

600V N-Channel Depletion-Mode Power MOSFET

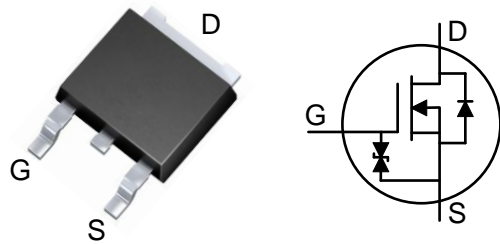
General Features

- ESD improved Capability
- Depletion Mode (Normally On)
- Proprietary Advanced Planar Technology
- Rugged Polysilicon Gate Cell Structure
- Fast Switching Speed
- RoHS Compliant
- Halogen-free available

BV_{DSX}	R_{DS(ON)} (Max.)	I_{DSS}(Min.)
600V	150 Ω	80mA

Applications

- Normally-on Switches
- SMPS Start-up Circuit
- Linear Amplifier
- Converters
- Constant Current Source
- Telecom

TO-252


Ordering Information

Part Number	Package	Marking	Remark
DMD6014E	TO-252	6014	Halogen Free

Absolute Maximum Ratings

 $T_A=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	DMD6014E	Unit
V_{DSX}	Drain-to-Source Voltage ^[1]	600	V
V_{DGX}	Drain-to-Gate Voltage ^[1]	600	V
I_D	Continuous Drain Current	0.08	A
I_{DM}	Pulsed Drain Current ^[2]	0.32	
P_D	Power Dissipation	36	W
V_{GS}	Gate-to-Source Voltage	± 20	V
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300	$^{\circ}\text{C}$
T_J and T_{STG}	Operating and Storage Temperature Range	-55 to 150	

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter	DMD6014E	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	3.47	K/W

Electrical Characteristics

OFF Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSX}	Drain-to-Source Breakdown Voltage	600	--	--	V	$V_{GS} = -5V, I_D = 250\mu A$
$I_{D(OFF)}$	Drain-to-Source Leakage Current	--	--	1	μA	$V_{DS} = 600V, V_{GS} = -5V$
		--	--	100	μA	$V_{DS} = 600V, V_{GS} = -5V$ $T_J = 125^\circ C$
I_{GSS}	Gate-to-Source Leakage Current	--	--	20	μA	$V_{GS} = +20V, V_{DS} = 0V$
		--	--	-20		$V_{GS} = -20V, V_{DS} = 0V$

ON Characteristics

 $T_A = 25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
I_{DSS}	Saturated Drain-to-Source Current	100	--	--	mA	$V_{GS} = 0V, V_{DS} = 25V$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	110	150	Ω	$V_{GS} = 0V, I_D = 50mA^{[3]}$
$V_{GS(OFF)}$	Gate-to-Source Cut-off Voltage	-3.3	--	-1.5	V	$V_{DS} = 3V, I_D = 8\mu A$
gfs	Forward Transconductance	--	77	--	mS	$V_{DS} = 10V, I_D = 5mA$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	62	--	pF	$V_{GS} = -5V$ $V_{DS} = 25V$ $f = 1.0MHz$
C_{oss}	Output Capacitance	--	13	--		
C_{rss}	Reverse Transfer Capacitance	--	9	--		
Q_g	Total Gate Charge	--	8	--	nC	$V_{GS} = -5V \sim 5V$ $V_{DS} = 300V$ $I_D = 7mA$
Q_{gs}	Gate-to-Source Charge	--	0.6	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	3	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(on)}$	Turn-on Delay Time	--	10	--	nS	$V_{GS} = -5V \sim 5V$ $V_{DD} = 300V$ $I_D = 7mA$ $R_G = 20\Omega$
t_{rise}	Rise Time	--	22	--		
$t_{d(off)}$	Turn-off Delay Time	--	35	--		
t_{fall}	Fall Time	--	210	--		

Source-Drain Diode CharacteristicsT_A=25°C unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Units	Test Conditions
V _{SD}	Diode Forward Voltage	--	--	1.2	V	I _{SD} =100mA, V _{GS} =-10 V

NOTE:[1] T_J=+25°C to +150°C

[2] Repetitive rating, pulse width limited by maximum junction temperature.

[3] Pulse width≤380μs; duty cycle≤2%.

Typical Characteristics

Figure 1. Maximum Power Dissipation vs. Case Temperature

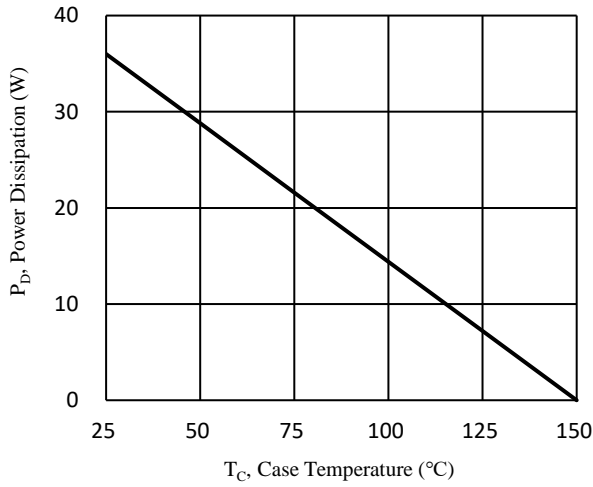


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

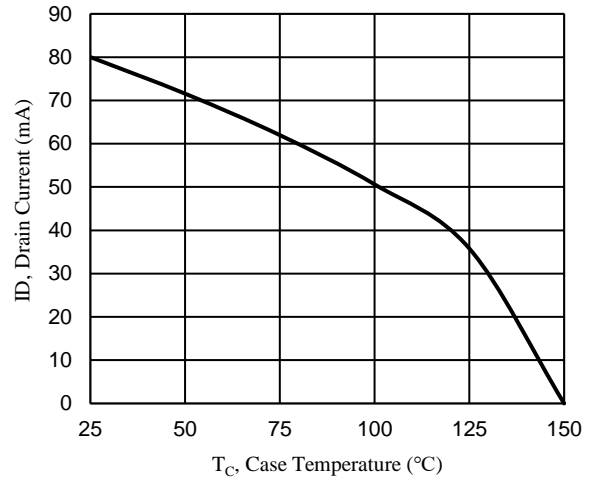


Figure 3. Typical Output Characteristics

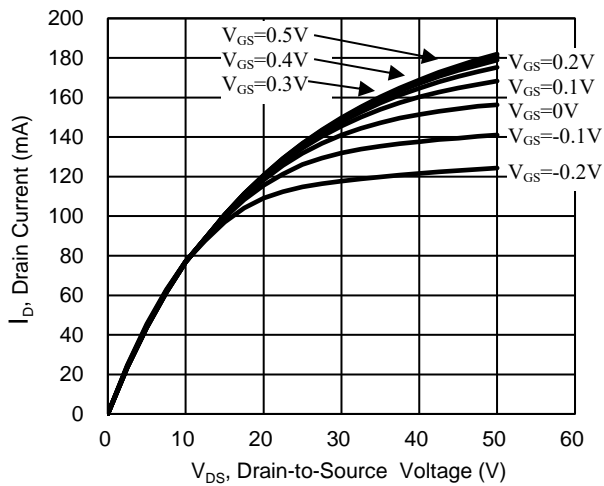


Figure 4. Typical Transfer Characteristics

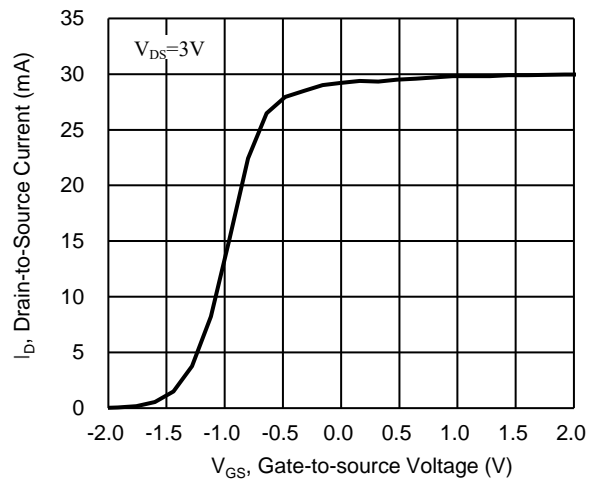


Figure 5. Typical Capacitance vs. Drain-to-Source Voltage

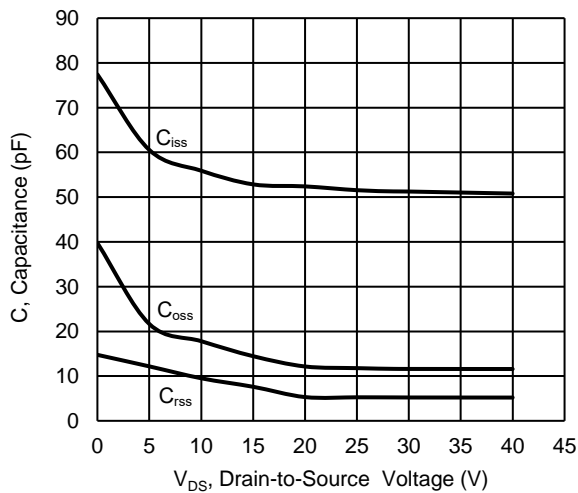
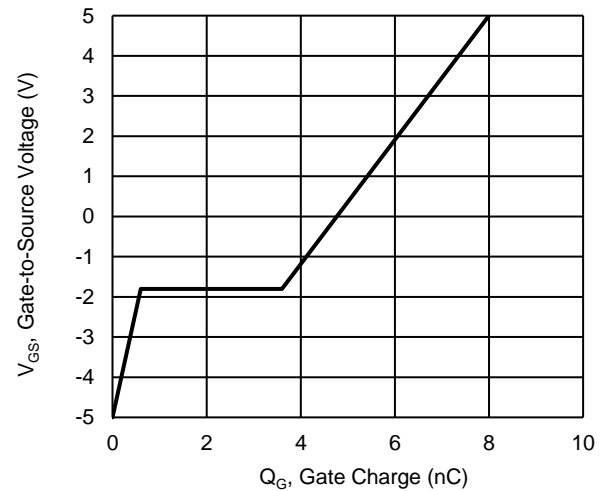
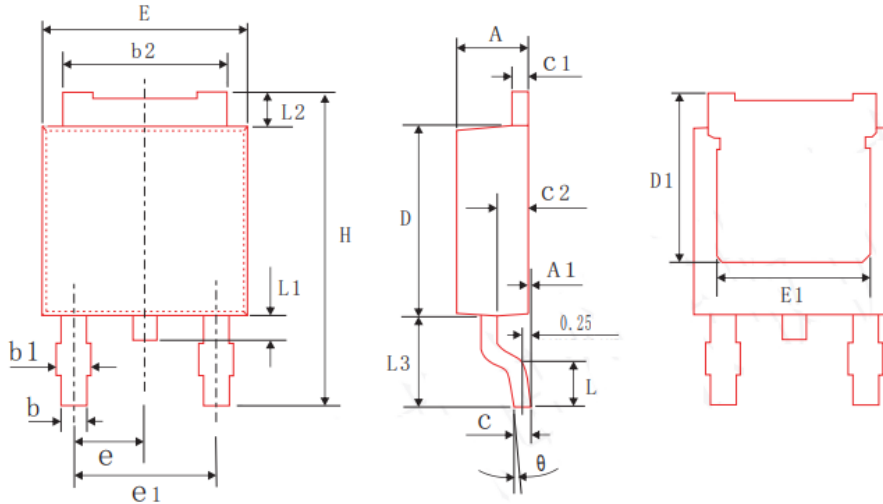


Figure 6. Typical Gate Charge vs. Gate-to-Source Voltage



Package Dimensions
TO-252


SYMBOL	MIN	NOM	MAX
A	2.2	2.3	2.4
A1	0.00	0.05	0.10
b	0.762	0.812	0.862
b1	--	--	1.10
b2	5.23	5.33	5.43
c	0.458	1.508	0.558
c1	0.458	0.508	0.558
c2	0.80	1.00	1.20
D	6.00	6.10	6.20
D1	5.25	5.45	5.65
H	10.00	10.10	10.20
E	6.50	6.60	6.70
E1	4.75	4.85	4.95
e1	4.37	4.57	4.77
L	--	--	1.45
L1	0.60	0.75	0.90
L2	0.90	1.10	1.30
L3	2.80	3.00	3.20
θ	0°	4°	8°
e	2.285 BSC		



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