

WPM1481
Single P-Channel, -12V, -5.1A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

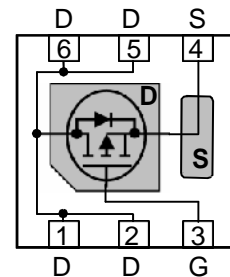
V _{DS} (V)	Typical R _{ds(on)} (Ω)	I _D (A)
-12	0.024 @ V _{GS} = - 4.5V	-5.5
	0.032 @ V _{GS} = - 2.5V	-4.0
	0.047 @ V _{GS} = - 1.8V	-2.5



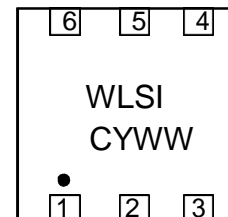
DFN2*2-6L

Descriptions

The WPM1481 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R_{DS (ON)} with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM1481 is Pb-free.


Pin configuration (Top view)
Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package DFN2*2-6L



WLSI = Company Code
 C = Device Code
 Y = Year
 WW = Week

Marking
Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

Device	Package	Shipping
WPM1481- 6/TR	DFN2*2-6L	3000/Reel&Tape

Absolute Maximum ratings

Parameter		Symbol	10 S	Steady State	Unit
Drain-Source Voltage		V_{DS}	-12		V
Gate-Source Voltage		V_{GS}	± 12		
Continuous Drain Current ^{a d}	$T_A=25^\circ\text{C}$	I_D	-5.1	-4.3	A
	$T_A=70^\circ\text{C}$		-4.0	-3.4	
Maximum Power Dissipation ^{a d}	$T_A=25^\circ\text{C}$	P_D	1.9	1.4	W
	$T_A=70^\circ\text{C}$		1.2	0.9	
Continuous Drain Current ^{b d}	$T_A=25^\circ\text{C}$	I_D	-3.7	-3.0	A
	$T_A=70^\circ\text{C}$		-3.0	-2.4	
Maximum Power Dissipation ^{b d}	$T_A=25^\circ\text{C}$	P_D	1.0	0.6	W
	$T_A=70^\circ\text{C}$		0.6	0.4	
Pulsed Drain Current ^c		I_{DM}	-24		A
Operating Junction Temperature		T_J	-55~150		$^\circ\text{C}$
Lead Temperature		T_L	260		$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55 ~150		$^\circ\text{C}$

Thermal resistance ratings

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	49	64	$^\circ\text{C/W}$
	Steady State		66	88	
Junction-to-Ambient Thermal Resistance ^b	$t \leq 10 \text{ s}$	$R_{\theta JA}$	84	118	
	Steady State		125	180	
Junction-to-Case Thermal Resistance		$R_{\theta JC}$	32	42	

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR-4 board using minimum pad size, 1oz copper

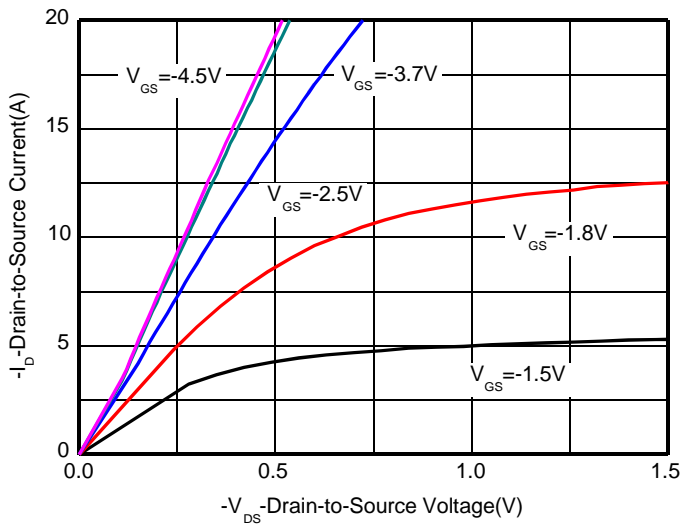
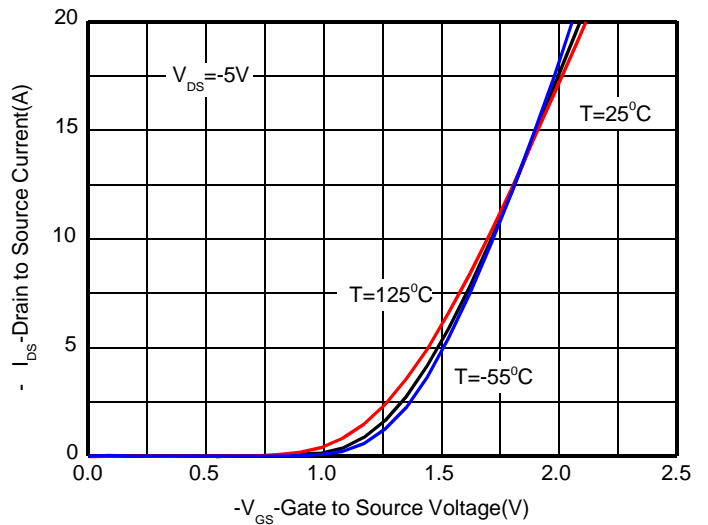
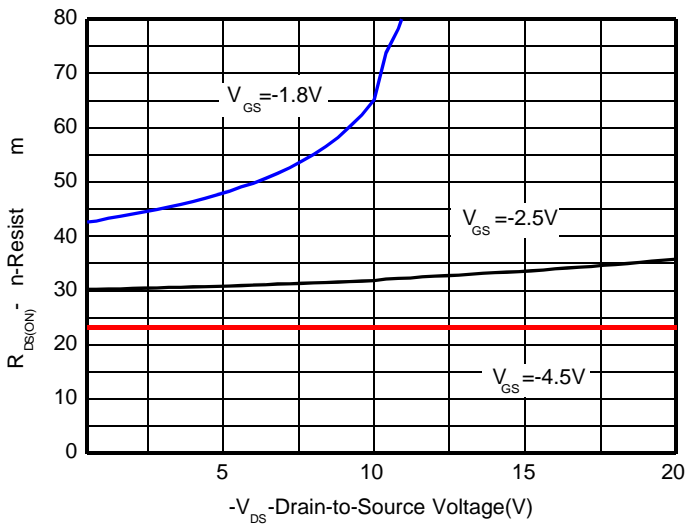
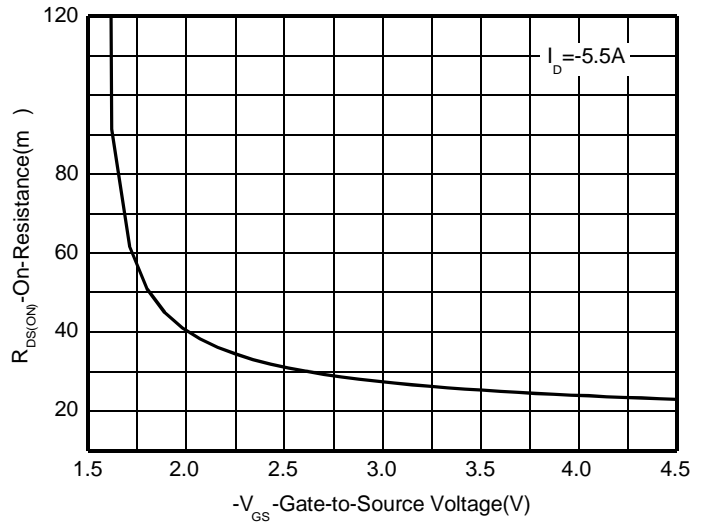
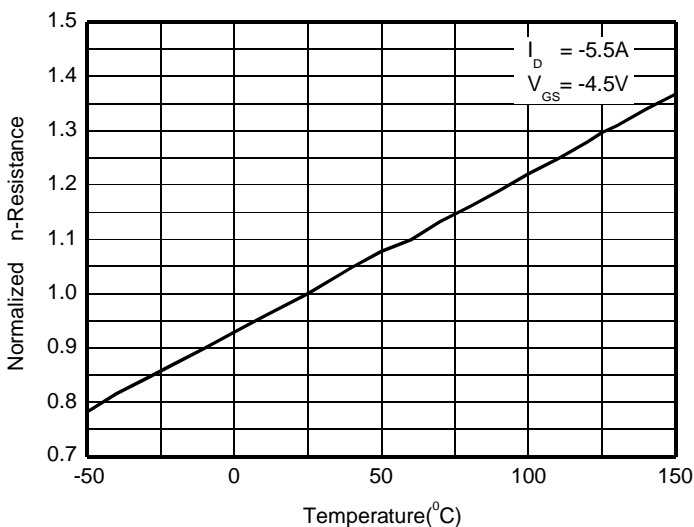
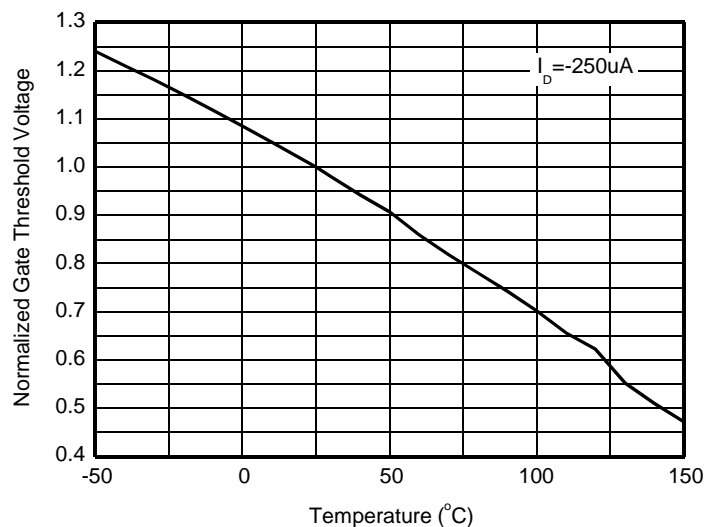
c Pulse width < 380 μs , Single pulse

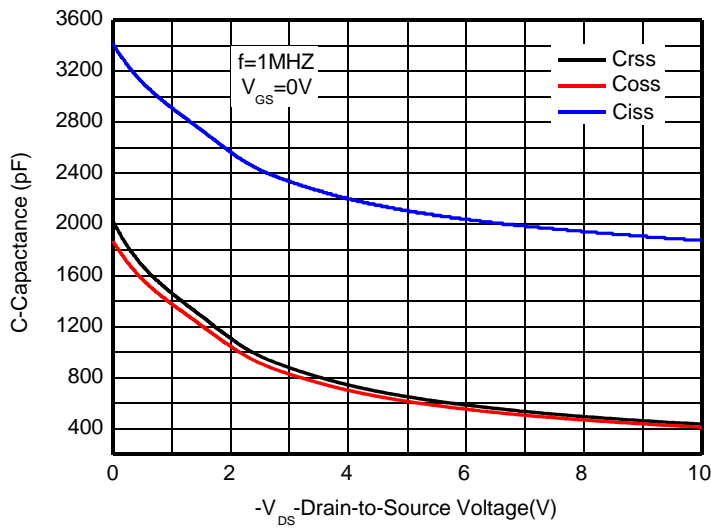
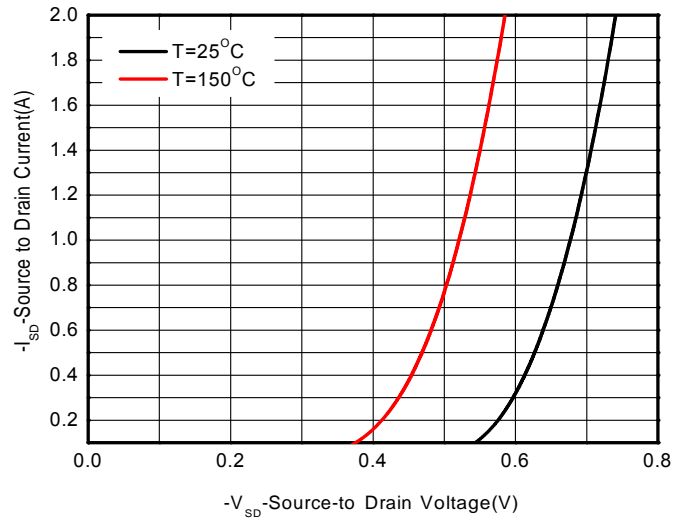
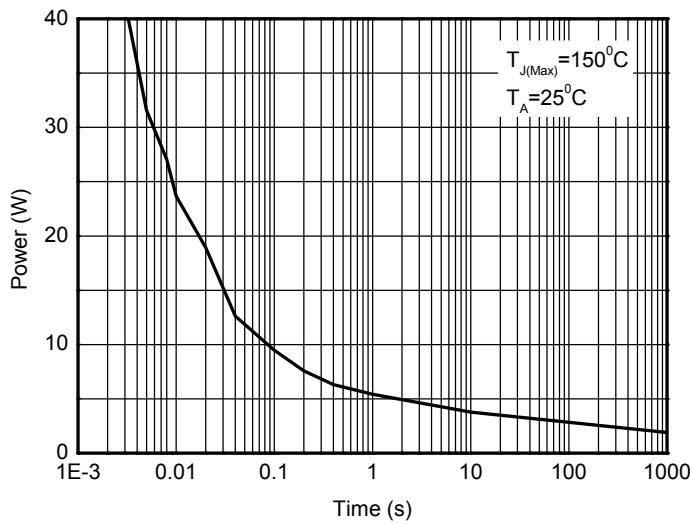
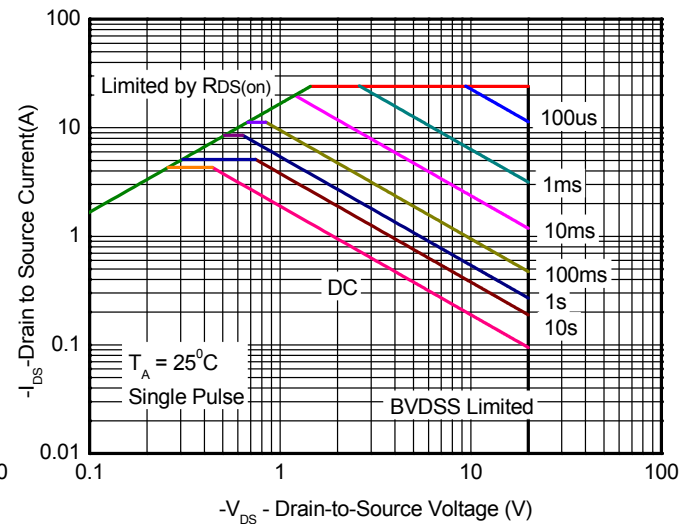
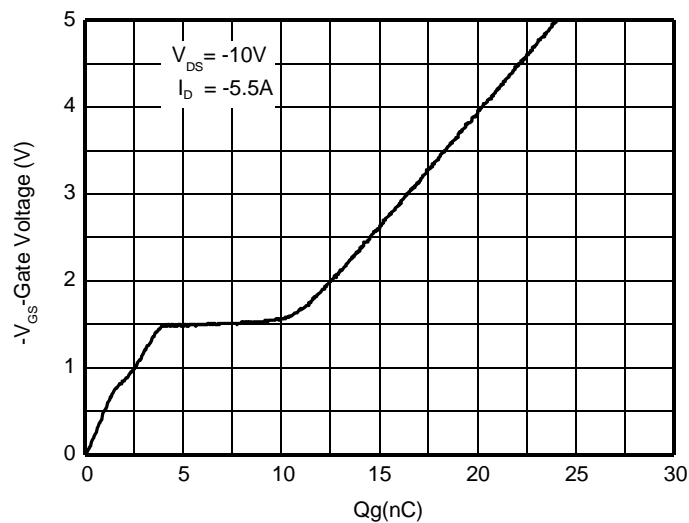
d Maximum junction temperature $T_J=150^\circ\text{C}$.

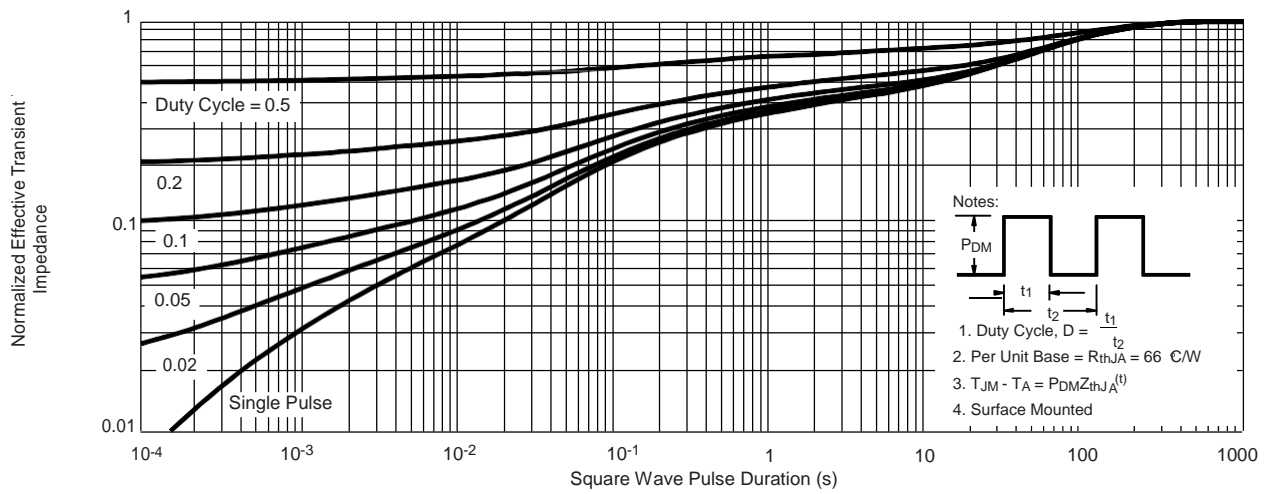
e Pulse test: Pulse width < 380 μs duty cycle < 2%.

Electronics Characteristics (Ta=25°C, unless otherwise noted)

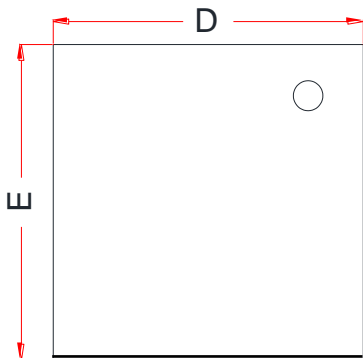
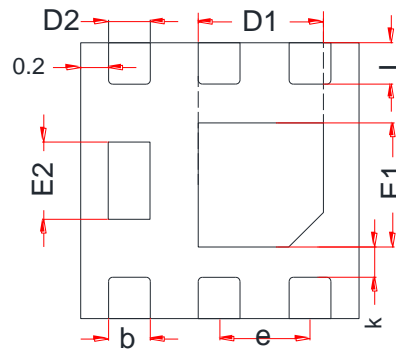
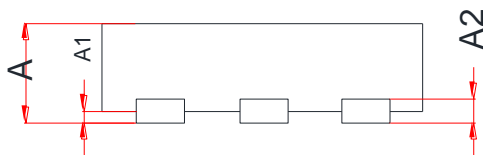
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = -250uA	-12			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -10V, V _{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±10V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = -250uA	-0.4		-0.9	V
Drain-to-source On-resistance ^{b, e}	R _{DS(on)}	V _{GS} = -4.5V, I _D = -5.5A		24	28	mΩ
		V _{GS} = -4.0V, I _D = -4.0A		26	30	
		V _{GS} = -2.5V, I _D = -4.0A		32	40	
		V _{GS} = -1.8V, I _D = -2.5A		47	61	
Forward Transconductance ^e	g _{FS}	V _{DS} = -5.0V, I _D = -5.5A		23		S
CAPACITANCES, CHARGES						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = -10 V		1880		pF
Output Capacitance	C _{OSS}			437		
Reverse Transfer Capacitance	C _{RSS}			413		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = -4.5 V, V _{DS} = -10 V, I _D = -5.5A		44.5		nC
Threshold Gate Charge	Q _{G(TH)}			3.5		
Gate-to-Source Charge	Q _{GS}			1.7		
Gate-to-Drain Charge	Q _{GD}			9.25		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	td _(ON)	V _{GS} = -4.5 V, V _{DS} = -6 V, R _L = 3 Ω, R _G = 6 Ω		33.6		ns
Rise Time	tr			35.6		
Turn-Off Delay Time	td _(OFF)			50		
Fall Time	tf			63		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 1.0A		-0.76	-1.5	V

Typical Characteristics (Ta=25°C, unless otherwise noted)

Output characteristics

Transfer characteristics

On-Resistance vs. Drain current

On-Resistance vs. Gate-to-Source voltage

On-Resistance vs. Junction temperature

Threshold voltage vs. Temperature

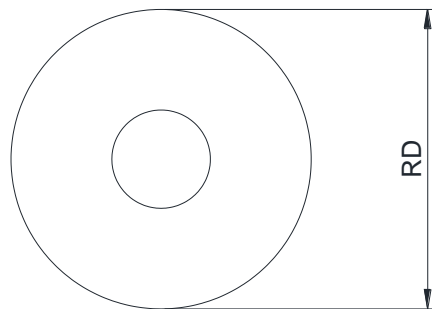
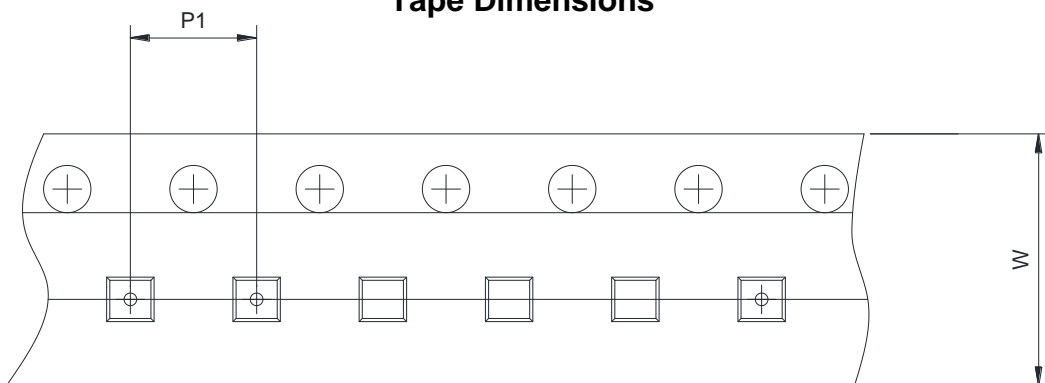
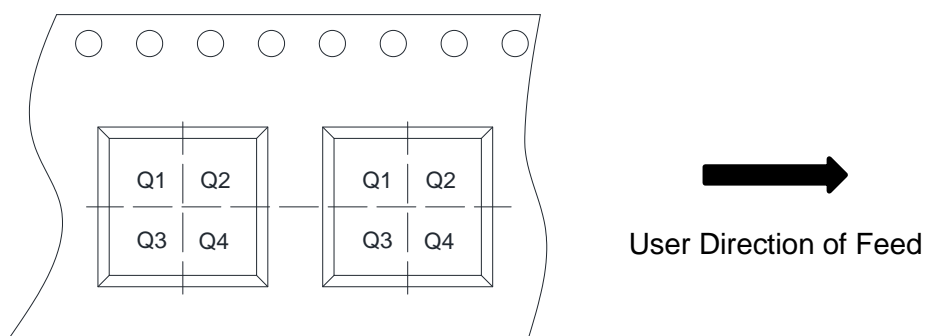

Capacitance

Body diode forward voltage

Single pulse power

Safe operating power

Gate Charge Characteristics



Transient thermal response (Junction-to-Ambient)

PACKAGE OUTLINE DIMENSIONS
DFN2x2-6L

TOP VIEW

BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.70	0.75	0.85
A1	0.00	0.02	0.05
A2	0.20 Ref.		
b	0.25	0.30	0.35
D	1.95	2.00	2.05
D1	0.85	0.90	0.95
D2	0.25	0.30	0.35
E	1.95	2.00	2.05
E1	0.75	0.80	0.85
E2	0.56 Ref.		
e	0.65 BSC.		
L	0.30	0.35	0.40
K	0.20	-	-

TAPE AND REEL INFORMATION
Reel Dimensions

Tape Dimensions

Quadrant Assignments For PIN1 Orientation In Tape


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch <input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm <input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input type="checkbox"/> 2mm <input checked="" type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1 <input type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4