

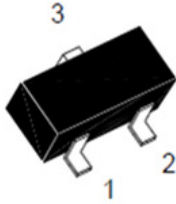
N-Channel Enhancement-Mode MOSFET (20V,6.5A)

PRODUCT SUMMARY

V _{DSS}	I _D	R _{DS(on)} (m-ohm) Max
20V	6.5A	22 @ V _{GS} = 4.5V, I _D =6.5A
		26 @ V _{GS} = 2.5V, I _D =5.5A
		34 @ V _{GS} = 1.8V, I _D =5.0A

◆ Features

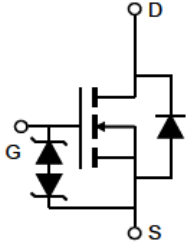
The SM3416 uses advanced trench technology to provide excellent R_{DS(ON)}, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD(2000V HBM) protected.



3
1 2

SM3416 Pin Assignment & Symbol


3-Lead Plastic SOT-23-3L
Pin1: Gate 2:Source 3:Drain





◆ Ordering Information

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
SM3416LRL	SM3416LRG	SOT-23-3L	G	S	D	Tape Reel

SM3416-LR-G

(1) Package Type 

(2) Packing Type 

(3) Lead Free 

(1) L: SOT-23-3L

(2) R: Tape Reel

(3) G: Halogen Free; L: Lead Free



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

Symbol	Parameter	Ratings	Units	
V _{DS}	Drain-Source Voltage	20	V	
V _{GS}	Gate-Source Voltage	±8	V	
I _D	Continuous Drain Current	TA=25°C	6.5	A
		TA=75°C	5.2	
I _{DM}	Drain Current (Pulsed) ^a	30	A	
P _D	Power Dissipation	TA=25°C	1.4	W
		TA=75°C	0.9	
I _S	Maximum Body-Diode Continuous Current	1	A	
T _j , T _{stg}	Operating Junction and Storage Temperature Range ^b	-55 to +150	°C	

Note: a. Repetitive Rating: Pulse width limited by the maximum junction temperature
 b. 1-in² 2oz Cu PCB board

◆ Electrical Characteristics (T_A=25°C, unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
• Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	-	-	1	uA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±8V, V _{DS} =0V	-	-	±10	uA
• On Characteristics^c						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	0.4		1	V
RDS(on)	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =6.5A	-		22	mΩ
		V _{GS} =2.5V, I _D =5.5A	-		26	
		V _{GS} =1.8V, I _D =5.0A			34	
g _{FS}	Forward Transconductance	V _{DS} =5 V, I _D =6.5A	-	50	-	S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Maximum Body-Diode Continuous Current		-	-	1	A
• Dynamic Characteristics^d						
C _{iss}	Input Capacitance	V _{DS} =10 V, V _{GS} =0V, f=1MHz	-	1160	-	pF
C _{oss}	Output Capacitance		-	104	-	
C _{rss}	Reverse Transfer Capacitance		-	29	-	
• Switching Characteristics^d						
Q _g	Total Gate Charge	V _{DS} =10V, I _D =6.5, V _{GS} =4.5V	-	10	-	nC
Q _{gs}	Gate-Source Charge		-	1.4	-	
Q _{gd}	Gate-Drain Charge		-	2.7	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} = 10V, R _L = 1.5Ω I _D = 1A, V _{GEN} = 5V R _G = 3Ω	-	6.2	-	nS
t _r	Turn-on Rise Time		-	12.7	-	
t _{d(off)}	Turn-off Delay Time		-	51.7	-	
t _f	Turn-off Fall Time		-	16	-	
• Drain-Source Diode Characteristics						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =1A	-	0.7	1.2	V

c. Pulse Test : Pulse Width < 300μs, Duty Cycle < 2%.

d. Guaranteed by design, not subject to production testing.

◆ Characteristics Curve (Ta=25°C, unless otherwise note)

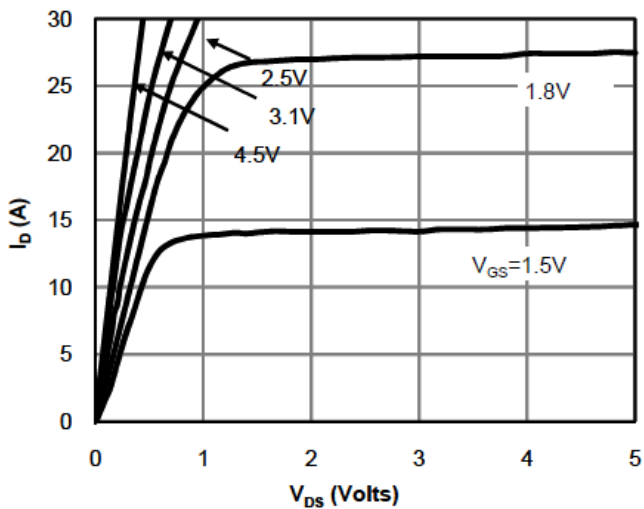


Fig 1: On-Region Characteristics (Note E)

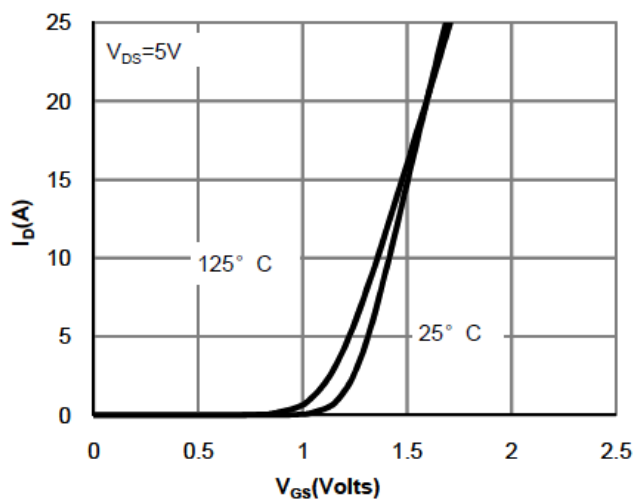


Figure 2: Transfer Characteristics (Note E)

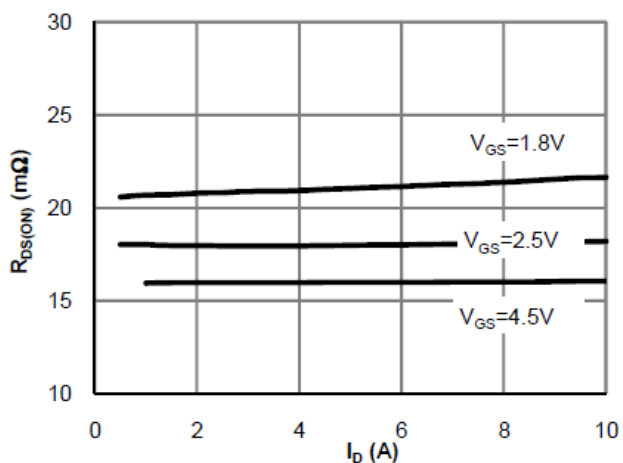


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

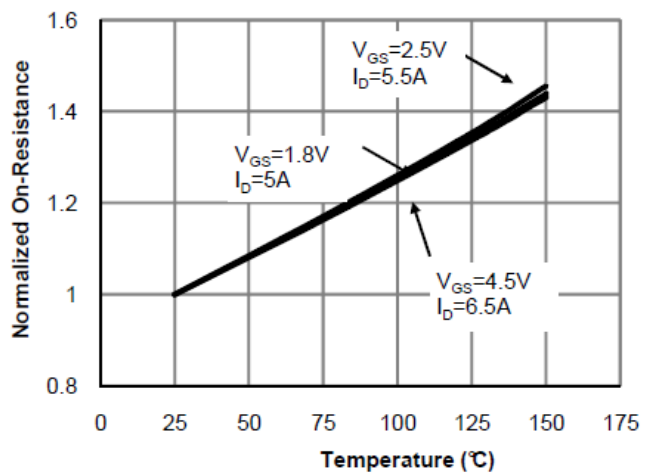


Figure 4: On-Resistance vs. Junction Temperature (Note E)

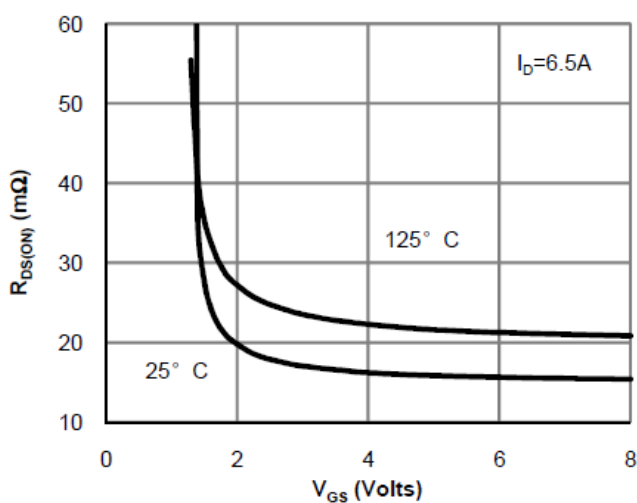


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

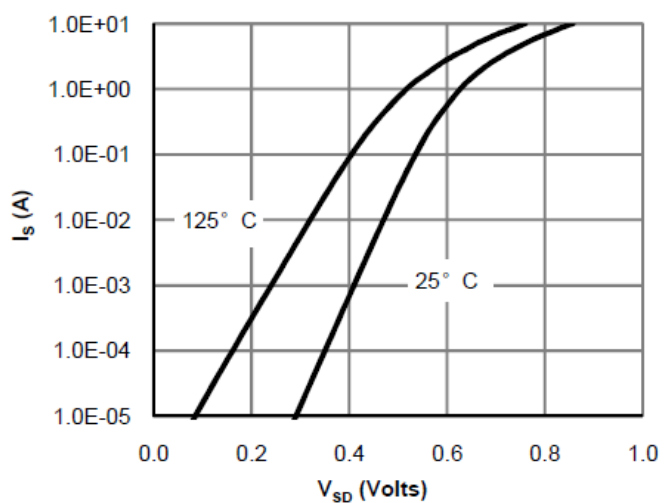


Figure 6: Body-Diode Characteristics (Note E)

◆ Characteristics Curve (Ta=25°C, unless otherwise note)

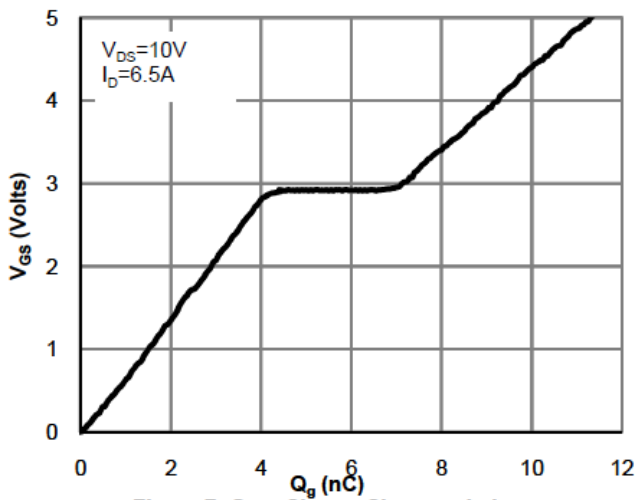


Figure 7: Gate-Charge Characteristics

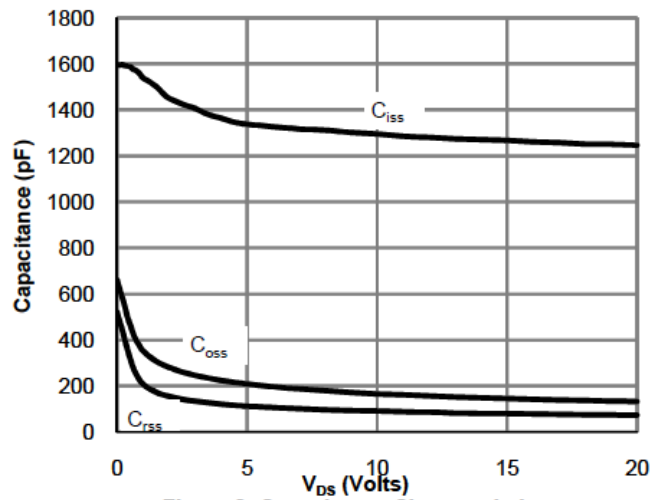


Figure 8: Capacitance Characteristics

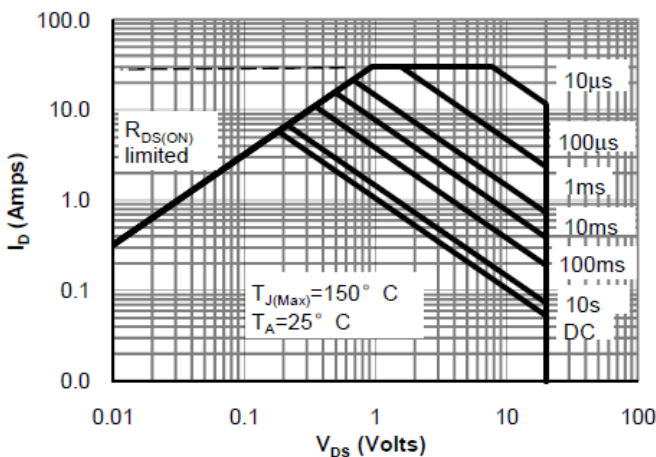


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

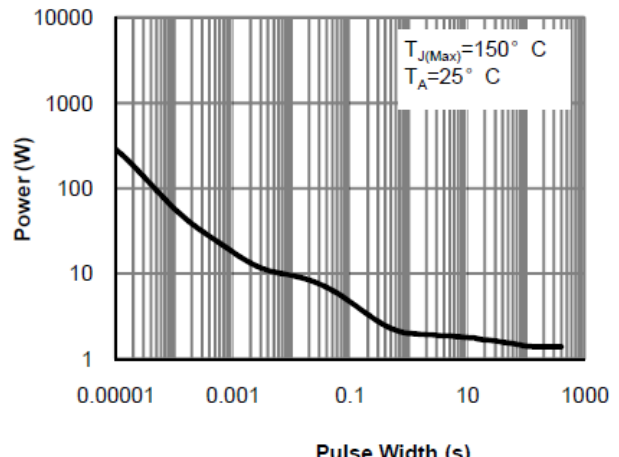


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

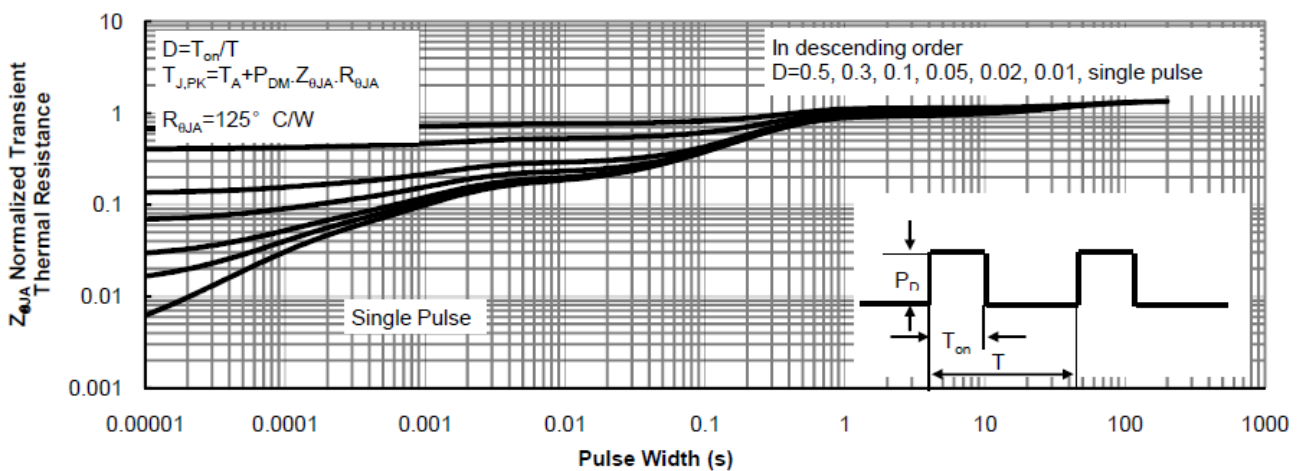


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

◆ Characteristics Curve (Ta=25°C, unless otherwise note)

