



## Description

The DMN2025U-13 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 20V$   $I_D = 6A$

$R_{DS(ON)} < 17m\Omega$  @  $V_{GS} = 4.5V$

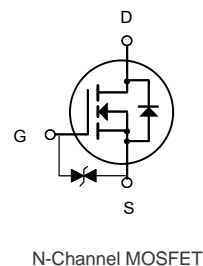
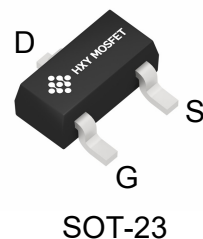
ESD=2500V HBM

## Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
DMN2025U-13	SOT-23	HXY MOSFET	3000

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current-Continuous	6	A
$I_{DM}$	Drain Current-Pulsed (Note 1)	30	A
$P_D$	Maximum Power Dissipation	1.4	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	89	$^\circ C/W$



**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	20		-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=6.5A$	-	14	17	m $\Omega$
		$V_{GS}=2.5V, I_D=5.5A$	-	18	23	m $\Omega$
		$V_{GS}=1.8V, I_D=5A$	-	28	40	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=6.5A$	8	-	-	S
Input Capacitance	$C_{iss}$	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	-	660	-	PF
Output Capacitance	$C_{oss}$		-	160	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	87	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1.5\Omega$ $V_{GS}=5V, R_{GEN}=3\Omega$	-	0.5		nS
Turn-on Rise Time	$t_r$		-	1		nS
Turn-Off Delay Time	$t_{d(off)}$		-	12		nS
Turn-Off Fall Time	$t_f$		-	4		nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=6.5A,$ $V_{GS}=4.5V$	-	8		nC
Gate-Source Charge	$Q_{gs}$		-	2.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=6.5A$	-	-	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	6.0	A

**Notes:**

Repetitive Rating: Pulse width limited by maximum junction temperature.

Surface Mounted on FR4 Board,  $t \leq 10$  sec.

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

Guaranteed by design, not subject to production



## Typical Characteristics

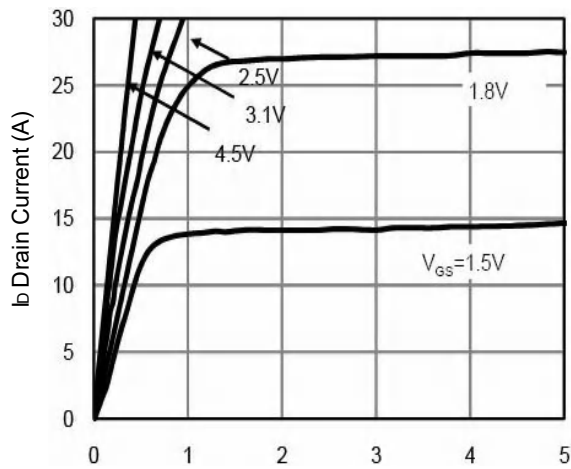


Fig.1 Typical Output Characteristics

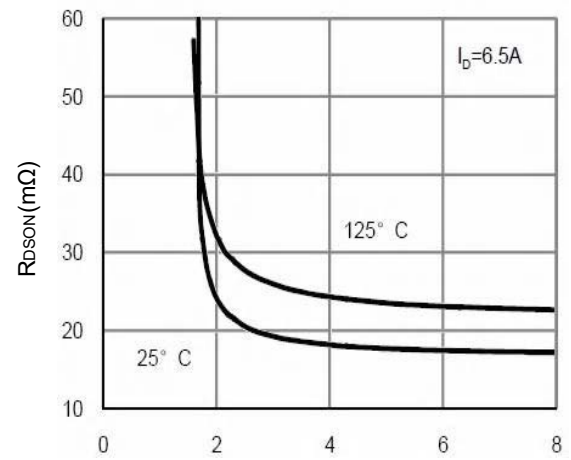


Fig.2 On-Resistance vs. Gate-Source

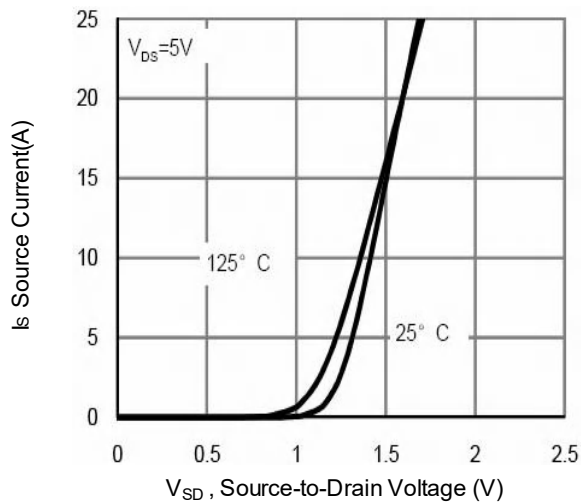


Fig.3 Forward Characteristics of Reverse

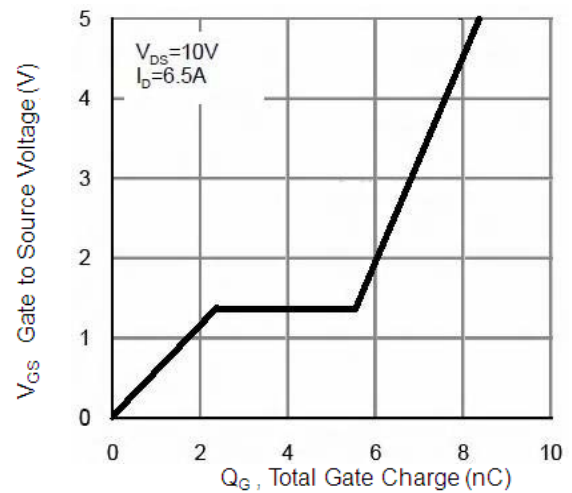


Fig.4 Gate-Charge Characteristics

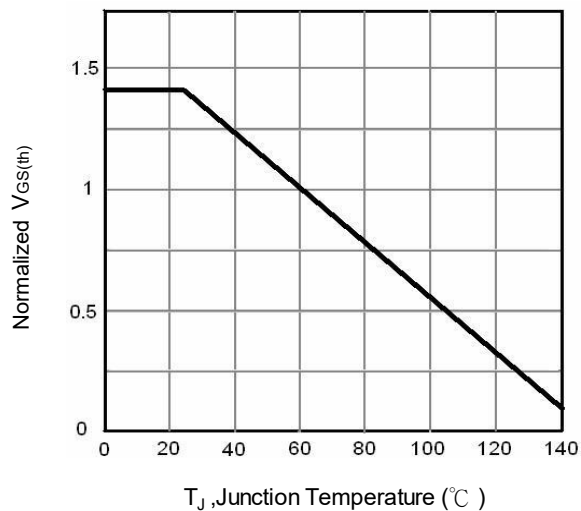


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

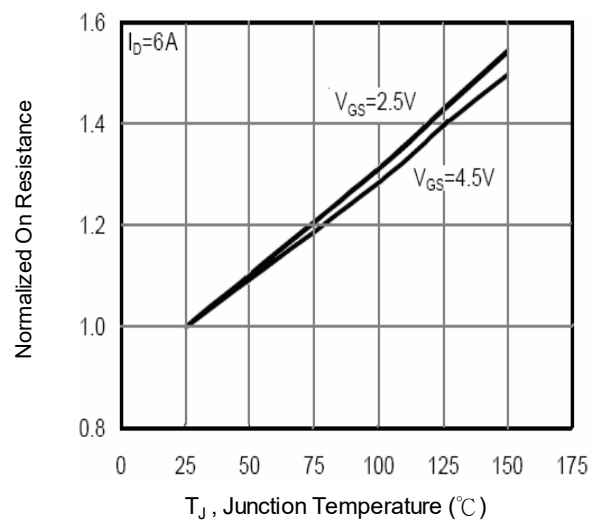


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

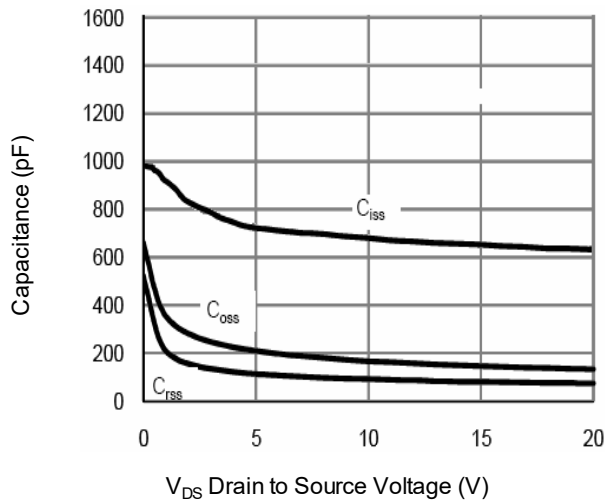


Fig.7 Capacitance

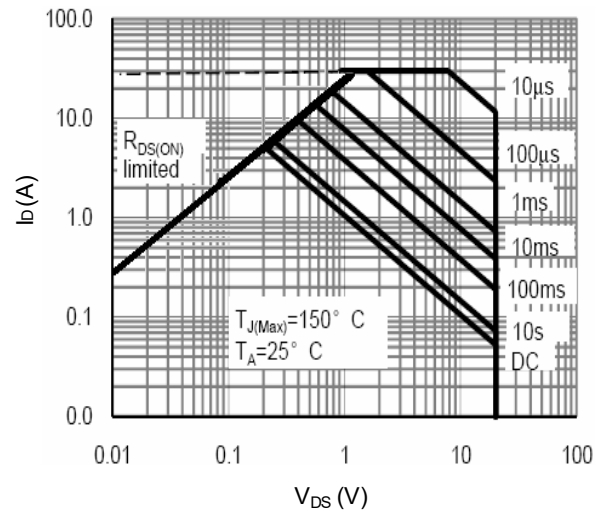


Fig.8 Safe Operating Area

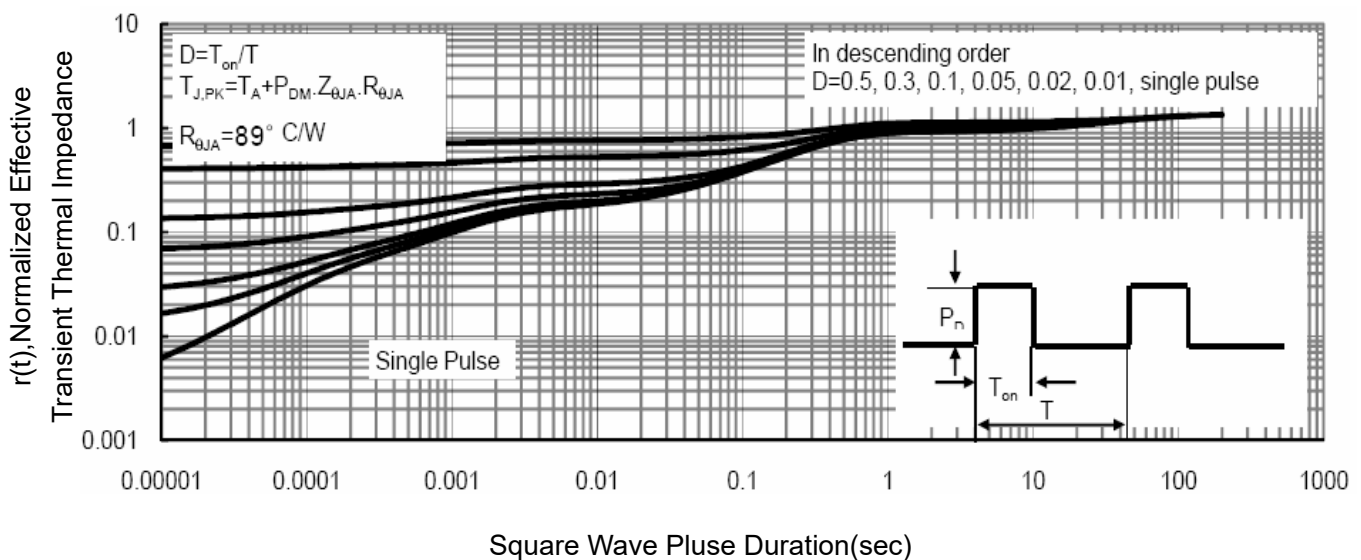


Fig.9 Normalized Maximum Transient Thermal Impedance

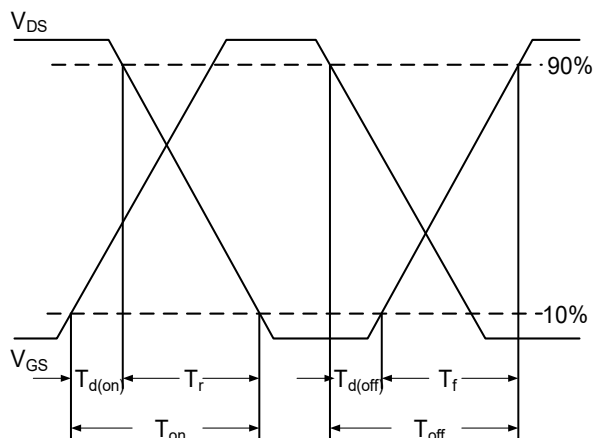


Fig.10 Switching Time Waveform

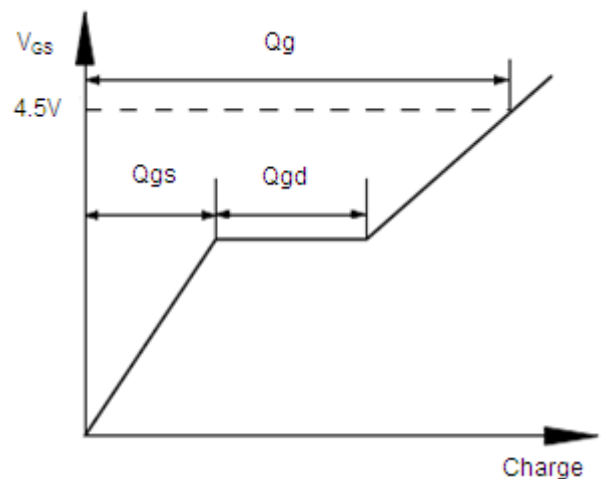
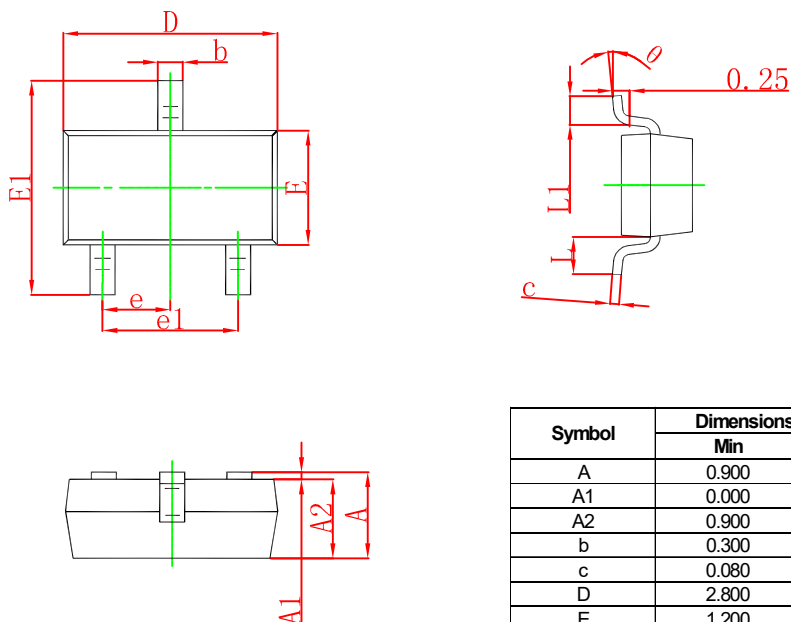


Fig.11 Gate Charge Waveform

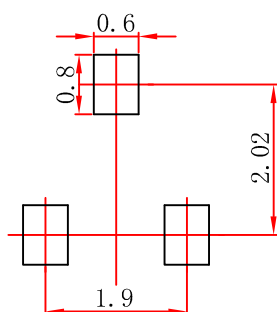


## SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

## SOT-23 Suggested Pad Layout



Note:  
1. Controlling dimension: in millimeters.  
2. General tolerance:  $\pm 0.05\text{mm}$ .  
3. The pad layout is for reference purposes only.



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