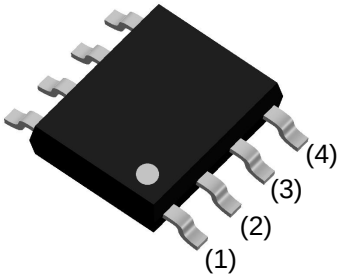
WCM4616

N- and P-Channel Complementary, 20V,MOSFET **http://www.sh-willsemi.com**

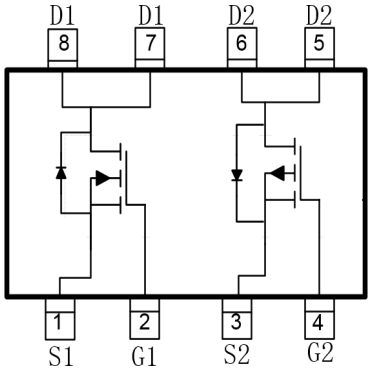
V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
N-Channel 20	0.020@V_{GS}=10V
	0.023@V_{GS}=4.5V
P-Channel -20	0.028@V_{GS}=-10V
	0.035@V_{GS}=-4.5V



SOP-8L

Descriptions

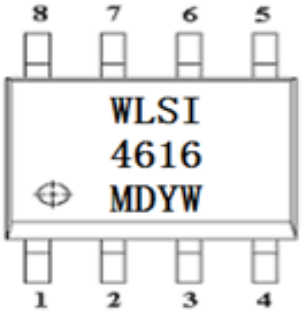
The WCM4616 is the N-Channel and P-Channel enhancement MOS Field Effect Transistor as a single package for DC-DC converter or level shift applications, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Standard Product WCM4616 is Pb-free and Halogen-free.



Pin configuration (Top View)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Package SOP-8L



4616 = Device Code
MD = Special Code
Y = Year
W =Week(A~z)

Marking

Applications

- Driver: Relays, Solenoids, Lamps, Hammers
- Power supply converters circuit
- Load/Power Switching for portable device

Order Information

Device	Package	Shipping
WCM4616-8/TR	SOP-8L	4000/Tape&Reel

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter		N-Channel		P-Channel		Unit
			10 s	Steady State	10 s	Steady State	
V_{DSS}	Drain-to-Source Voltage		20		-20		V
V_{GSS}	Gate-to-Source Voltage		±20		±20		V
I_D	Continuous Drain Current [a d]	T_A=25°C	6.5	5.1	-6.4	-5.0	A
		T_A=70°C	5.2	4.1	-5.1	-4.0	
P_D	Power Dissipation [a d]	T_A=25°C	1.9	1.2	1.8	1.1	W
		T_A=70°C	1.2	0.8	1.1	0.7	
I_D	Continuous Drain Current [b d]	T_A=25°C	6.0	4.9	-5.9	-4.8	A
		T_A=70°C	4.8	3.9	-4.7	-3.8	
P_D	Power Dissipation [b d]	T_A=25°C	1.6	1.1	1.5	1.0	W
		T_A=70°C	1.1	0.7	1.0	0.6	
I_{DM}	Pulsed Drain Current [c]		26		-25		A
T_J	Operation junction temperature		-55 to 150				°C
T_L	Lead Temperature		260				°C
T_{stg}	Storage temperature range		-55 to 150				°C

Thermal Resistance Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	56	65	°C/W
	Steady State		87	105	
Junction-to-Ambient Thermal Resistance [b]	t ≤ 10 s	$R_{\theta JA}$	64	76	
	Steady State		96	115	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	32	40	

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR4 board using minimum pad size, 1oz copper

c Repetitive rating, pulse width limited by junction temperature, tp=10μs, Duty Cycle=1%

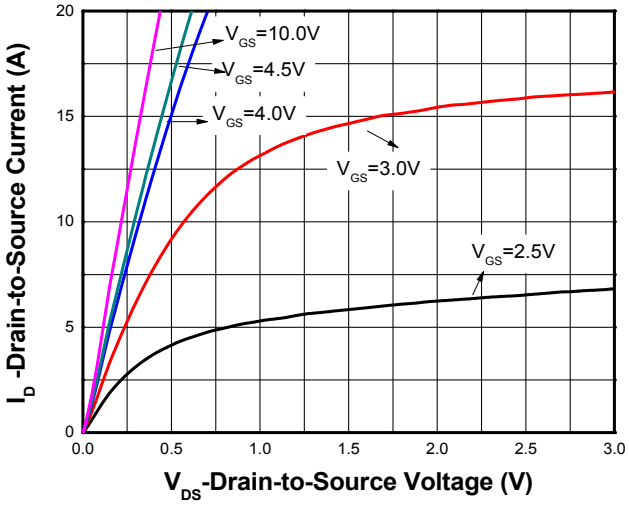
d Repetitive rating, pulse width limited by junction temperature TJ=150°C.

Electronics Characteristics (T_A=25°C unless otherwise noted)

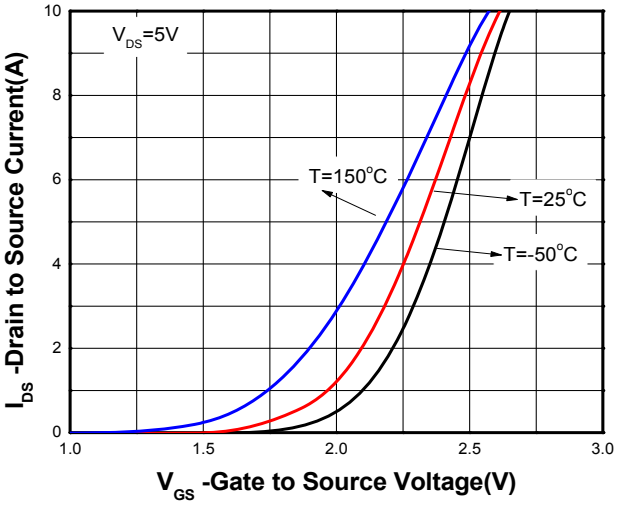
Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
Off Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	N-Ch	20			V
		V_{GS}=0V, I_D=-250uA	P-Ch	-20			
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	N-Ch			1	uA
		V_{DS}=-16V, V_{GS}=0V	P-Ch			-1	
I_{GSS}	Gate –Source leakage current	V_{DS}=0V, V_{GS}=±20V	N-Ch			±100	nA
			P-Ch			±100	
ON Characteristics							
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250uA	N-Ch	1.0	1.5	2.5	V
		V_{DS}= V_{GS}, I_D=-250uA	P-Ch	-1.0	-1.5	-2.5	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V, I_D=6A	N-Ch		20	31	mΩ
		V_{GS}=-10V, I_D=-5.5A	P-Ch		23	35	
		V_{GS}=4.5V, I_D=5.0A	N-Ch		28	41	
		V_{GS}=-4.5V, I_D=-5.0A	P-Ch		35	45	
Dynamic Characteristics							
Ciss	Input Capacitance	Nmos： V_{DS}=15V,V_{GS}=0V, F=1MHz Pmos： V_{DS}=-15V,V_{GS}=0V, f=1MHz	N-Ch		429		pF
			P-Ch		1109		
Coss	Output Capacitance		N-Ch		81		
			P-Ch		167		
Crss	Reverse Transfer Capacitance		N-Ch		74		
			P-Ch		140		
td(on) [e]	Turn-On Delay Time	Nmos： V_{DD}=5V,V_{GS}=4.5V, I_D=3.0A, R_G=3Ω Pmos： VDD=-5V,VGS=-4.5V, ID=-3A, R_G=3Ω	N-Ch	4	12	24	ns
			P-Ch	9	27	54	
tr [e]	Turn-On Rise Time		N-Ch	3	11	22	
			P-Ch	7	22	44	
td(off) [e]	Turn-Off Delay Time		N-Ch	7	21	42	
			P-Ch	14	41	82	
tf [e]	Turn-Off Fall Time		N-Ch	3	10	20	
			P-Ch	8	24	48	
BODY DIODE CHARACTERISTICS							
V_{SD}	Forward Voltage	V_{GS} =0 V, I_S = 1.0A	N-Ch		0.75	1.5	V
		V_{GS} =0 V, I_S =-1.0A	P-Ch		-0.75	-1.5	

e Guaranteed by design

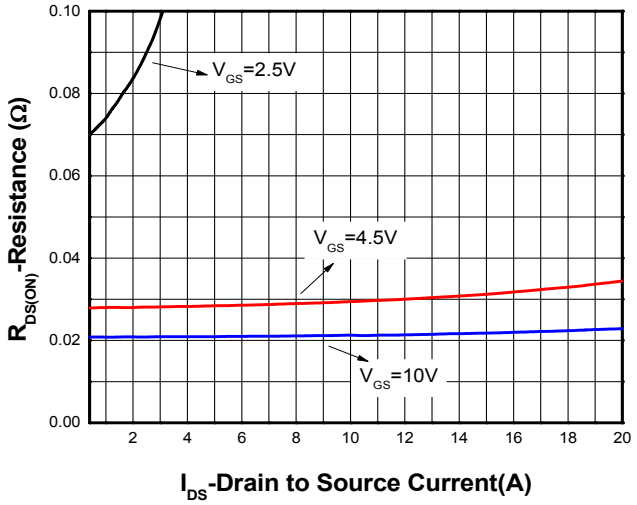
Typical Characteristics (N-Channel Ta=25℃, unless otherwise noted)



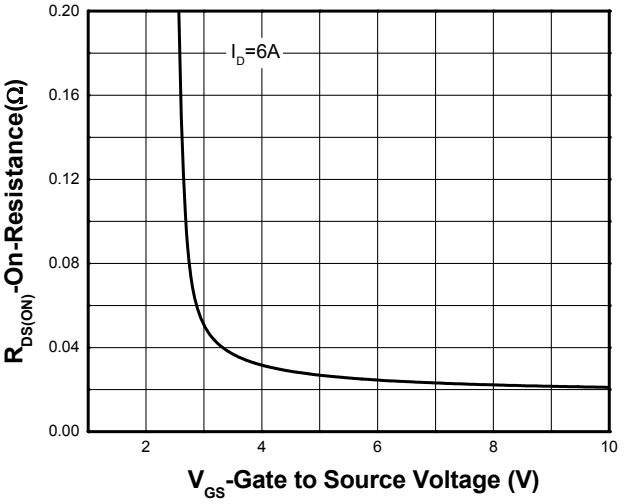
Output characteristics



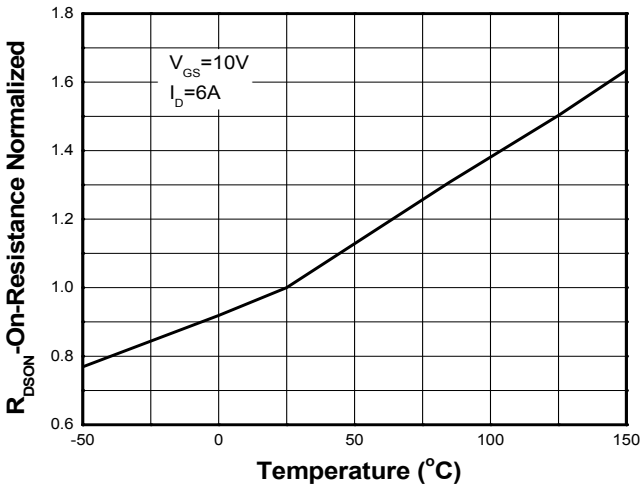
Transfer characteristics



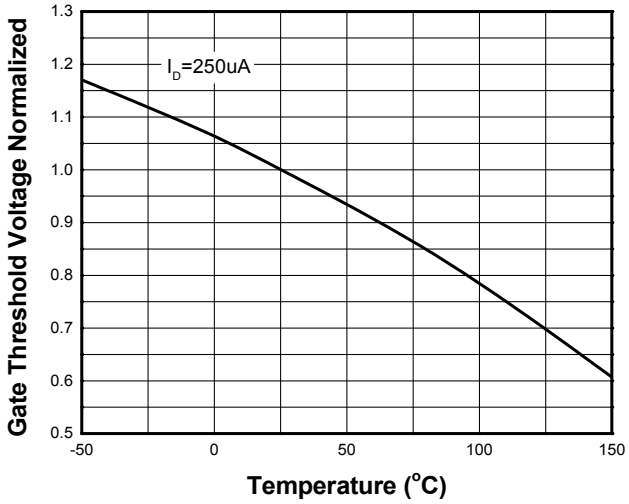
On-Resistance vs. Drain current



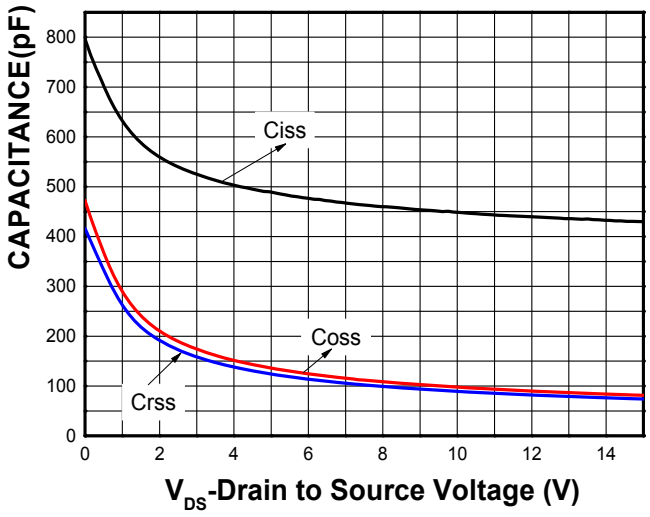
On-Resistance vs. Gate-to-source



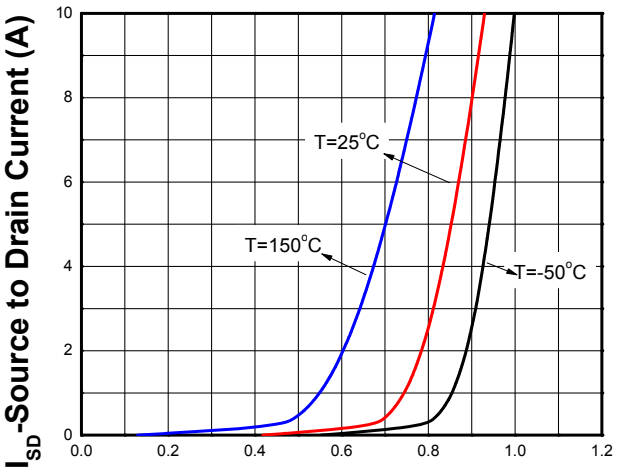
On-Resistance vs. Junction temperature



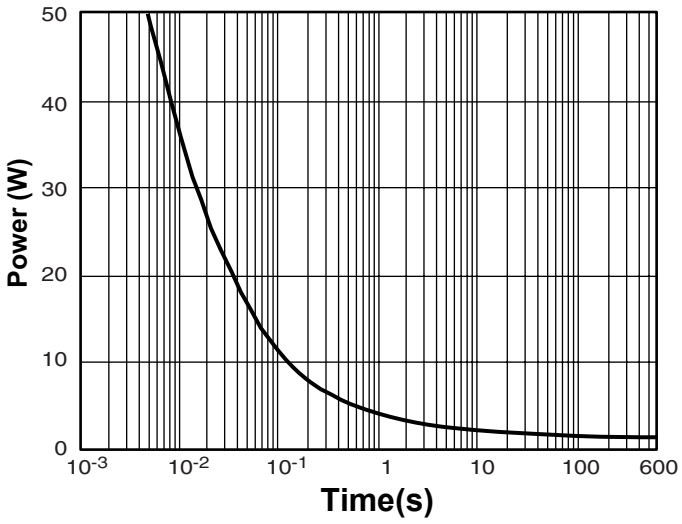
Threshold voltage vs. Temperature



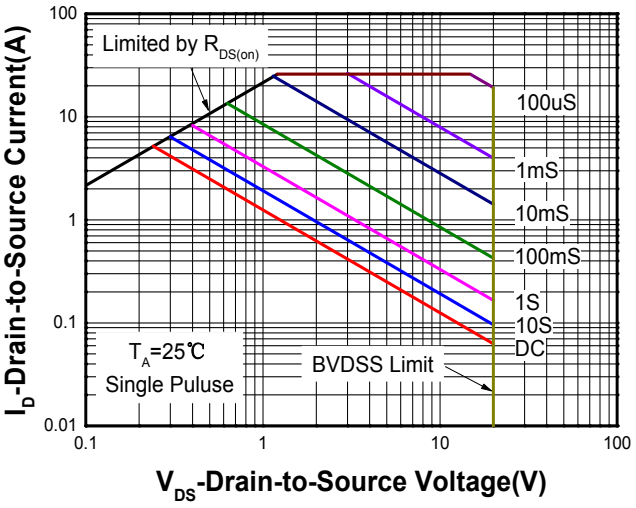
Capacitance



Body Diode Forward Voltage

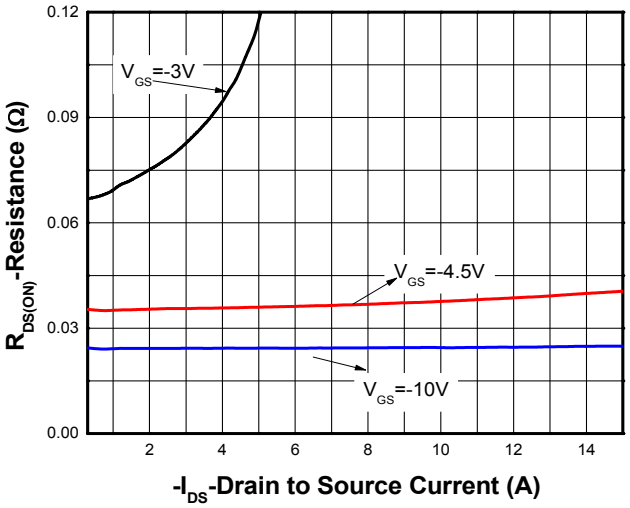


Single pulse power

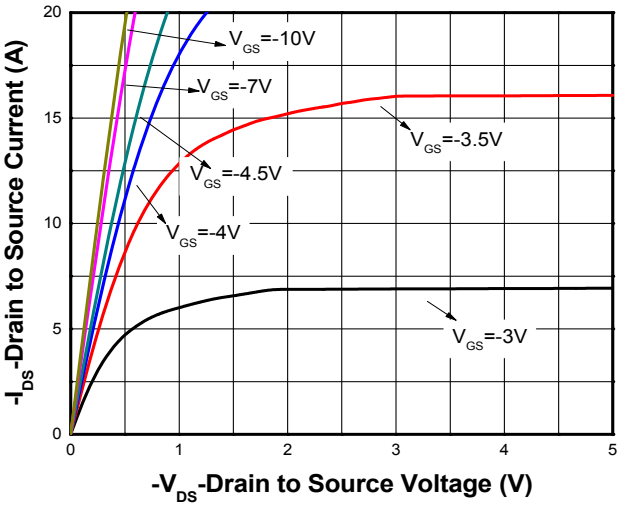


Safe operating power

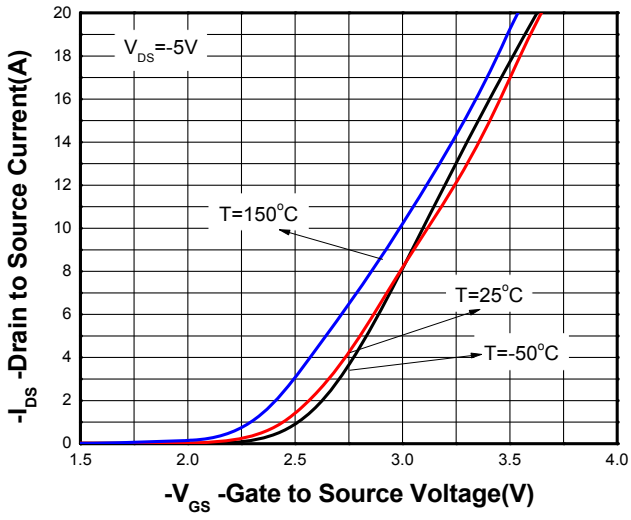
Typical Characteristics (P-Channel Ta=25℃, unless otherwise noted)



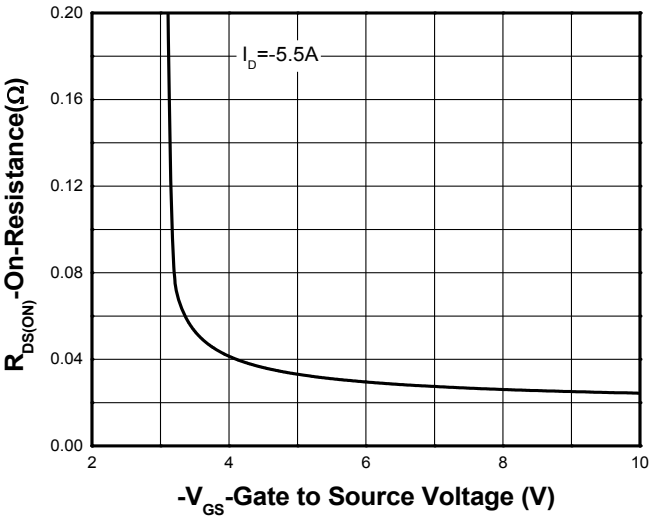
Output characteristics



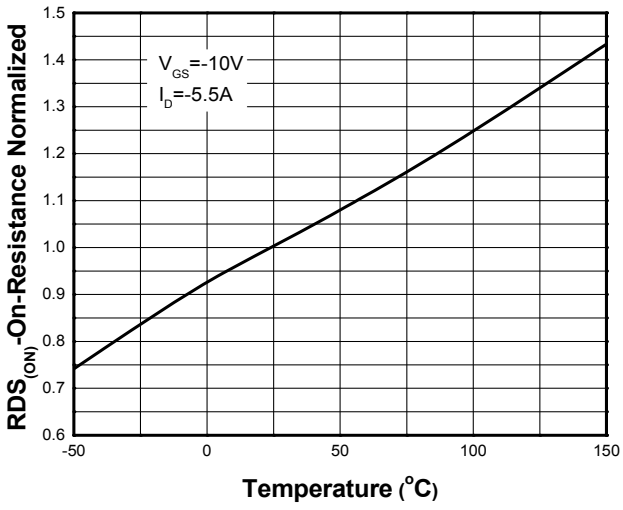
Transfer characteristics



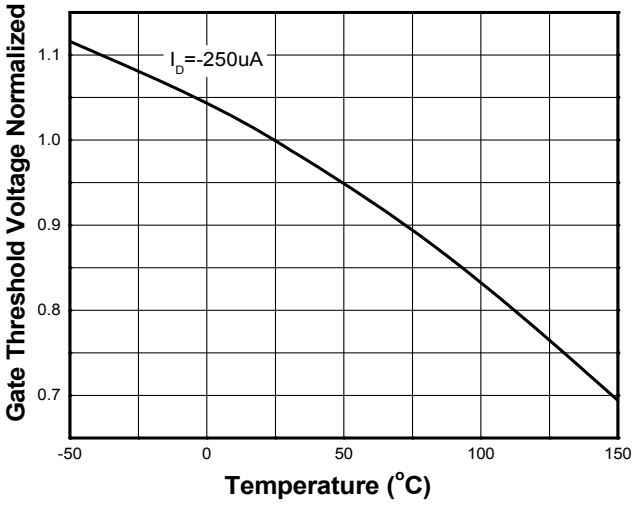
On-Resistance vs. Drain current



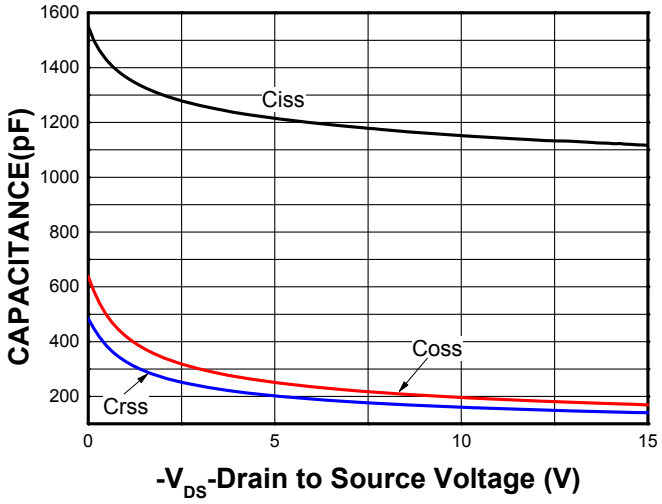
On-Resistance vs. Gate-to-source voltage



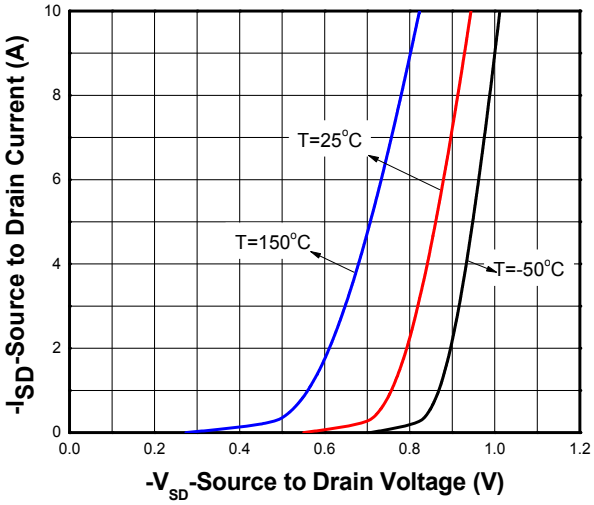
On-Resistance vs. Junction temperature



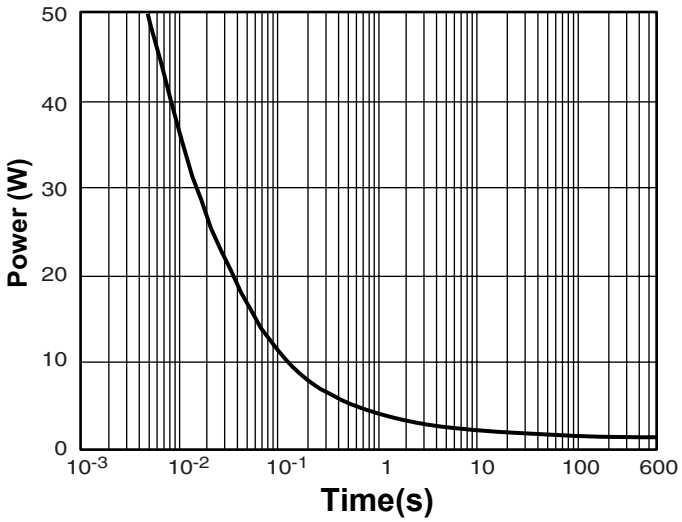
Threshold voltage vs. Temperature



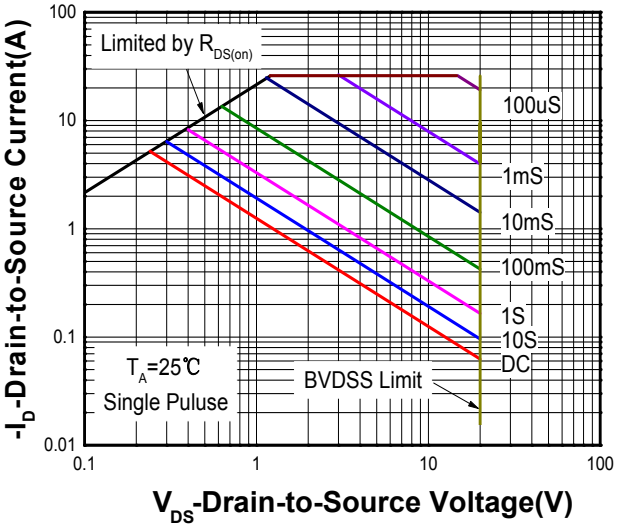
Capacitance



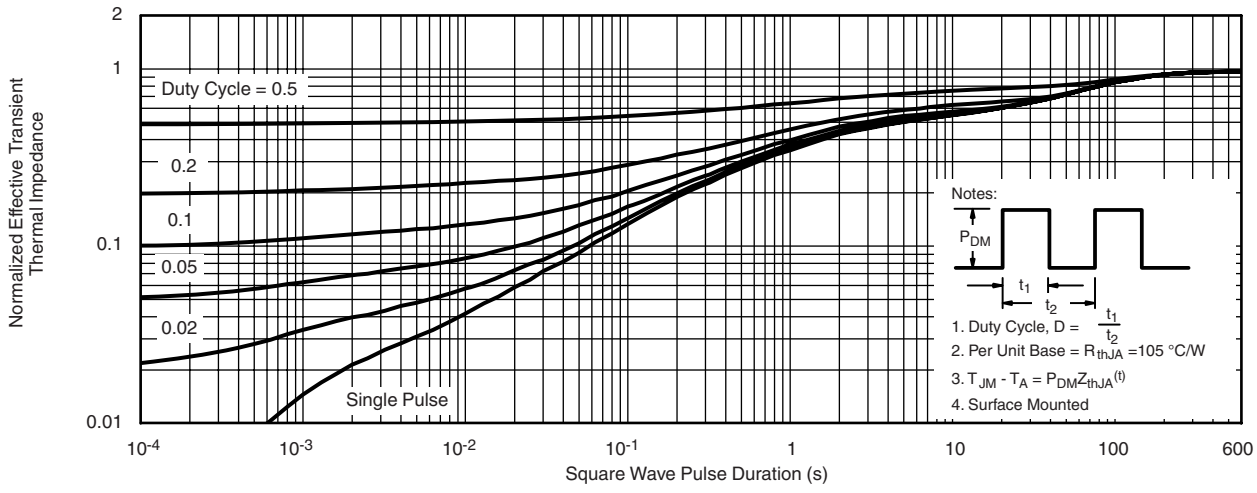
Body Diode Forward Voltage



Single pulse power



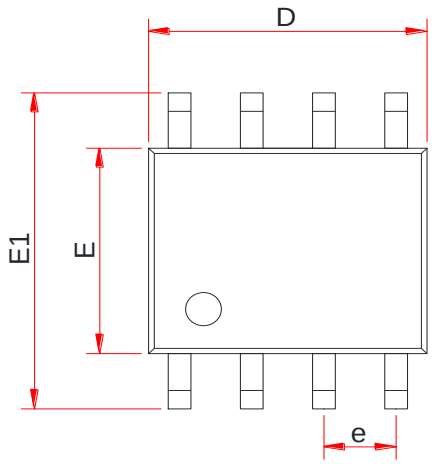
Safe operating power



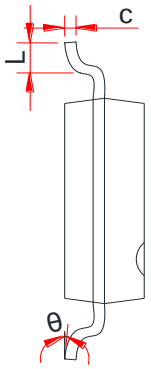
Normalized Thermal Transient Impedance, Junction-to-Ambient

PACKAGE OUTLINE DIMENSIONS

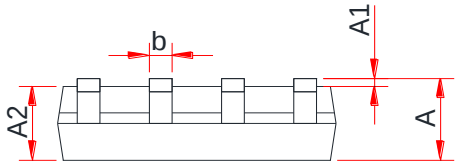
SOP-8L



TOP VIEW



SIDE VIEW

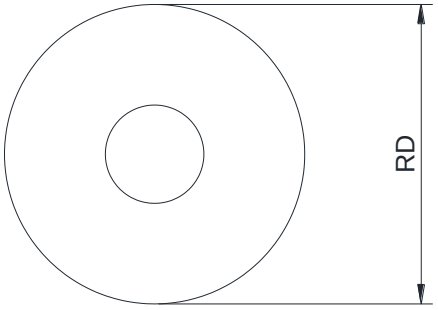


SIDE VIEW

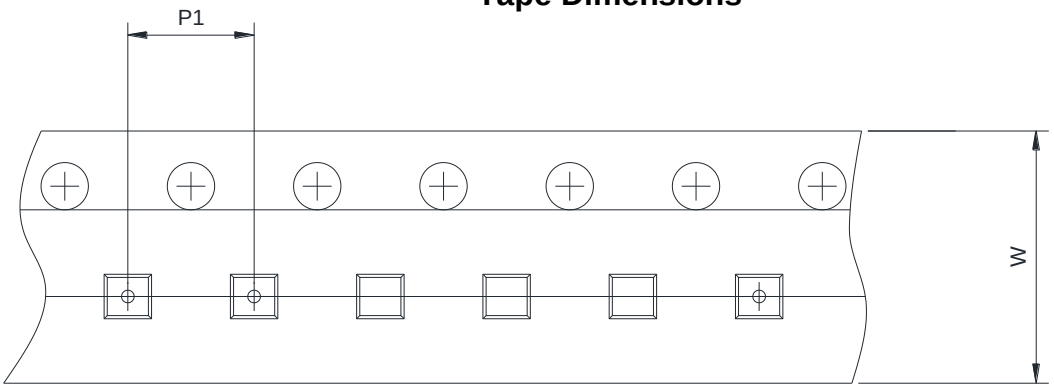
Symbol	Dimensions In Millimeters (mm)		
	Min.	Typ.	Max.
A	1.35	1.55	1.75
A1	0.05	0.15	0.25
A2	1.25	1.40	1.65
b	0.33	-	0.51
c	0.15	-	0.26
D	4.70	4.90	5.10
E	3.70	3.90	4.10
E1	5.80	6.00	6.20
e	1.27BSC		
L	0.40	-	1.27
θ	0°	-	8°

TAPE AND REEL INFORMATION

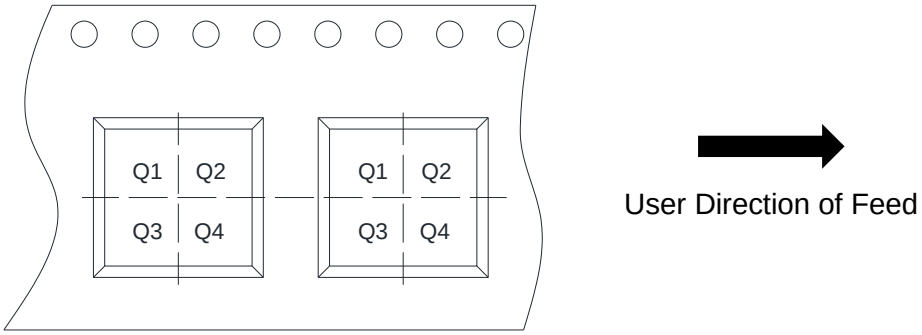
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☐ 7inch ☑ 13inch
W	Overall width of the carrier tape	☐ 8mm ☑ 12mm
P1	Pitch between successive cavity centers	☐ 2mm ☐ 4mm ☑ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4