

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
60V	3.7mΩ@10V	110A
	4.6mΩ@4.5V	

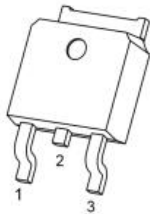
## Feature

- Fast Switching
- Low Gate Charge and R<sub>ds(on)</sub>
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

## Applications

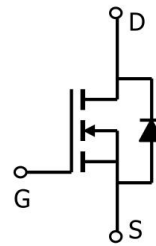
- DC-DC Converters
- Power Management

## Package

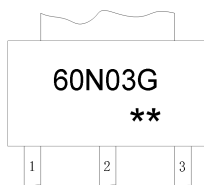


TO-252(1:G 2:D 3:S)

## Circuit diagram



## Marking



**60N03G** =Device Code  
**\*\*** =Week Code

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup> (Tc=25°C)	$I_D$	110	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	440	A
Single Pulse Avalanche Energy <sup>3</sup>	$E_{AS}$	756	mJ
Total Power Dissipation <sup>4</sup> (Tc=25°C)	$P_D$	130	W
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	0.96	°C/W
Storage Temperature Range	$T_{STG}$	-55 to 150	°C
Operating Junction Temperature Range	$T_J$	-55 to 150	°C

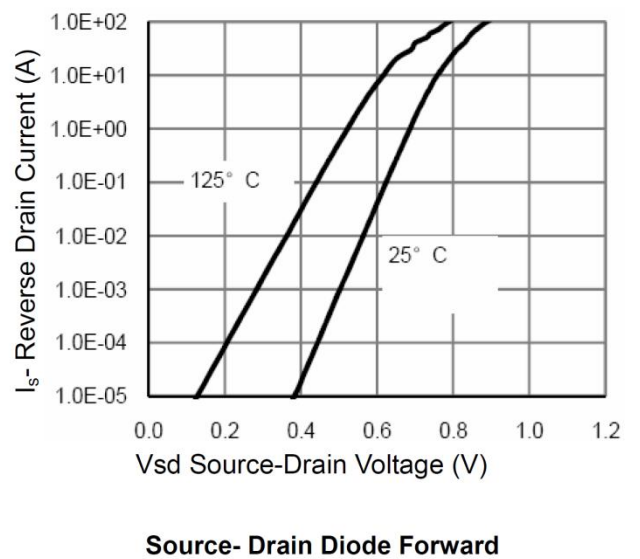
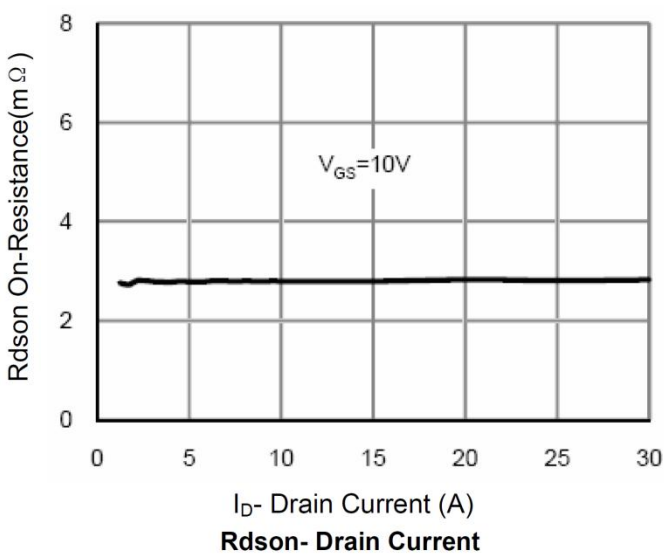
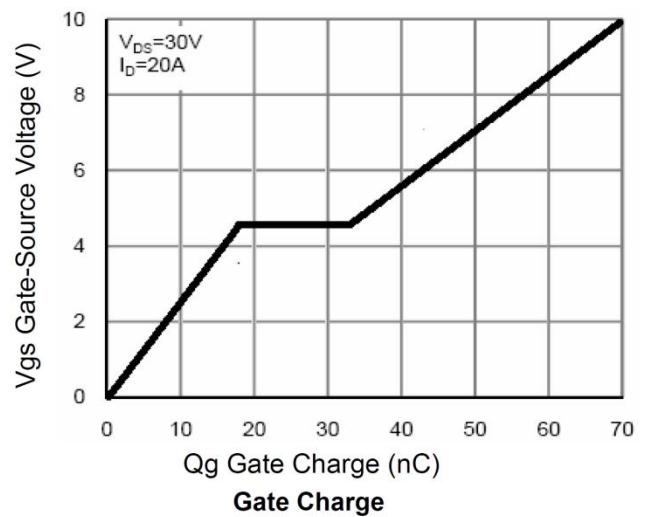
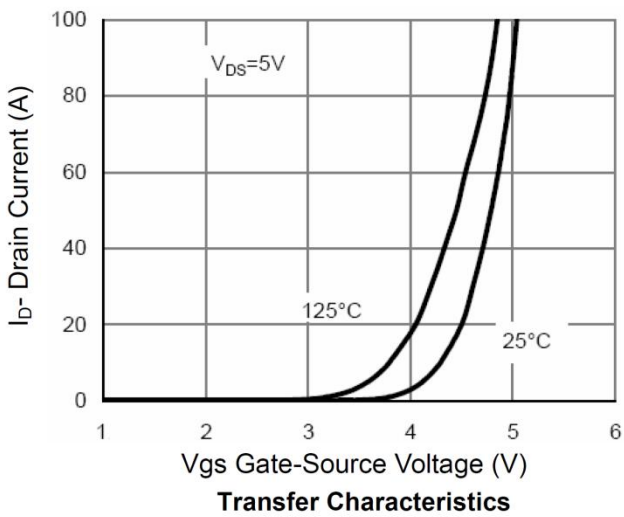
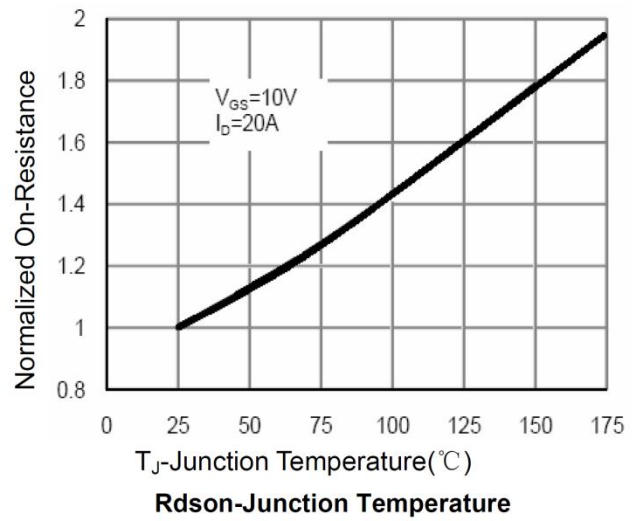
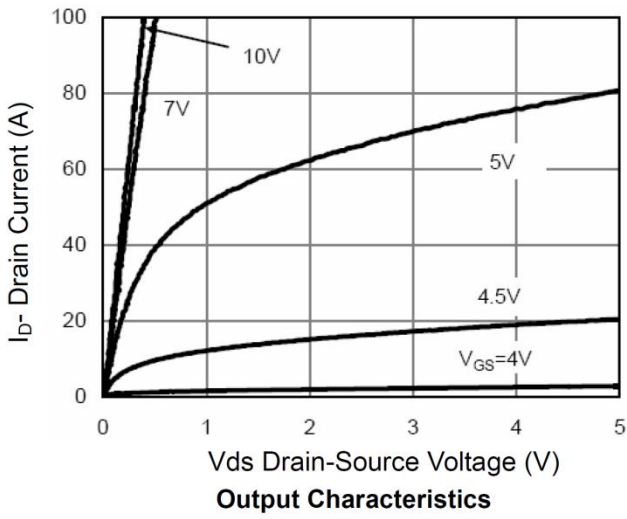
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

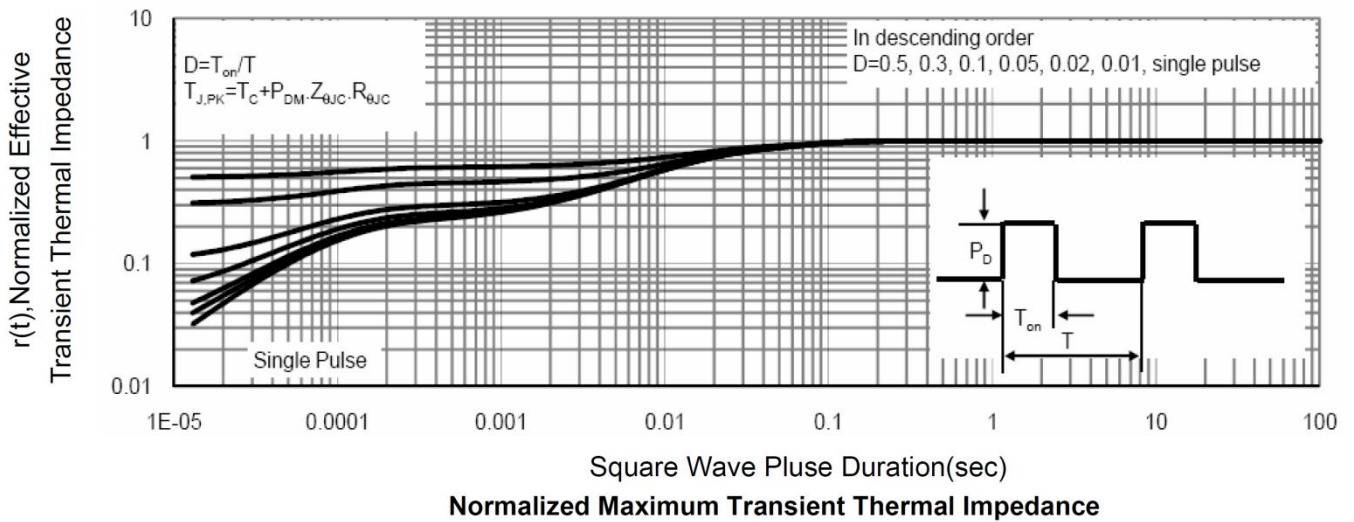
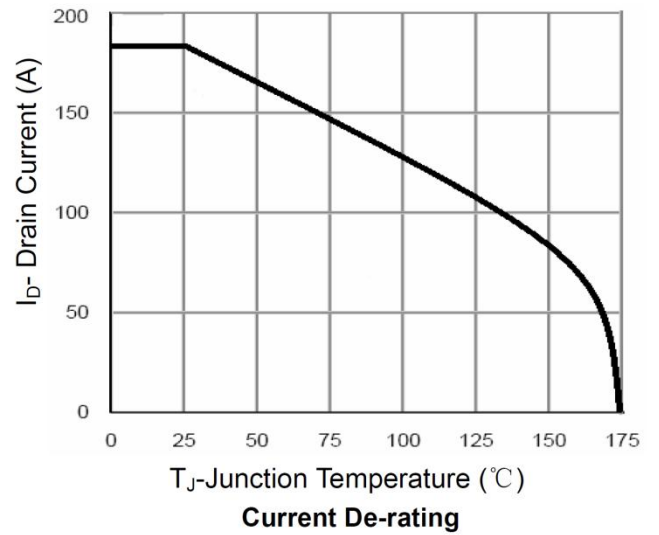
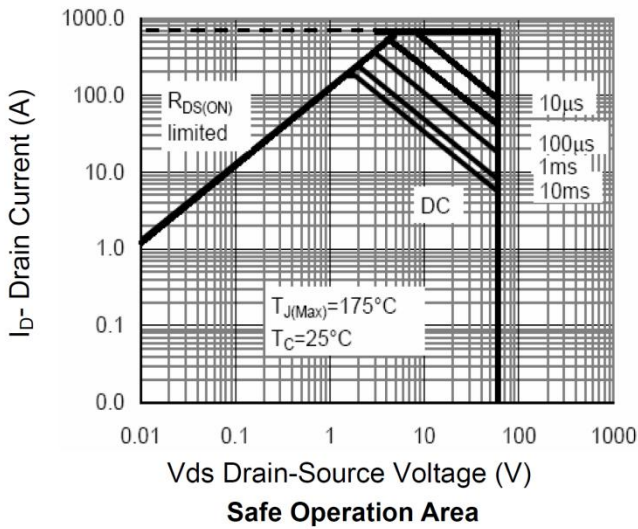
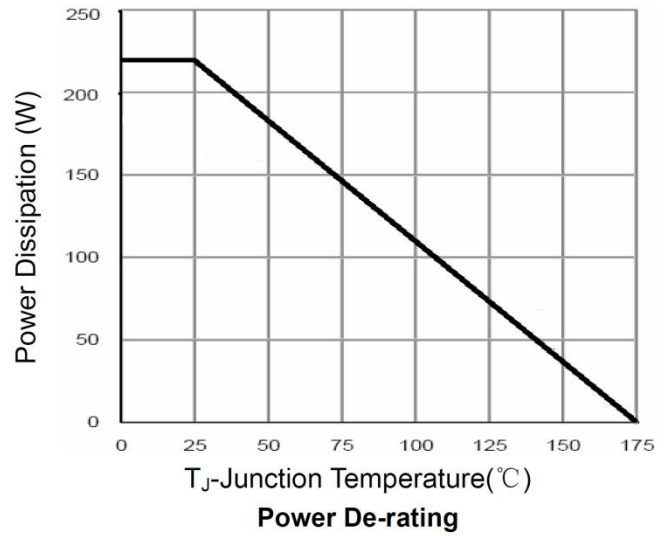
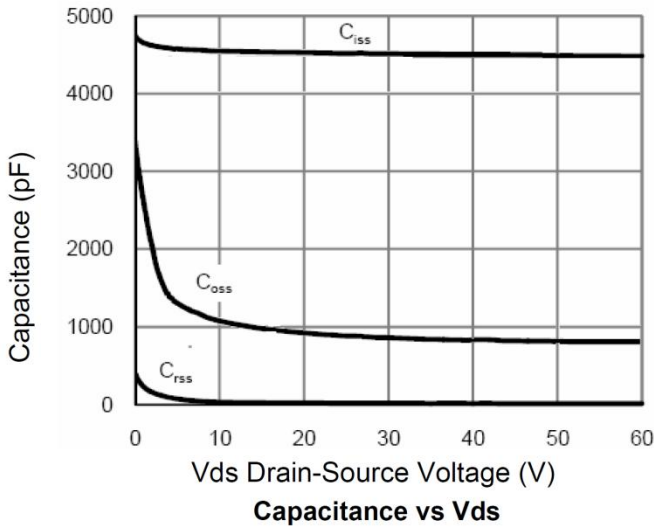
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=48V, V_{GS}=0V$	---	---	1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.7	2.5	V
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	---	3.7	4.7	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$	---	4.6	6.2	m $\Omega$
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, f=1MHz$	---	4250	---	pF
Output Capacitance	$C_{oss}$		---	975	---	
Reverse Transfer Capacitance	$C_{rss}$		---	41	---	
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS}=30V, V_{GS}=10V, I_D=20A$	---	68	---	nC
Gate-Source Charge	$Q_{gs}$		---	19	---	
Gate-Drain Charge	$Q_{gd}$		---	14	---	
Turn-On Delay Time	$T_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=4.7\Omega, I_D=20A$	---	6	---	ns
Rise Time	$T_r$		---	12	---	
Turn-Off Delay Time	$T_{d(off)}$		---	24	---	
Fall Time	$T_f$		---	5	---	
<b>Diode Characteristics</b>						
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.2	V

**Note :**

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating . The test condition is  $V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

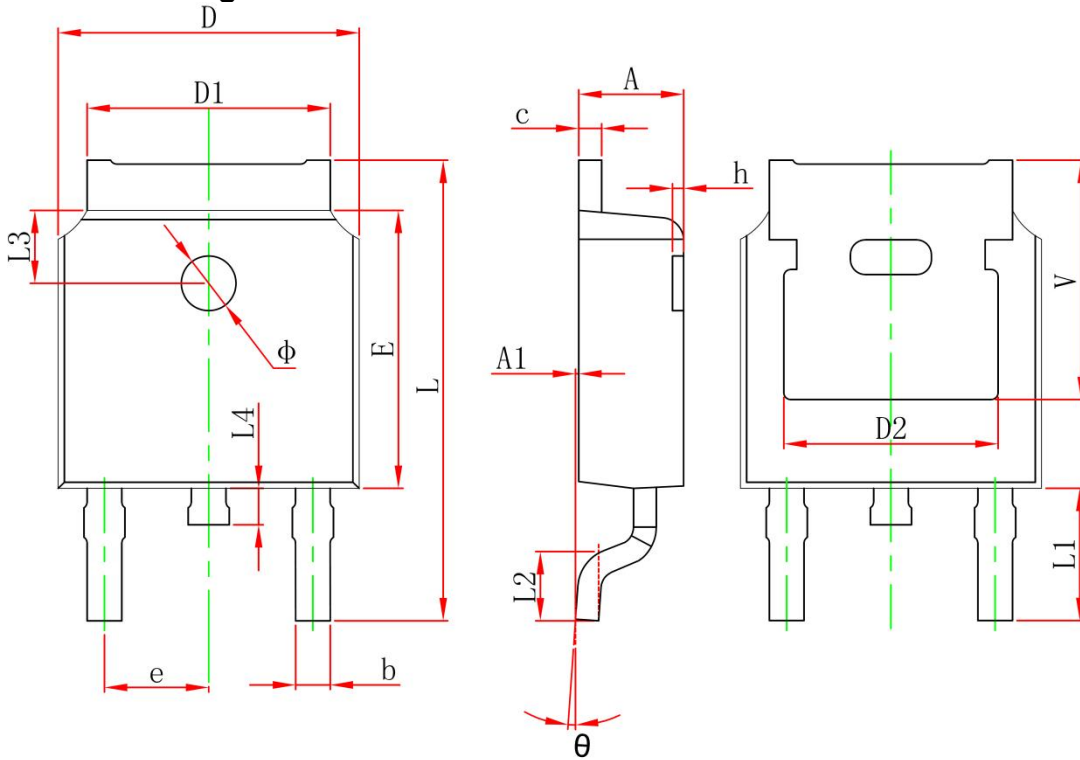
**Typical Characteristics**







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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