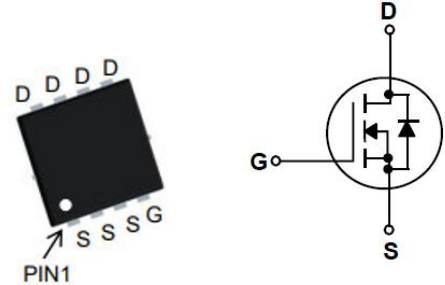


Features

- ◆ 30V, 40A, $R_{DS(ON)}(Typ.) = 4.6m\Omega @ V_{GS} = 10V$
- ◆ Lead Free
- ◆ Advanced Trench Technology
- ◆ Excellent $R_{DS(ON)}$ and Low Gate Charge

Application

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power Management



Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter		Rating	Unit
V_{DS}	Drain-Source Voltage ^a		30	V
V_{GS}	Gate-Source Voltage		± 20	
I_D	Drain Current-Continuous	$T_C = 25^\circ C$	40	A
		$T_C = 100^\circ C$	26	
I_{DM}	Drain Current-Pulsed ^b		160	
P_D	Maximum Power Dissipation @ $T_J = 25^\circ C$		35	W
E_{AS}	Single Pulsed Avalanche Energy ^c		100	mJ
T_J, T_{STG}	Operating and Store Temperature Range		150, -55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.6	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	43	

Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA



MU3010X

N-Channel Enhancement Mode MOSFET

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = 10V, I_D = 20A$	-	4.6	5.8	mΩ
		$V_{GS} = 4.5V, I_D = 10A$	-	6.6	8.0	

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 15V,$ $V_{GS} = 0V,$ $f = 1MHz$	-	1788	-	pF
C_{oss}	Output Capacitance		-	225	-	
C_{rss}	Reverse Transfer Capacitance		-	180	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15V,$ $V_{GS} = 10V,$ $I_D = 30A,$ $R_{GEN} = 3\Omega$	-	7	-	ns
t_r	Turn-On Rise Time		-	14	-	
$t_{d(off)}$	Turn-Off Delay Time		-	34	-	
t_f	Turn-Off Fall Time		-	11	-	
Q_g	Total Gate Charge	$V_{DS} = 15V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 30A$	-	34	-	nC
Q_{gs}	Gate-Source Charge		-	6.5	-	
Q_{gd}	Gate-Drain Charge		-	7.5	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	-	-	-	40	A
I_{SM}	Maximum Pulsed Current	-	-	-	160	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 30A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A,$ $di/dt = 100A/\mu s$	-	10	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 20A,$ $di/dt = 100A/\mu s$	-	1.7	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- $L = 0.5mH, V_{DD} = 25V, I_{AS} = 20A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

■ Characteristic Curve

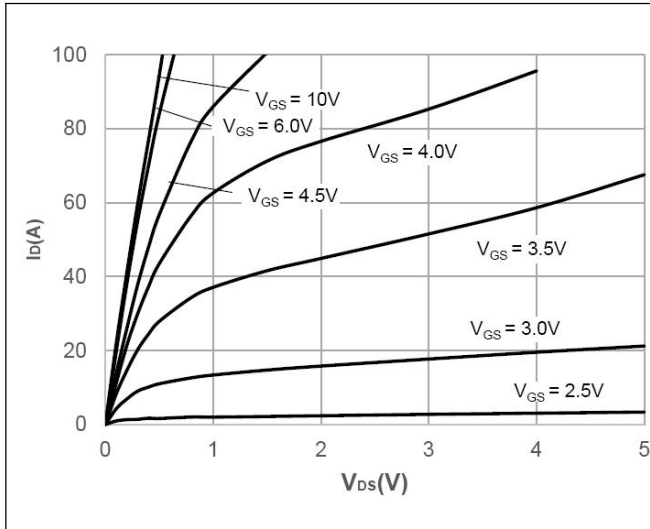


Figure 1. Typical Output Characteristics

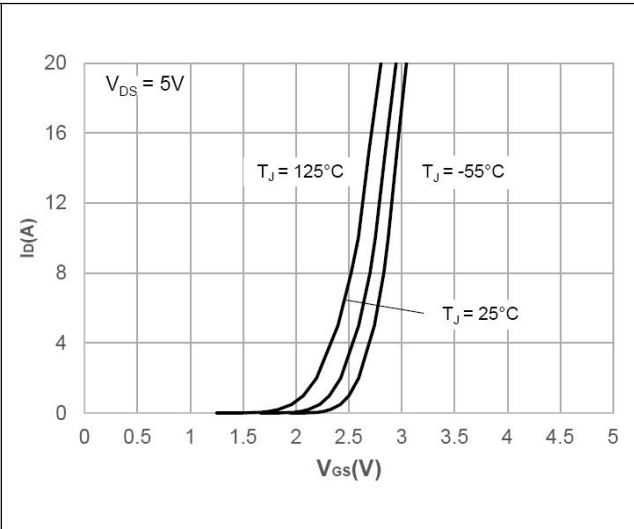


Figure 2. Typical Transfer Characteristics

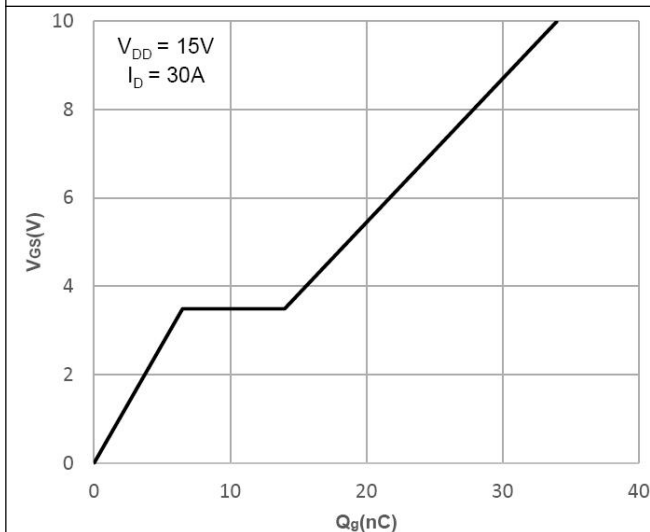


Figure 3. Typical Gate Charge

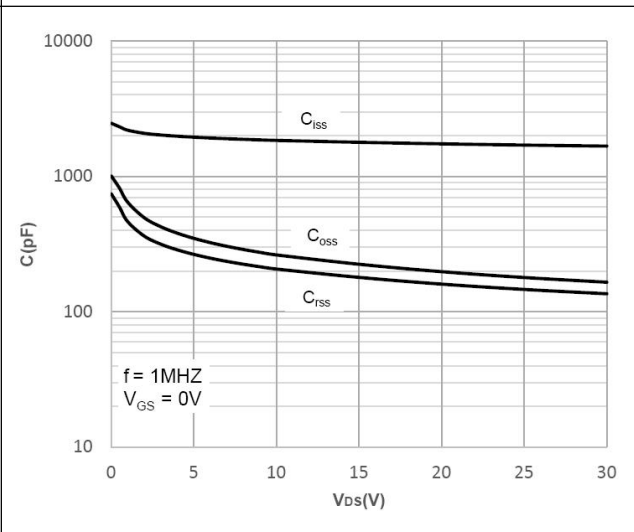


Figure 4. Typical Capacitance

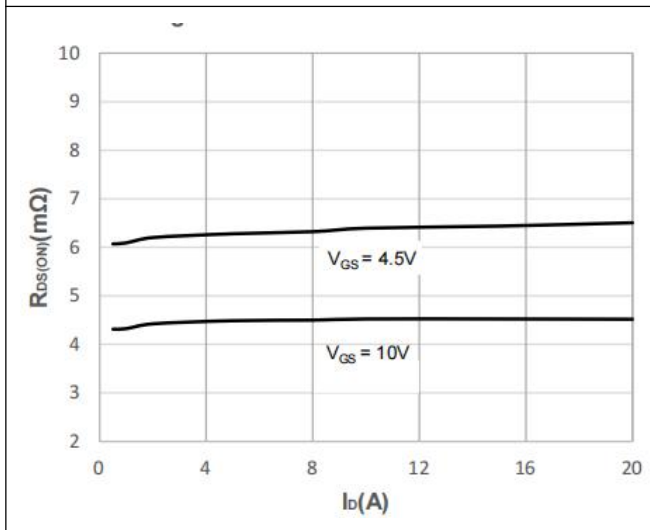


Figure 5. On-resistance vs Drain Current

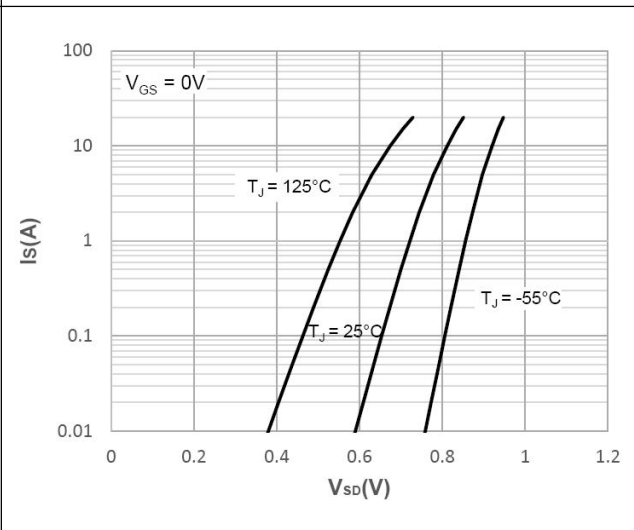


Figure 6. Body Diode Characteristics

■ Characteristic Curve

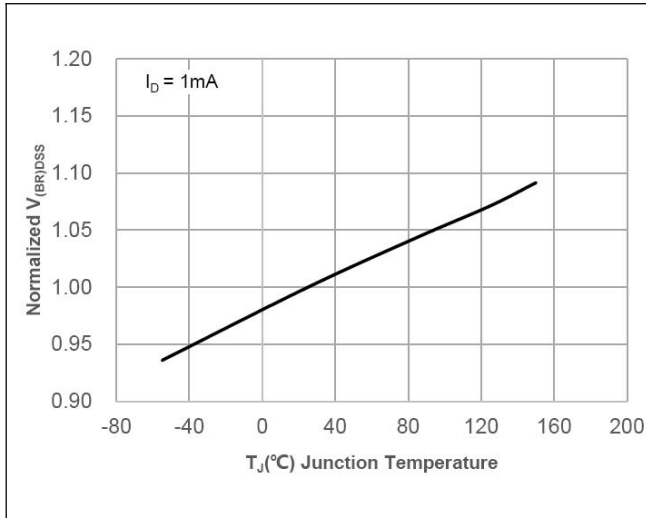


Figure 7. Normalized Breakdown voltage vs Junction Temperature

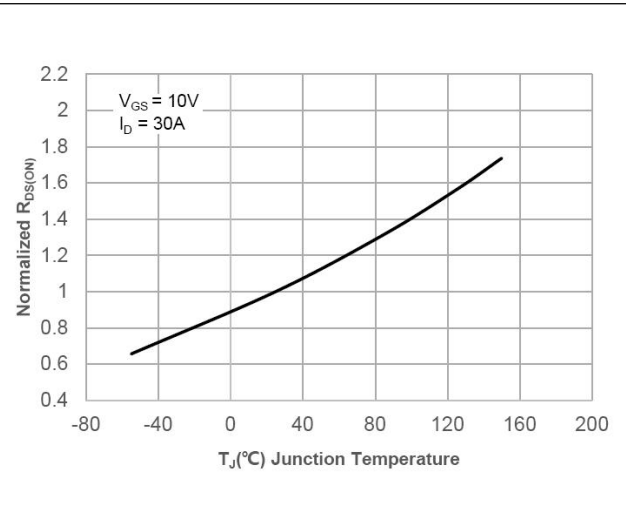


Figure 8. Normalized on Resistance vs Junction Temperature

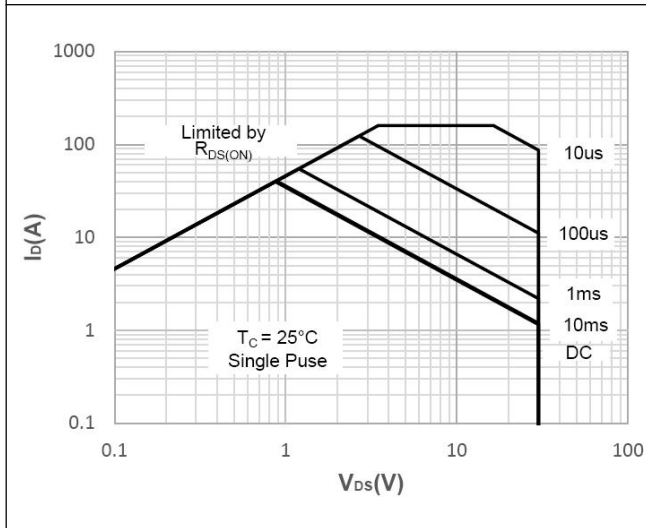


Figure 9. Maximum Safe Operating Area

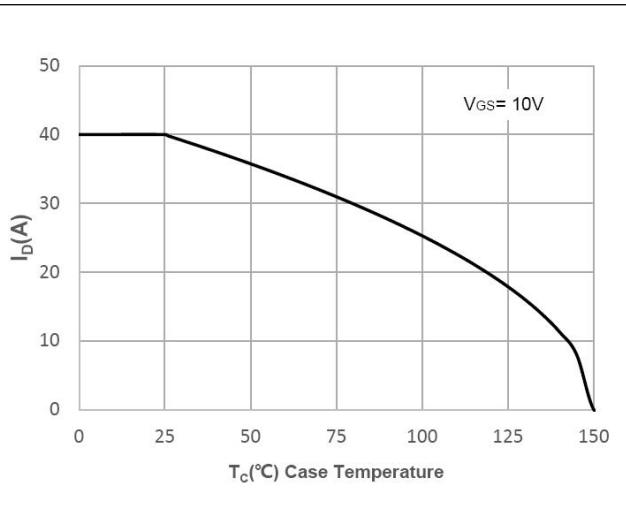


Figure 10. Maximum Continuous Drain Current vs Case Temperature

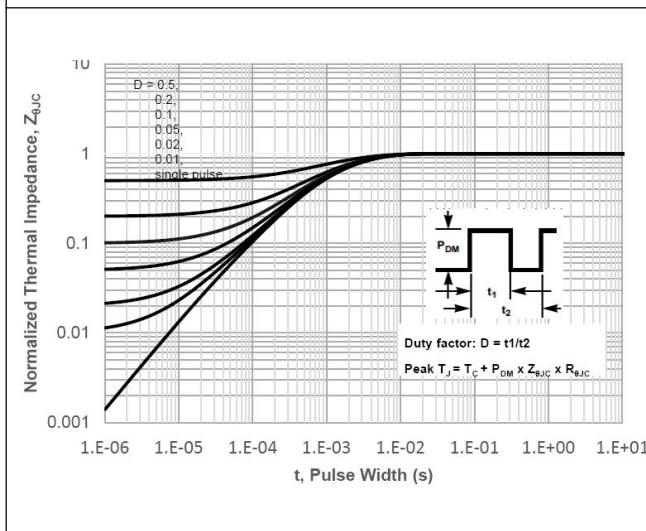


Figure 11. Normalized Maximum Transient Thermal Impedance

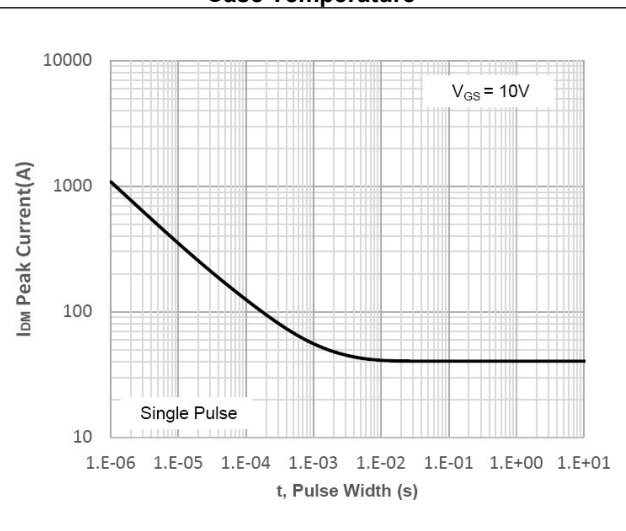
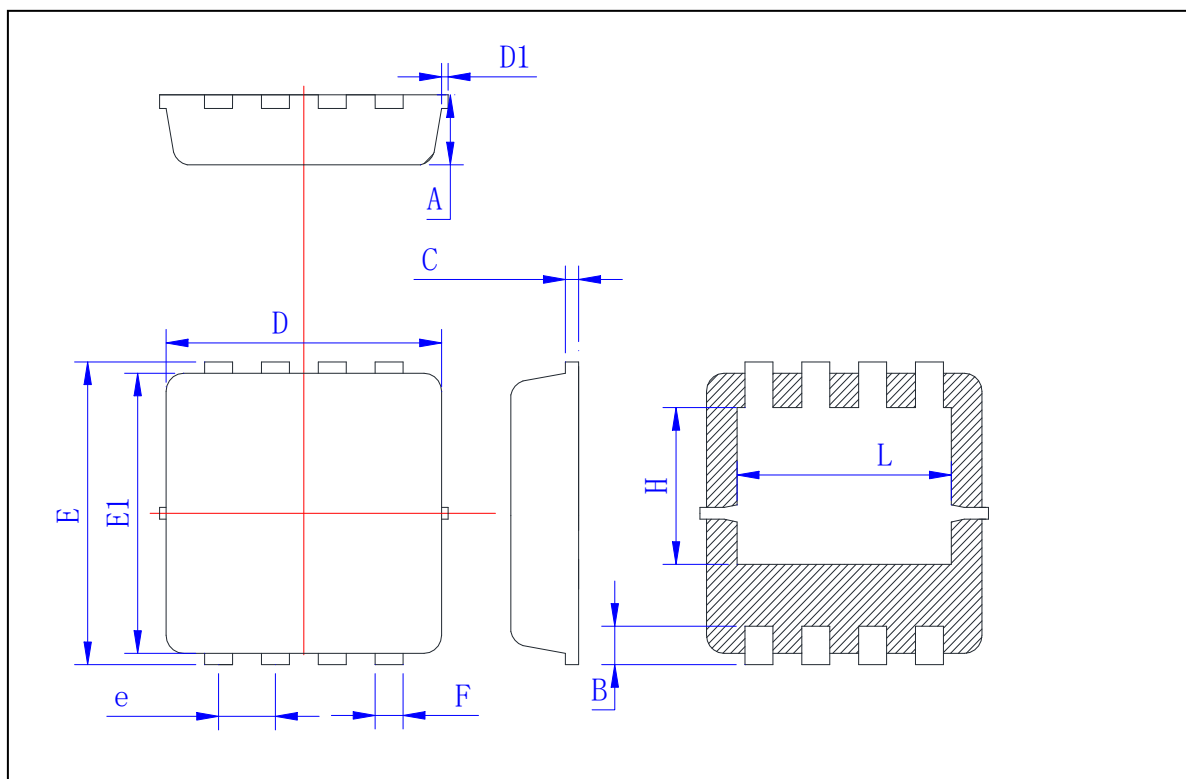


Figure 12. Peak Current Capacity

■ Package Information

PDFN3×3



Symbol	Min	Typ	Max
A	0.725	0.775	0.825
B	0.28	0.38	0.48
C	0.13	0.15	0.20
D	3.05	3.15	3.25
D1			0.10
E	3.25	3.35	3.45
E1	3.0	3.1	3.2
e	0.60	0.65	0.70
F	0.25	0.30	0.35
H	1.63	1.73	1.83
L	2.35	2.45	2.55