

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
60V	12mΩ@10V	30A
	15mΩ@4.5V	



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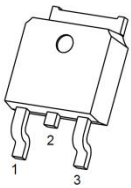
## Feature

- Fast Switching
- Extremely low switching loss
- Excellent Rdson and Low Gate Charge

## Application

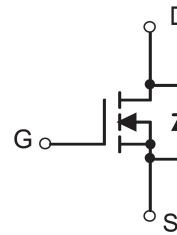
- Power Management
- Switched mode power supply

## Package

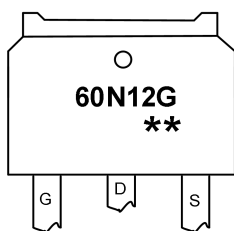


TO-252-2L(G:1 D:2 S:3)

## Circuit diagram



## Marking



60N12G  
\*\*

=Device Code  
=Week Code

## Order Information

Device	Package	Unite/Tape
SP60N12GTH	TO-252	2500

**Absolute maximum ratings (Ta=25°C unless otherwise noted)**

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	60	V
Gate-source voltage	$V_{GS}$	±20	V
Continuous drain current <sup>1)</sup> , TC=25 °C	$I_D$	30	A
Pulsed drain current <sup>2)</sup> , TC=25 °C	$I_{DM}$	120	A
Continuous diode forward current <sup>1)</sup> , TC=25 °C	$I_S$	12	A
Power dissipation <sup>3)</sup> , TC=25 °C	$P_D$	60	W
Single pulsed avalanche energy <sup>4)</sup>	$E_{AS}$	36	mJ
Thermal resistance, junction-case	$R_{\theta JC}$	2.5	°C/W
Operation and storage temperature	$T_{stg}, T_J$	-55 to 150	°C

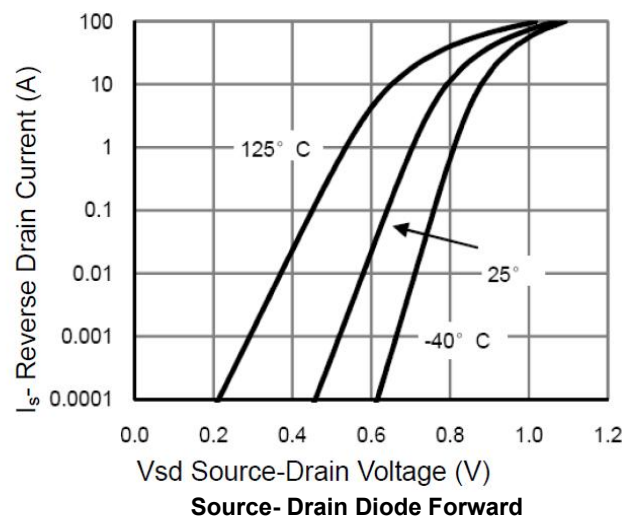
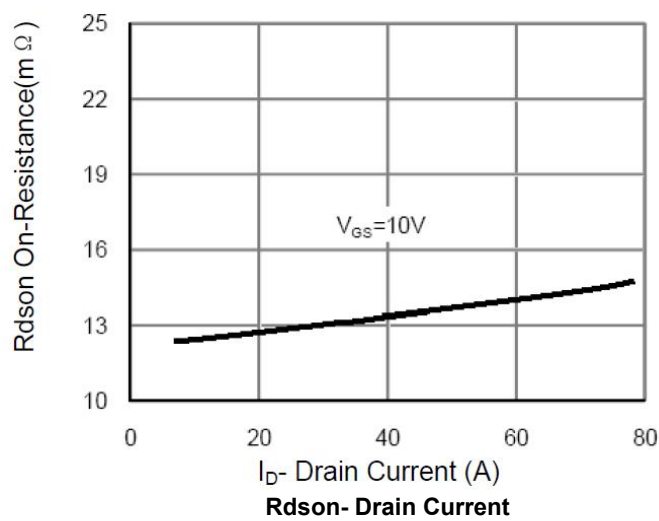
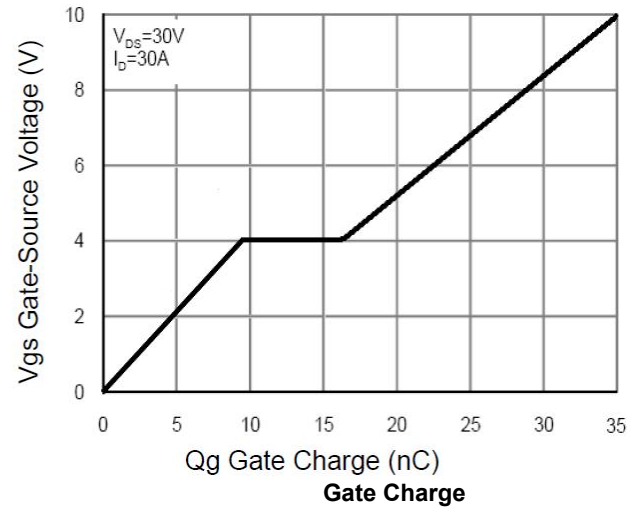
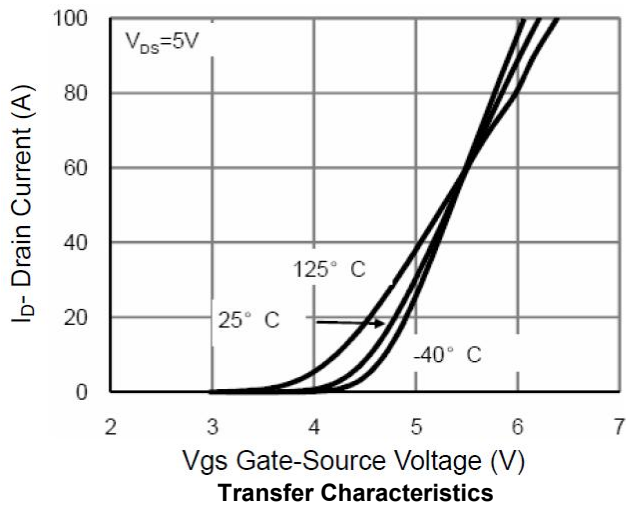
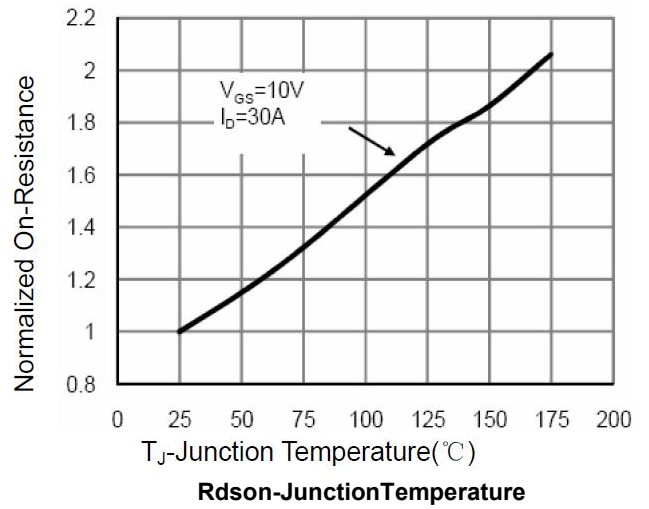
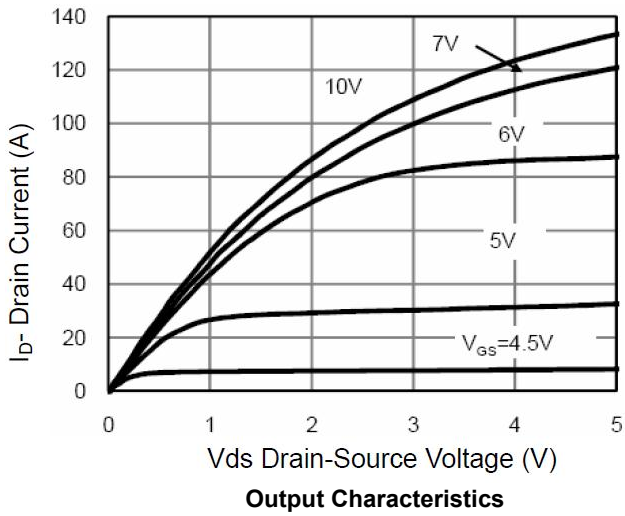
**Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

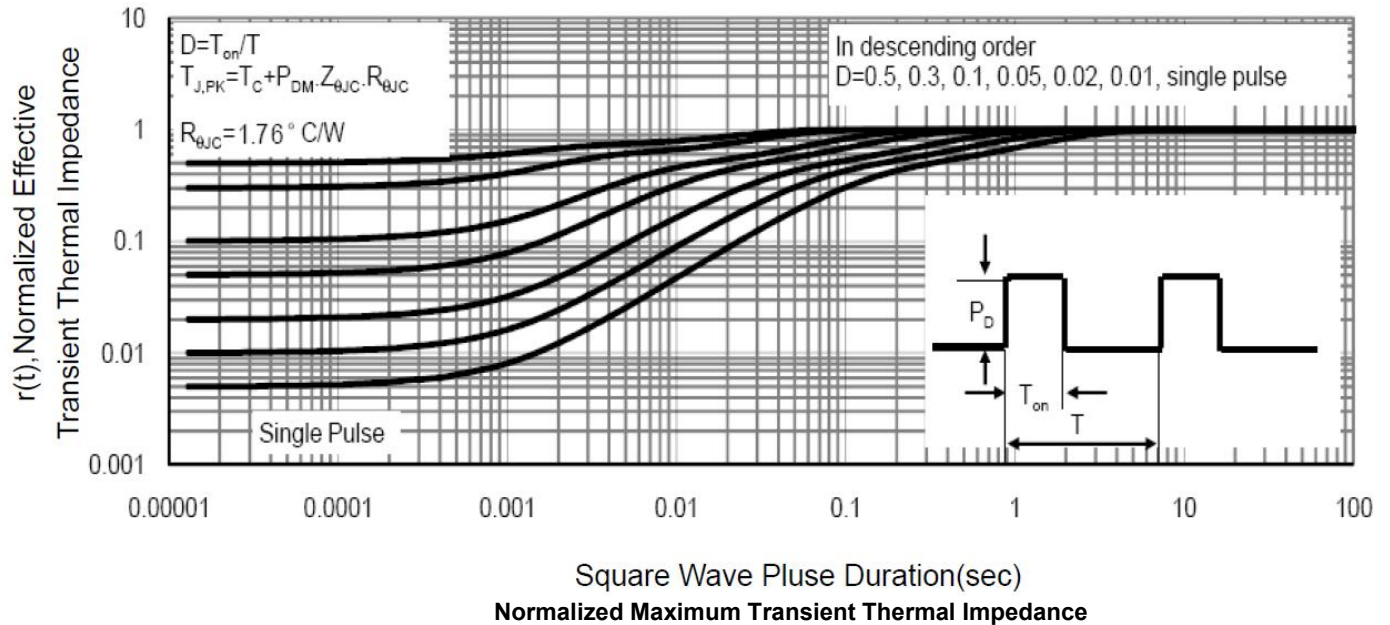
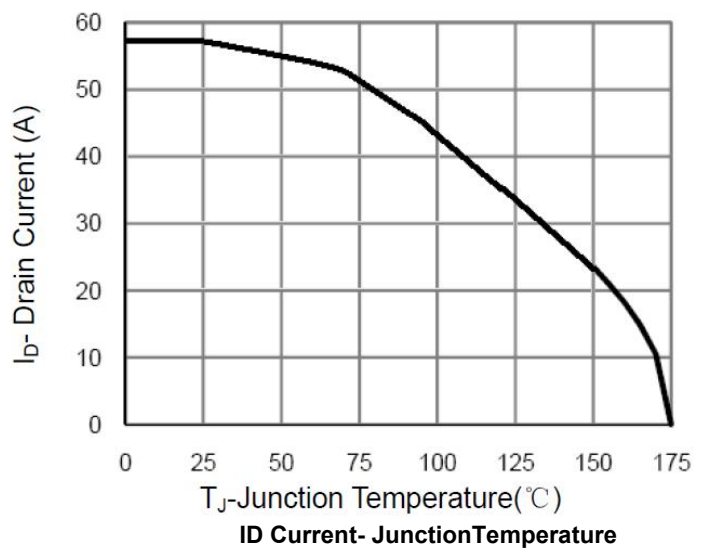
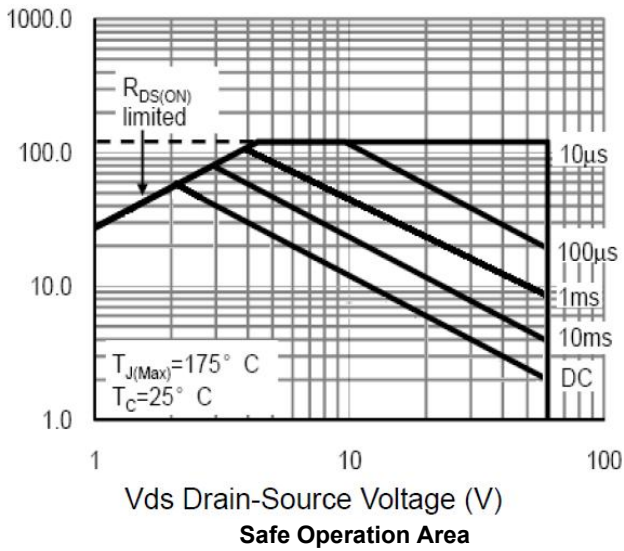
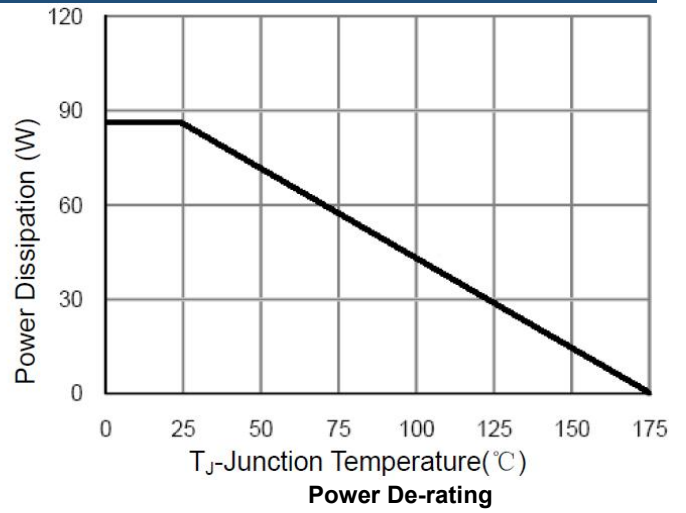
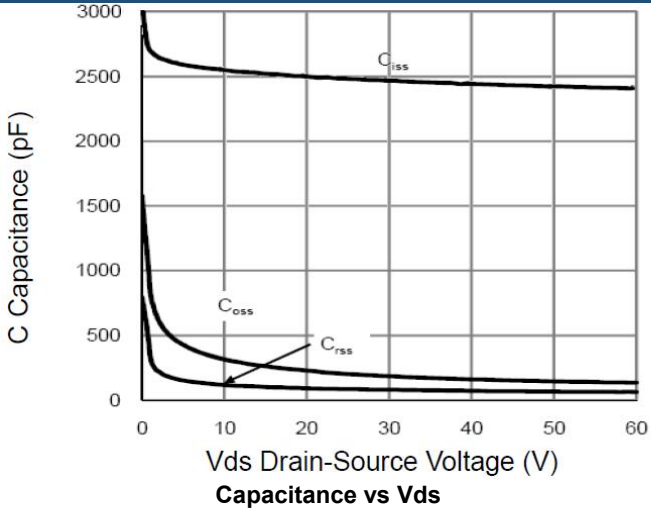
Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0\text{ V}, I_D=250\ \mu\text{A}$	60			V
Gate-source leakage current	$I_{GSS}$	$V_{GS}=\pm 20\text{ V}$			±100	nA
Drain-source leakage current	$I_{DSS}$	$V_{DS}=48\text{ V}, V_{GS}=0\text{ V}$			1	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\ \mu\text{A}$	1	1.6	2.5	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=20\text{ A}$		12	16	mΩ
		$V_{GS}=4.5\text{ V}, I_D=10\text{ A}$		15	22	
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V}, f=1\text{ MHz}$		940		pF
Output capacitance	$C_{oss}$			235		
Reverse transfer capacitance	$C_{rss}$			10		
Total gate charge	$Q_g$	$V_{GS}=10\text{ V}, V_{DS}=30\text{ V}, I_D=20\text{ A}$		23		nC
Gate-source charge	$Q_{gs}$			4.8		
Gate-drain charge	$Q_{gd}$			4.0		
<b>Switching Characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10\text{ V}, V_{DS}=30\text{ V}, R_G=1.6\ \Omega, I_D=20\text{ A}$		4.7		ns
Rise time	$t_r$			2.9		
Turn-off delay time	$t_{d(off)}$			14		
Fall time	$t_f$			2.9		
<b>Body Diode Characteristics</b>						
Diode forward voltage	$V_{SD}$	$I_S=1\text{ A}, V_{GS}=0\text{ V}$			1.2	V

Note:

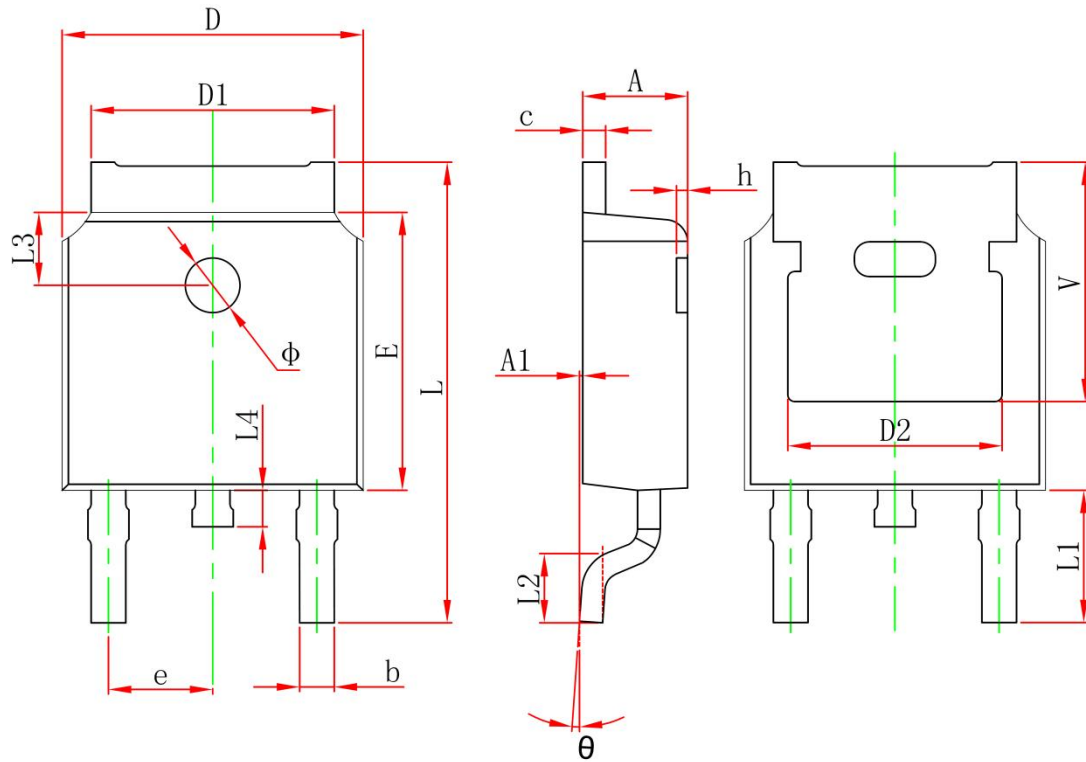
1. Calculated continuous current based on maximum allowable junction temperature.
2. Repetitive rating; pulse width limited by max. junction temperature.
3.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
4.  $V_{DD}=30\text{ V}, V_{GS}=10\text{ V}, L=0.5\text{ mH}$ , starting  $T_J=25\text{ °C}$ .

**Typical Characteristics**





## TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	

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