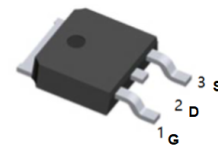
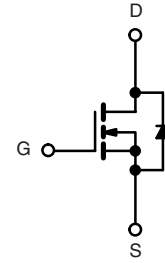


**General Description**

This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications.



TO-252(DPAK) top view

$V_{DS}$	60V
$I_D$ (at $V_{GS}=10V$ )	30A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 25mΩ
$R_{DS(ON)}$ (at $V_{GS} = 4.5V$ )	< 30mΩ

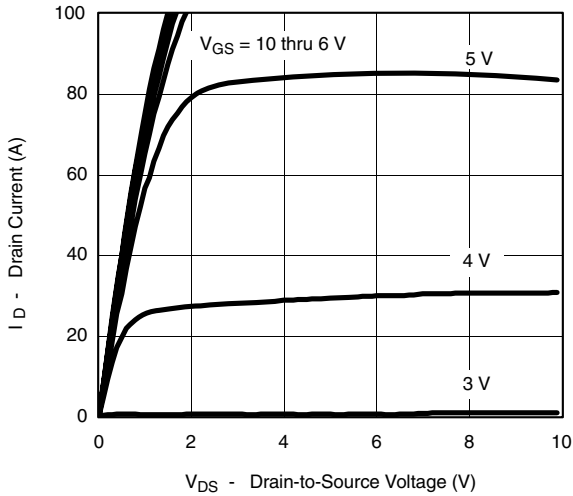
ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted				
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175\text{ }^\circ\text{C}$ ) <sup>a</sup>	$T_C = 25\text{ }^\circ\text{C}$	$I_D$	35	A
	$T_C = 100\text{ }^\circ\text{C}$		28	
Pulsed Drain Current		$I_{DM}$	100	
Continuous Source Current (Diode Conduction)		$I_S$	23	
Avalanche Current		$I_{AS}$	20	
Single Avalanche Energy (Duty Cycle $\leq 1\%$ )	$L = 0.1\text{ mH}$	$E_{AS}$	20	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	$P_D$	100	W
	$T_A = 25\text{ }^\circ\text{C}$		3	
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	- 55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	$t \leq 10\text{ sec}$	$R_{thJA}$	18	22	$^\circ\text{C/W}$
	Steady State		40	50	
Maximum Junction-to-Case		$R_{thJC}$	3.2	4	

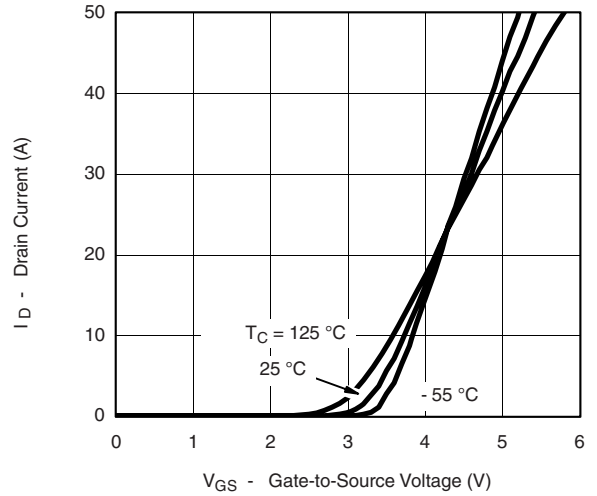
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	2.0	3.0	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	50			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$		25	31	m $\Omega$
		$V_{GS} = 10\text{ V}, I_D = 15\text{ A}, T_J = 125\text{ }^\circ\text{C}$			55	
		$V_{GS} = 10\text{ V}, I_D = 15\text{ A}, T_J = 175\text{ }^\circ\text{C}$			69	
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		30	45	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		20		S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		670		pF
Output Capacitance	$C_{oss}$			140		
Reverse Transfer Capacitance	$C_{rss}$			60		
Total Gate Charge <sup>b</sup>	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 23\text{ A}$		11	17	nC
Gate-Source Charge <sup>b</sup>	$Q_{gs}$			3		
Gate-Drain Charge <sup>b</sup>	$Q_{gd}$			3		
Turn-On Delay Time <sup>b</sup>	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 1.3\text{ }\Omega$ $I_D \cong 23\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		8	15	ns
Rise Time <sup>b</sup>	$t_r$			15	25	
Turn-Off Delay Time <sup>b</sup>	$t_{d(off)}$			30	45	
Fall Time <sup>b</sup>	$t_f$			25	40	
<b>Source-Drain Diode Ratings and Characteristics</b> ( $T_C = 25\text{ }^\circ\text{C}$ )						
Pulsed Current	$I_{SM}$				50	A
Diode Forward Voltage	$V_{SD}$	$I_F = 15\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = 15\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		30	60	ns

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Independent of operating temperature.

TYPICAL CHARACTERISTICS 25 °C unless noted



Output Characteristics



Transfer Characteristics



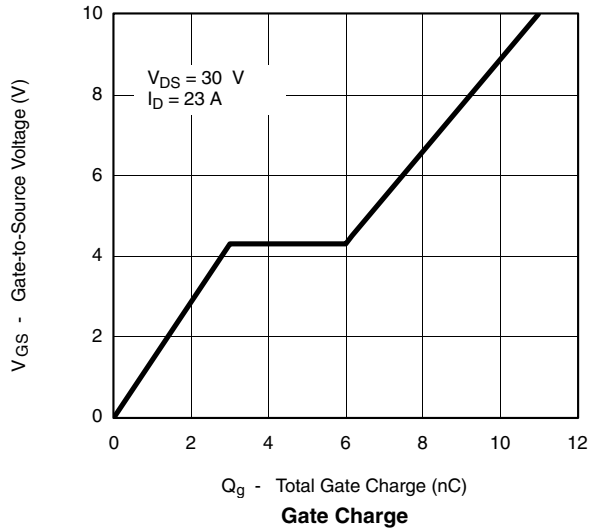
Transconductance



On-Resistance vs. Drain Current

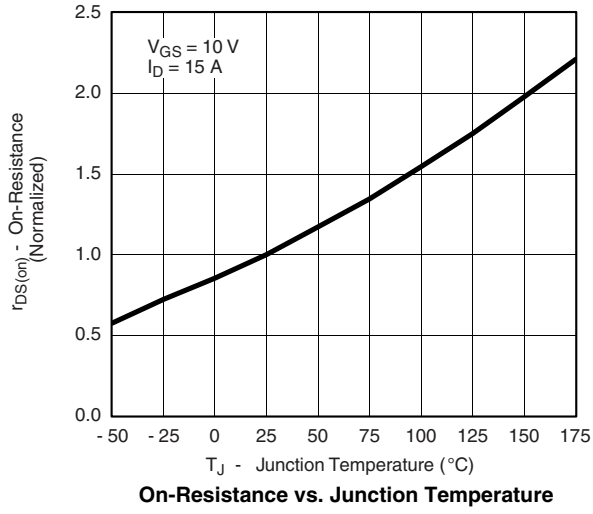


Capacitance



Gate Charge

TYPICAL CHARACTERISTICS 25 °C unless noted



THERMAL RATINGS



TA - Ambient Temperature (°C)  
**Maximum Drain Current vs. Ambient Temperature**



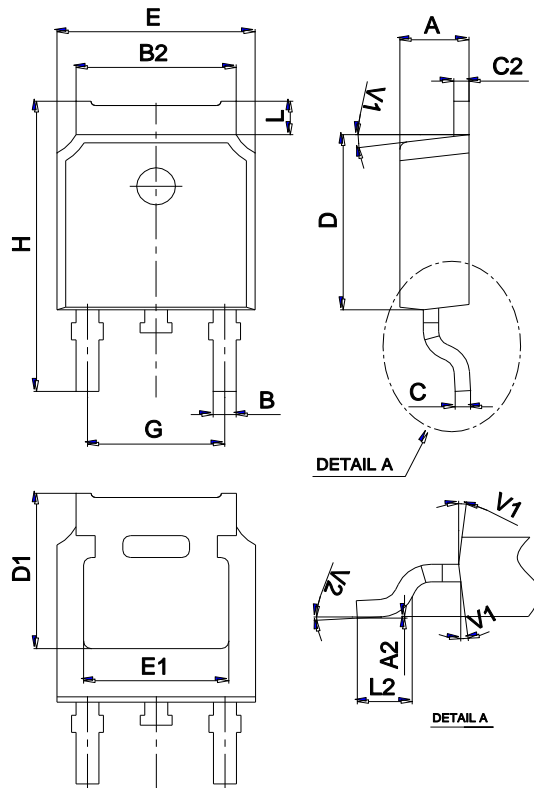
V<sub>DS</sub> - Drain-to-Source Voltage (V)  
\*V<sub>GS</sub> > minimum V<sub>GS</sub> at which r<sub>DS(on)</sub> is specified  
**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Case**

Package Mechanical Data TO-252

60V N-Channel MOSFET



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Ordering information

Order code	Package	Baseqty	Delivery mode
UMW FQD20N06	TO-252	2500	Tape and reel