

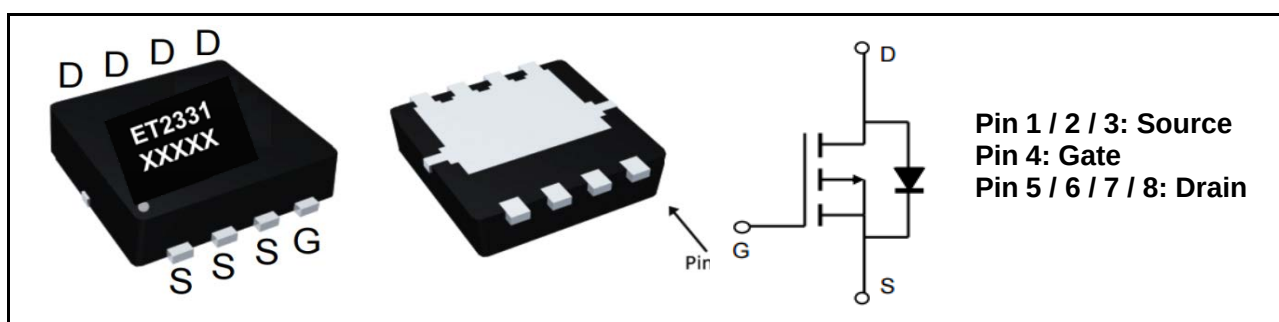
P-Channel Enhancement-Mode MOSFET (-20V, -58A)

PRODUCT SUMMARY

V_{DS}	I_D	$R_{DS(on)}$ (m Ω) Typ.
-20V	-58A	4.8 @ $V_{GS} = 4.5V, I_D = 20A$
		6.0 @ $V_{GS} = 2.5V, I_D = 10A$

Features

- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- Lead (Pb) -free and halogen-free



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

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current (Continuous) @ $T_A = 25^\circ C$	-58	A
	Drain Current (Continuous) @ $T_A = 75^\circ C$	-35	A
I_{DM}	Drain Current (Pulsed) ^a	-198	A
P_D	Total Power Dissipation @ $T_c = 25^\circ C$	38	W
	Total Power Dissipation @ $T_c = 75^\circ C$	25	W
I_S	Maximum Diode Forward Current	-58	A
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ C$
R_{QJA}	Thermal Resistance Junction to Ambient (PCB mounted) ^b	35	$^\circ C/W$

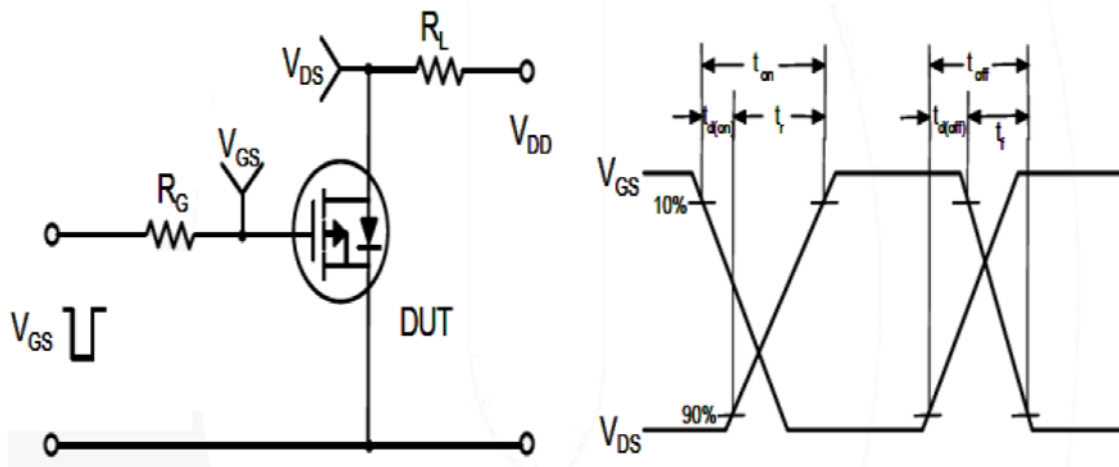
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in² 2oz Cu PCB board

Electrical Characteristics ($T_A=25^\circ\text{C}$, 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} =30V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
• On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	-0.50	-0.65	-0.90	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-20A	-	4.8	6.0	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	6.0	7.5	
• Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	-	4720	-	PF
C _{oss}	Output Capacitance		-	585	-	
C _{rss}	Reverse Transfer Capacitance		-	470	-	
• Switching Characteristics						
Q _g	Total Gate Charge	V _{DS} =-15V, I _D =1A, V _{GS} =-4.5V	-	98	-	nC
Q _{gs}	Gate-Source Charge		-	8	-	
Q _{gd}	Gate-Drain Charge		-	20	-	
t _{d(on)}	Turn-on Delay Time	V _{DD} =15V, I _D =1A, V _{GEN} =4.5V, R _G =6Ω	-	49	-	nS
t _r	Turn-on Rise Time		-	33	-	
t _{d(off)}	Turn-off Delay Time		-	67	-	
t _f	Turn-off Fall Time		-	21	-	
• Drain-Source Diode Characteristics						
V _{SD}	Drain-Source Diode Forward	V _{GS} =0V, I _S =20A	-	-	-1.2	V

Note: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$



Switching Time Test Circuit and waveforms

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

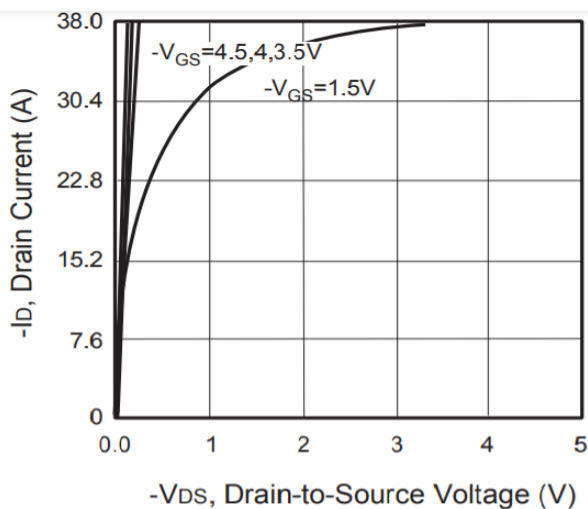


Figure 1. Output Characteristics

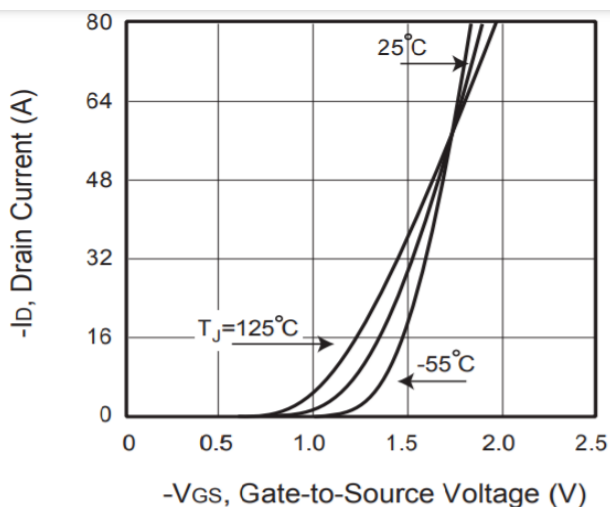


Figure 2. Transfer Characteristics

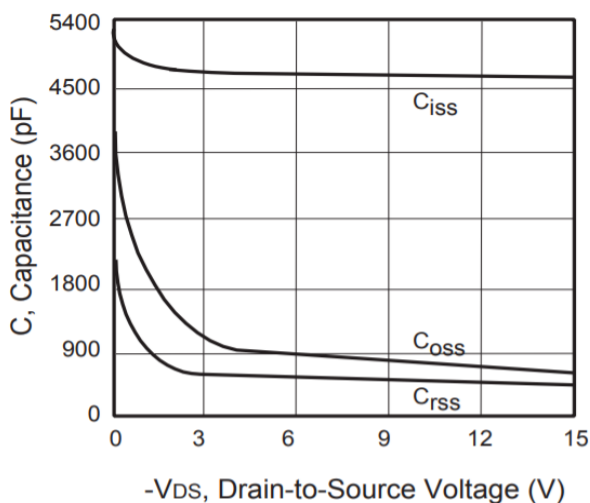


Figure 3. Capacitance

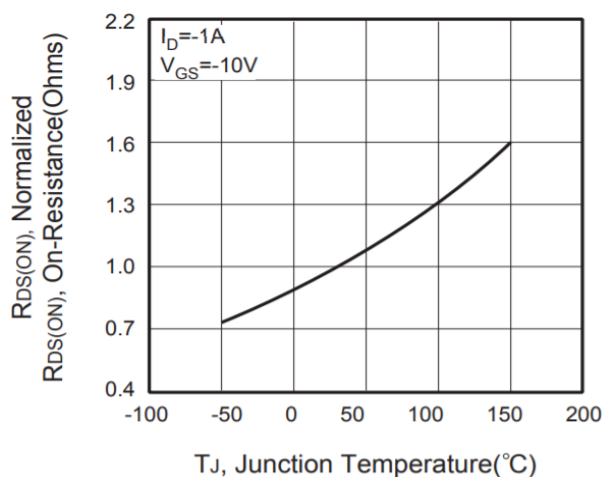


Figure 4. On-Resistance Variation with Temperature

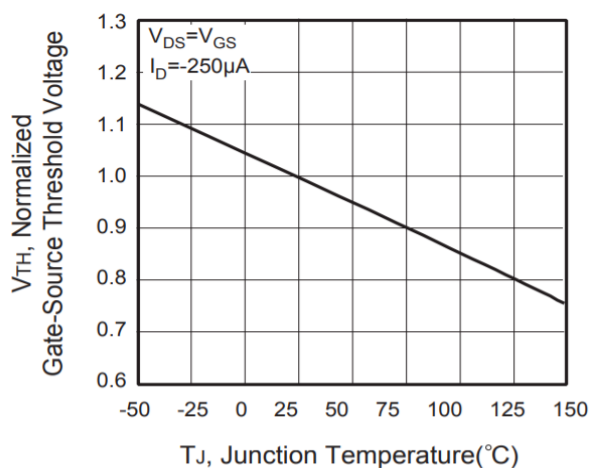


Figure 5. Gate Threshold Variation with Temperature

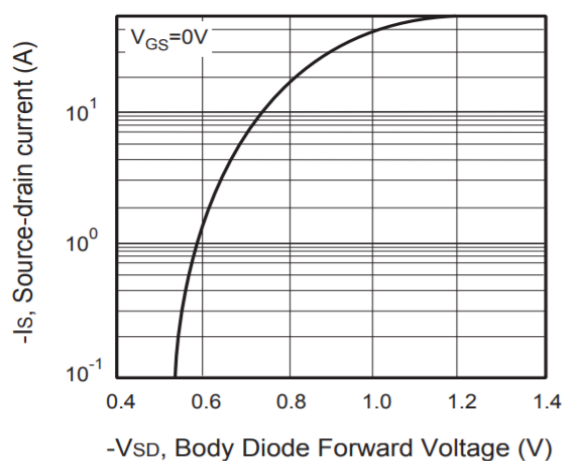


Figure 6. Body Diode Forward Voltage Variation with Source Current

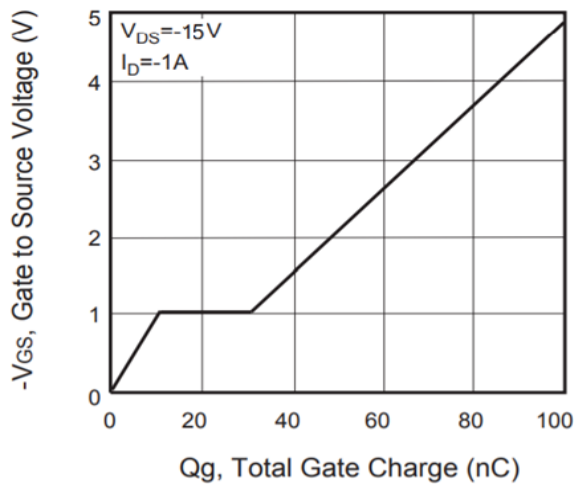


Figure 7. Gate Charge

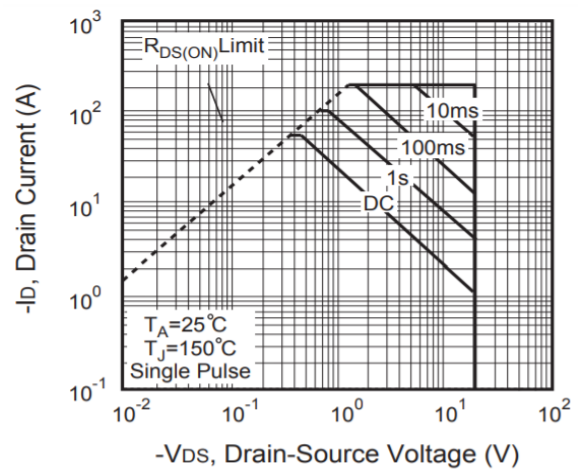


Figure 8. Maximum Safe Operating Area

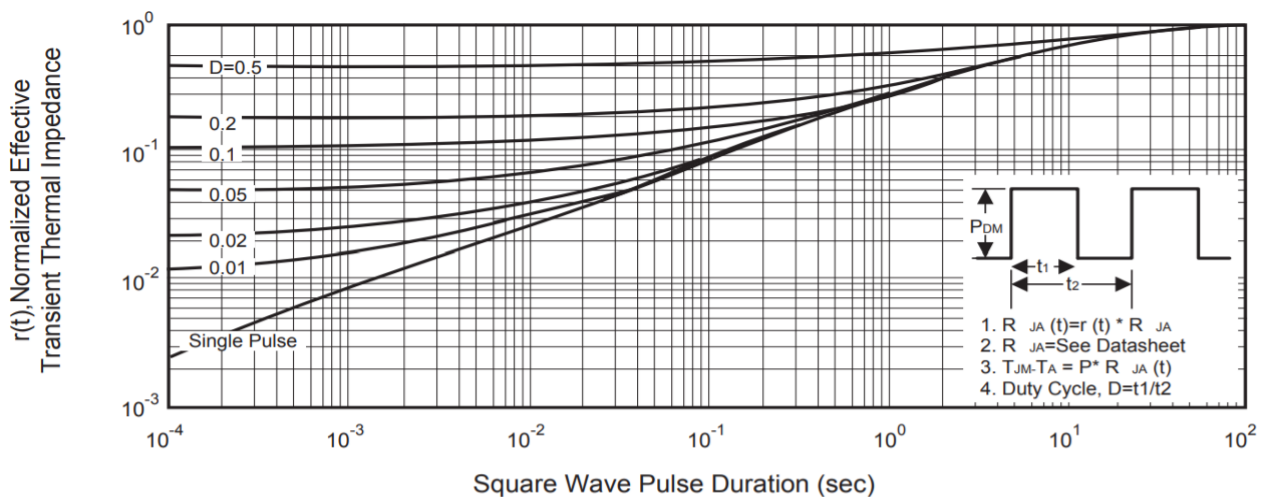
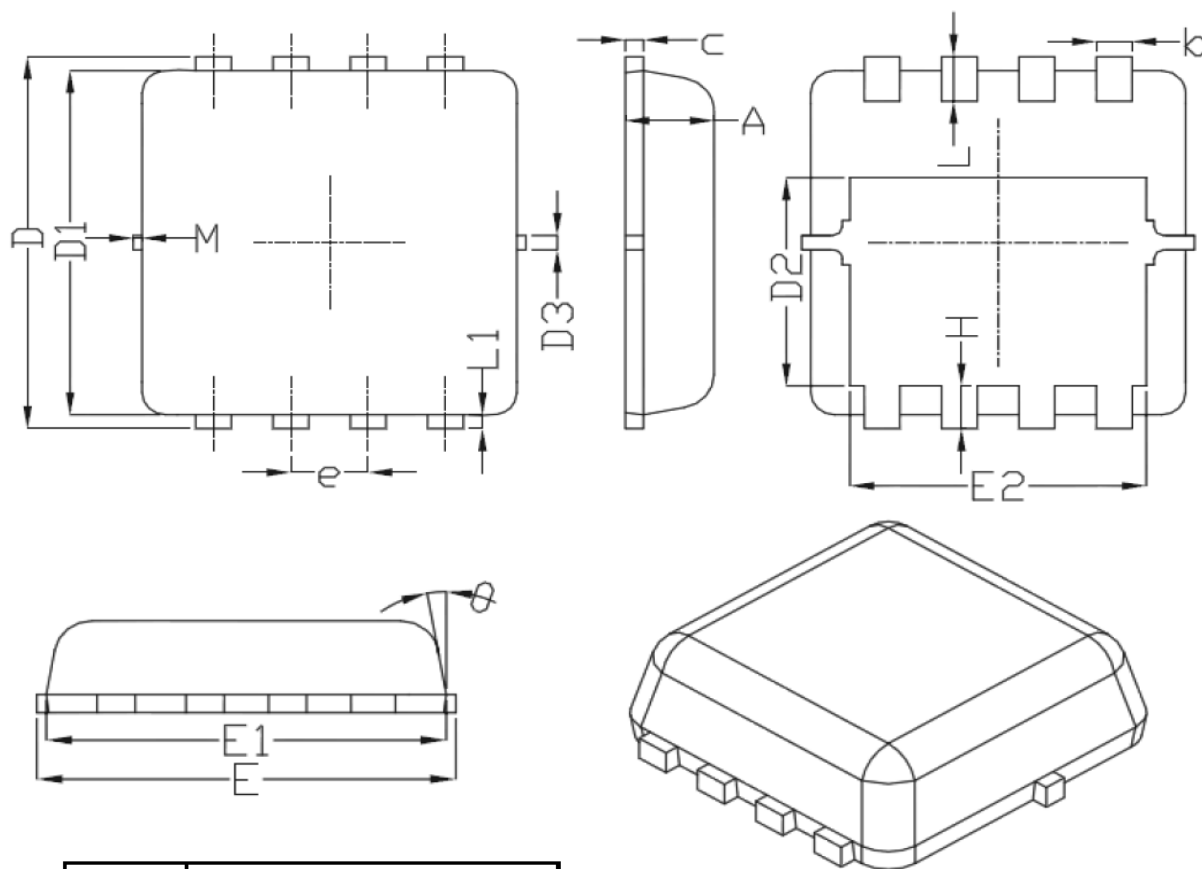


Figure 9. Normalized Thermal Transient Impedance Curve

PDFN3333 PACKAGE OUTLINE DIMENSIONS



Symbol	DIMENSIONS (unit : mm)		
	Min	Typ	Max
A	0.7	0.75	0.8
b	0.25	0.3	0.35
C	0.1	0.15	0.25
D	3.25	3.35	3.45
D1	3	3.1	3.2
D2	1.78	1.88	1.98
D3	--	0.13	--
E	3.2	3.3	3.4
E1	3	3.15	3.2
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.3	0.39	0.5
L	0.3	0.4	0.5
L1	--	0.13	--
θ	--	10°	12°
M	*	*	0.15