
Turn-Off Delay Time	$t_{d(off)}$		-	935	1680	nS
Turn-Off Fall Time	t_f		-	410	740	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=5.5A,V_{GS}=4.5V	-	23.2	33	nC
Gate-Source Charge	Q_{gs}		-	1.9	-	nC
Gate-Drain Charge	Q_{gd}		-	4.8	-	nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=5.5A, dI/dt=100A/μs	-	445	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	2170	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=20A	-	0.7	1.3	V

NOTES:

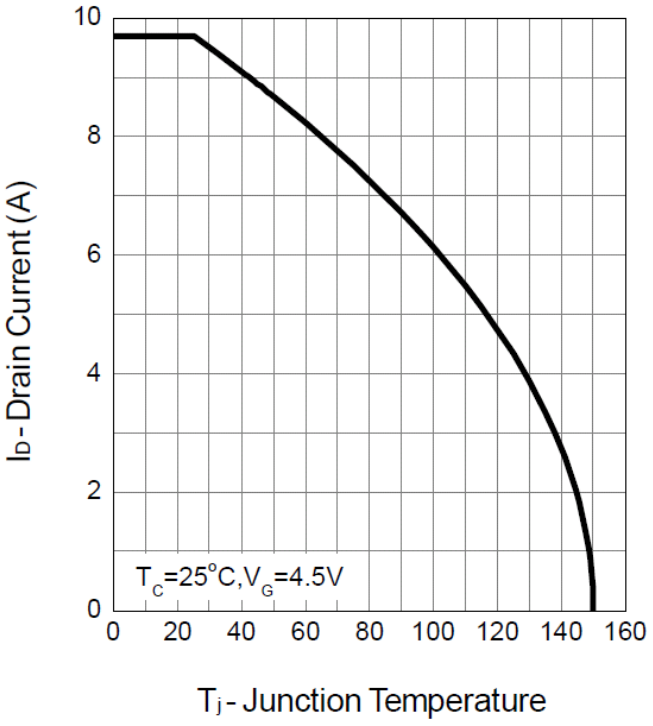
1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

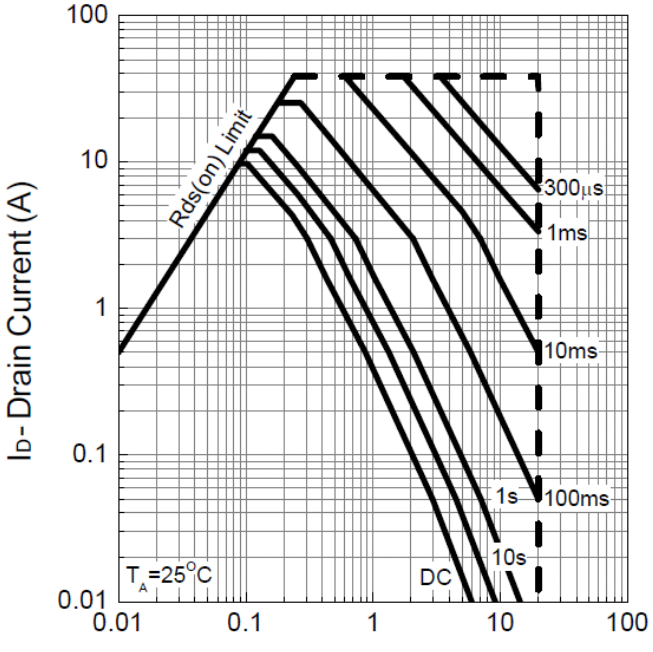
Power Dissipation



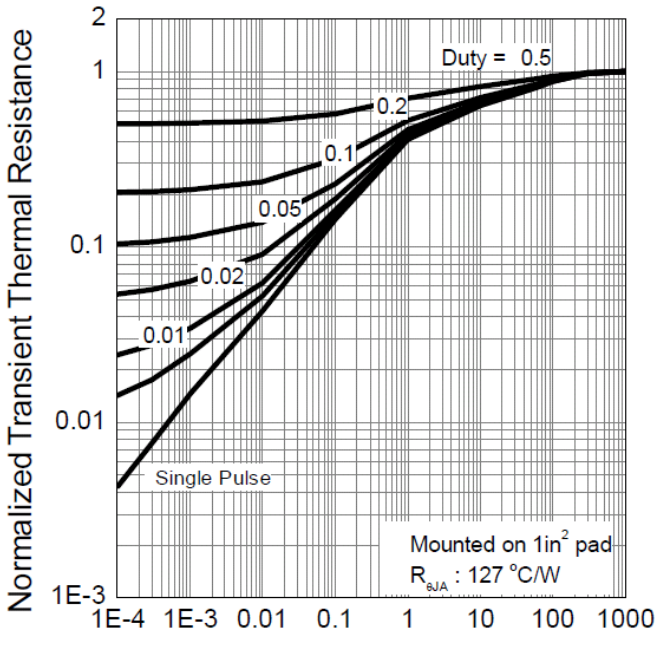
Drain Current



Safe Operation Area

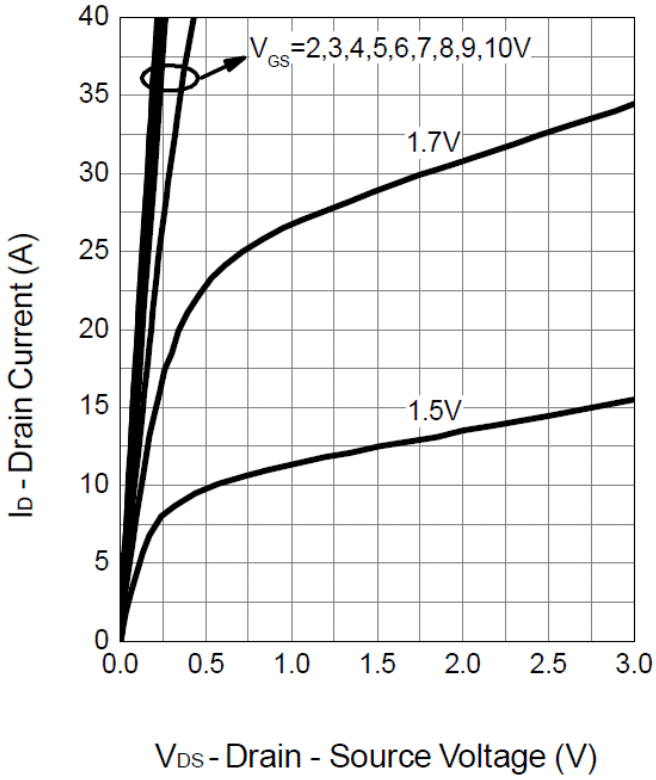


Thermal Transient Impedance

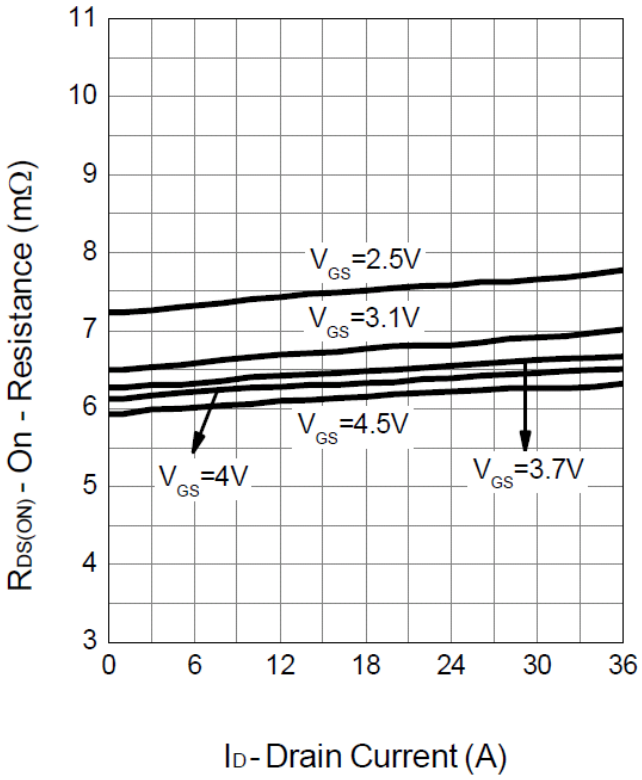


Typical Operating Characteristics(Cont.)

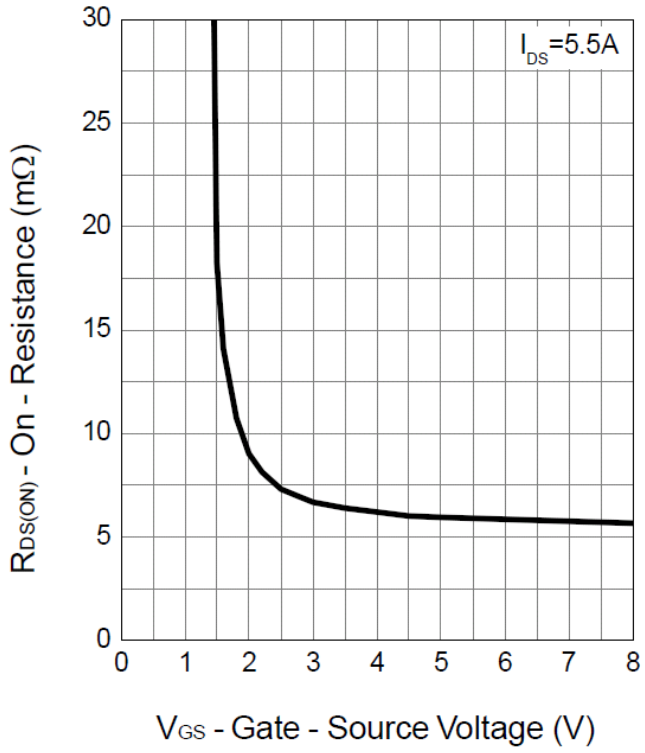
Output Characteristics



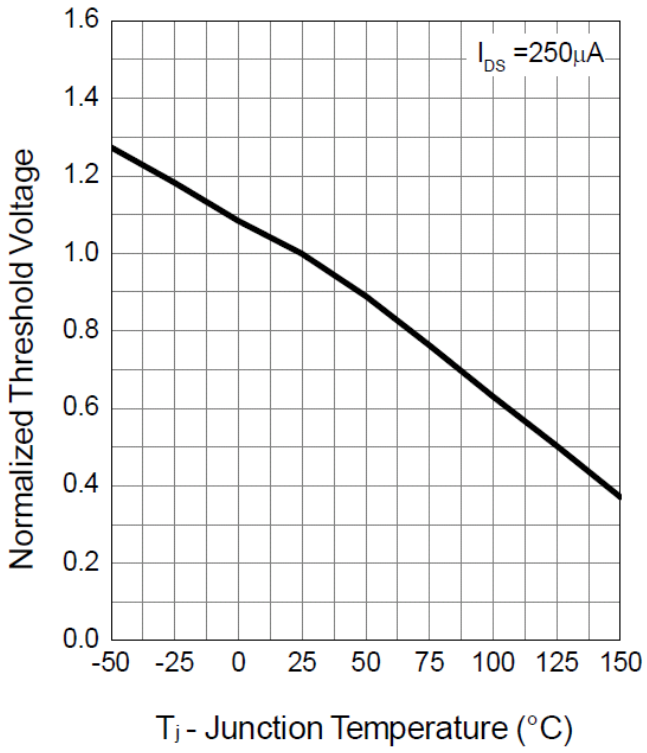
Drain-Source On Resistance



Gate-Source On Resistance

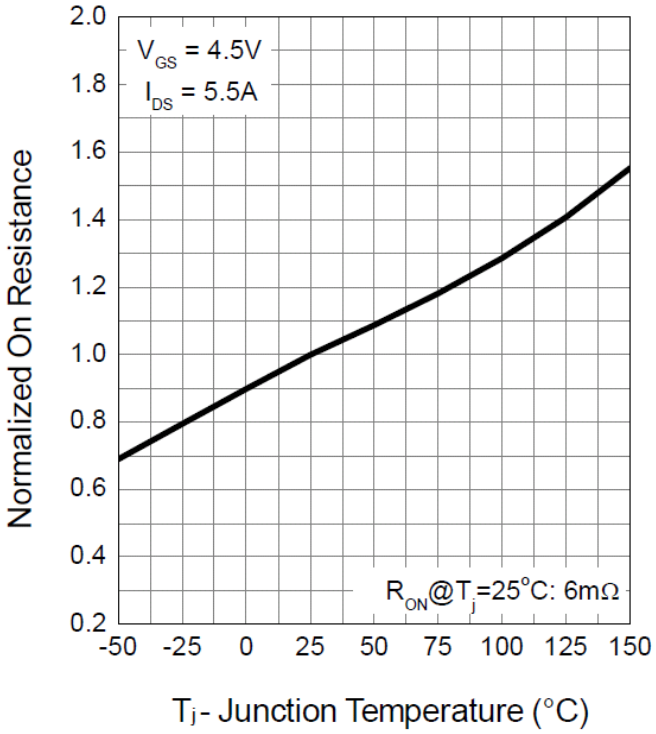


Gate Threshold Voltage

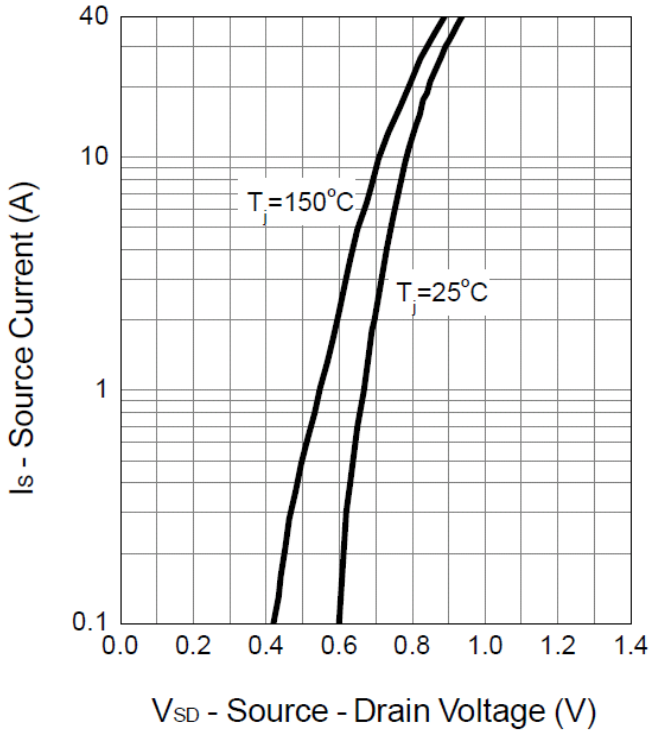


Typical Operating Characteristics(Cont.)

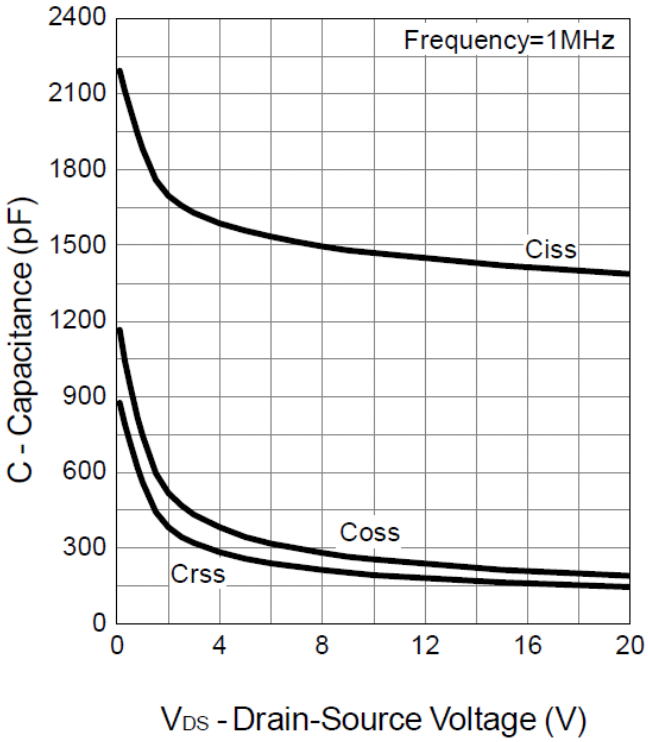
Drain-Source On Resistance



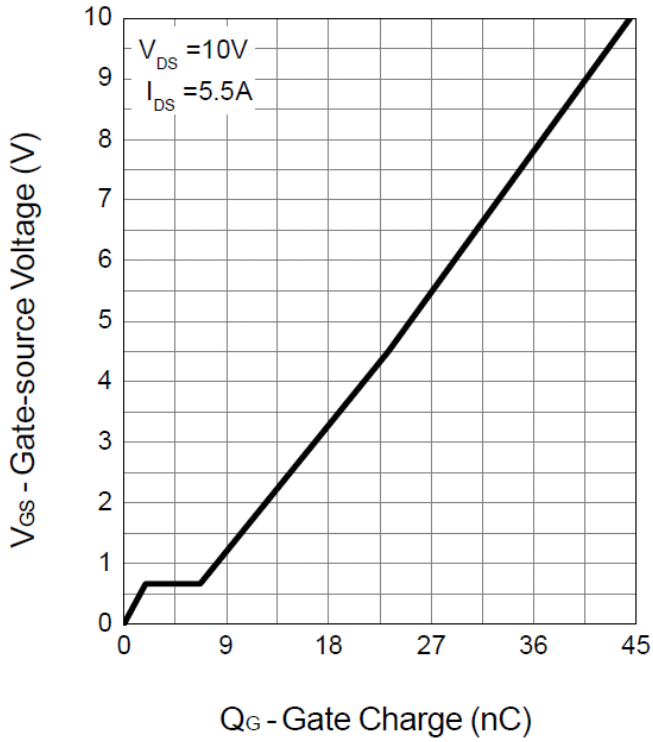
Source-Drain Diode Forward



Capacitance

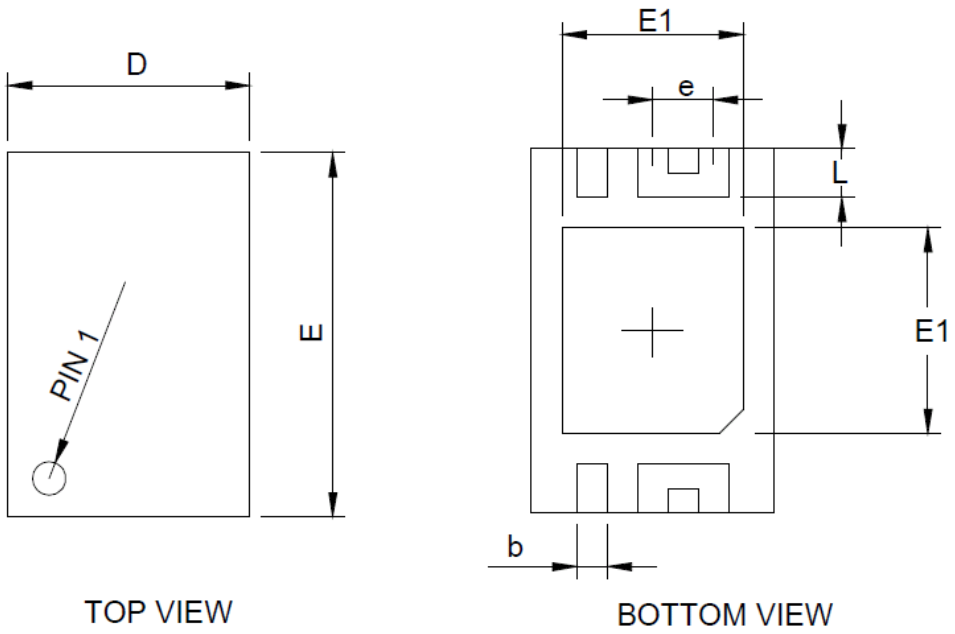


Gate Charge



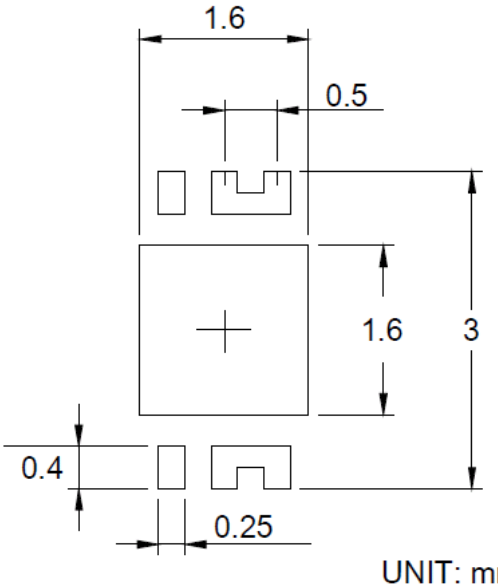
Package Information

DFN2X3A-6_EP Package



SYMBOL	DFN2x3A-6_EP1_S			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
A3	0.203 REF		0.008 REF	
b	0.20	0.30	0.008	0.012
D	1.90	2.10	0.075	0.083
E1	1.60	1.80	0.063	0.071
E	2.90	3.10	0.114	0.122
D1	1.40	1.60	0.055	0.063
e	0.50 BSC		0.02 BSC	
L	0.30	0.50	0.012	0.020

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes