

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
60V	2.8mΩ@10V	140A
	3.2mΩ@4.5V	

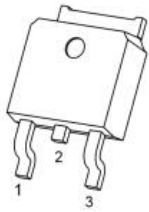
Feature

- Trench Power Technology
- Low RDS(ON)
- Low Gate Charge
- Optimized for Fast-switching Applications

Application

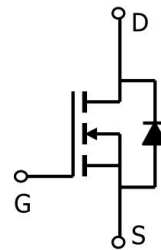
- High Speed Power Switching
- DC/DC Converters

Package

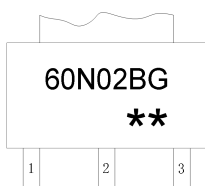


TO-252 (G:1 D:2 S:3)

Circuit diagram



Marking



60N02BG : Product code
 ** : Week code.

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 (T _C =25°C, Silicon limited)	I _D	240	A
Continuous Drain Current (T _C =25°C, Package limited)	I _D	140	A
Pulsed Drain Current	I _{DM}	560	A
Single Pulse Avalanche Energy (note1)	E _{AS}	243	mJ
Power Dissipation (T _C =25°C)	P _D	125	W
Thermal Resistance, Junction-to-Case	R _{θJC}	1	°C/W
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~+150	°C

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

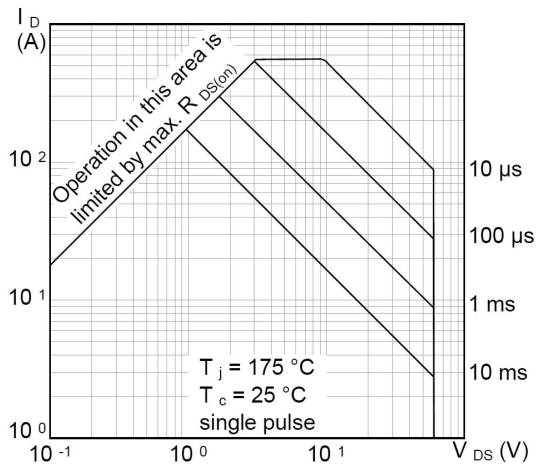
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 48V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.7	2.2	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 40A	--	2.8	3.5	mΩ
		V _{GS} = 4.5V, I _D = 40A	--	3.2	4.3	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 30V, f = 1.0MHz	--	3910	--	pF
Output Capacitance	C _{oss}		--	1300	--	
Reverse Transfer Capacitance	C _{rss}		--	11	--	
Total Gate Charge	Q _g	V _{DD} = 30V, I _D = 40A, V _{GS} = 10V	--	53	--	nC
Gate-Source Charge	Q _{gs}		--	17	--	
Gate-Drain Charge	Q _{gd}		--	10	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 30V, V _{GS} = 10V, I _D = 40A, R _G = 4Ω	--	15	--	ns
Turn-on Rise Time	t _r		--	34	--	
Turn-off Delay Time	t _{d(off)}		--	33	--	
Turn-off Fall Time	t _f		--	9	--	
Drain-Source Body Diode Characteristics						
Body Diode Voltage	V _{SD}	V _{GS} = 0V, I _S = 40A,	--	--	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 40A,	--	48	--	ns
Reverse Recovery Charge	Q _{rr}	diF/dt = 100A/μs	--	99	--	nC

Notes :

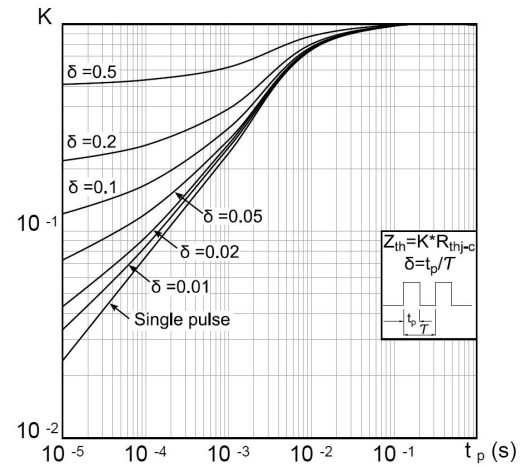
1. EAS condition: V_{DD} = 30V, V_G=10V, L=0.3mH, R_G=25Ω, T_J = 25°C.

Typical Characteristics

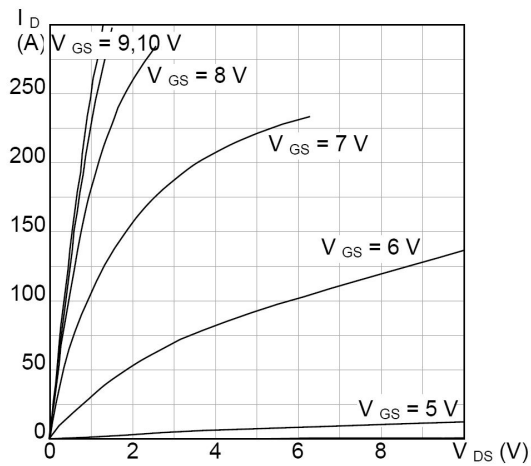
Safe operating area



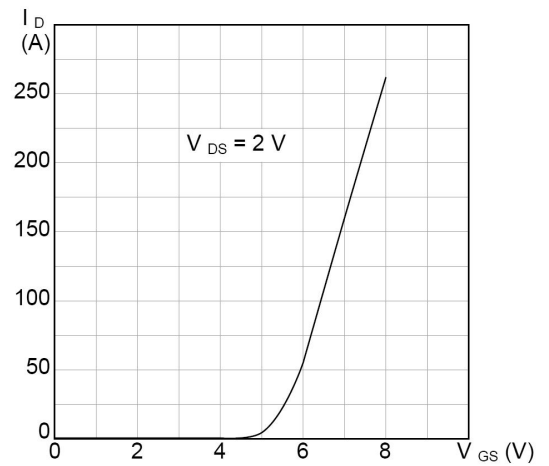
Thermal impedance



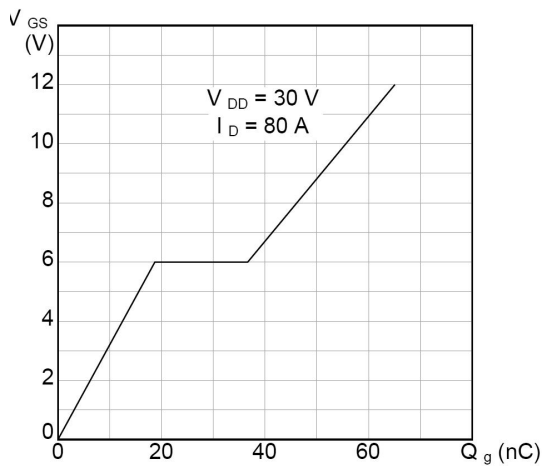
Output characteristics



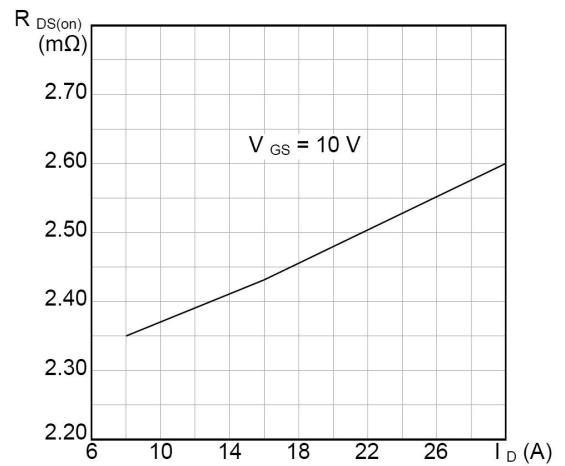
Transfer characteristics



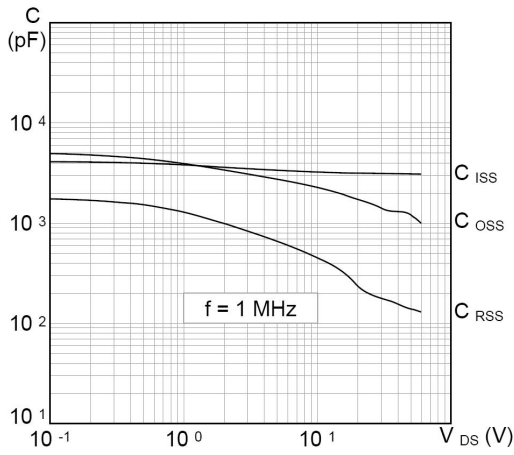
Gate charge vs gate-source voltage



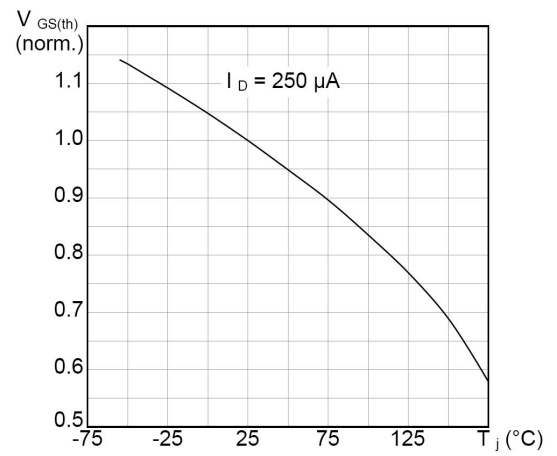
Static drain-source on-resistance



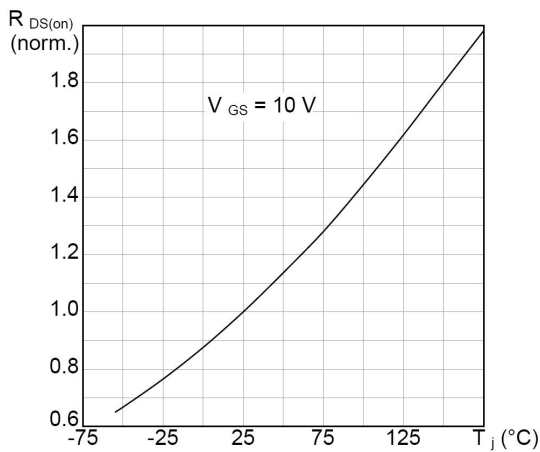
Capacitance variations



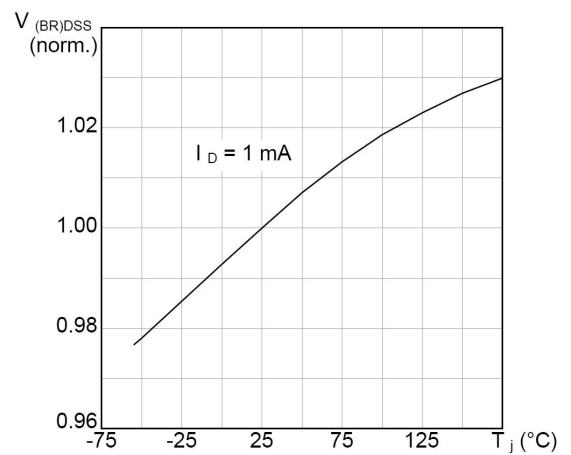
Normalized gate threshold voltage vs temperature



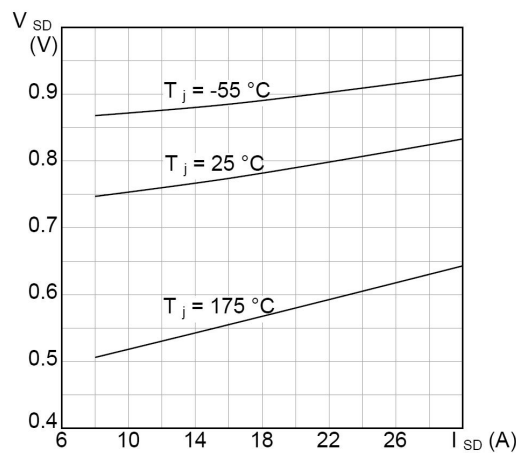
Normalized on-resistance vs temperature



Normalized $V_{(BR)DSS}$ vs temperature

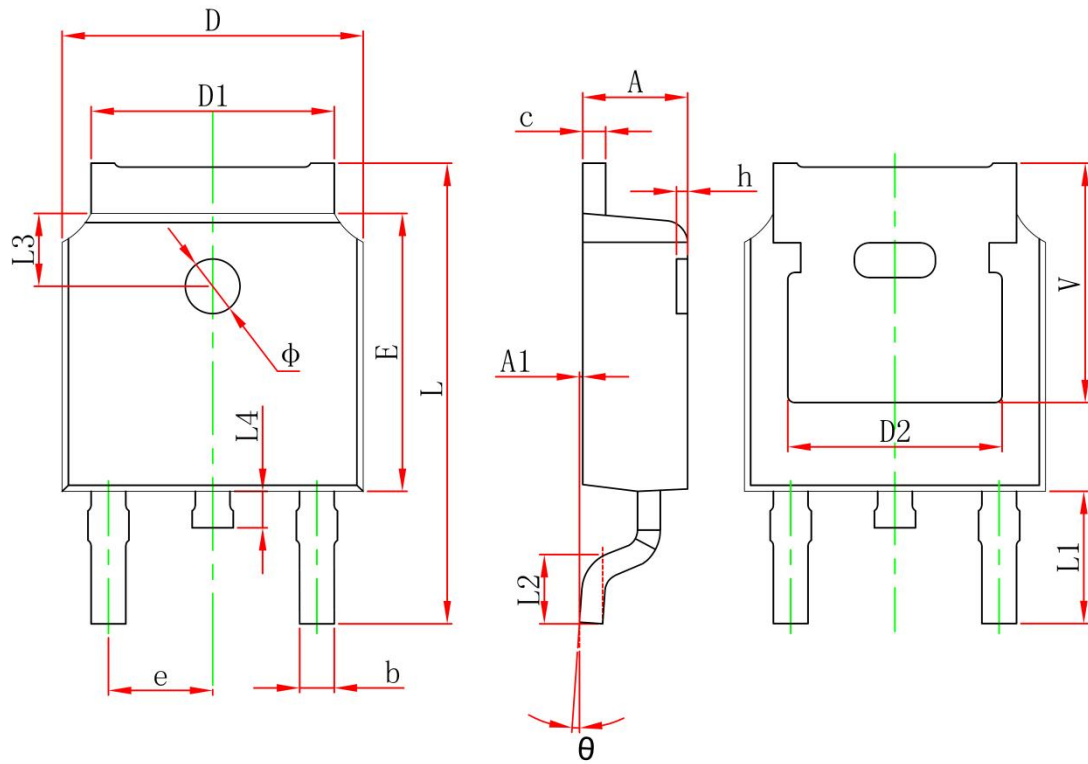


Source-drain diode forward characteristics





TO-252 Package Outline Dimensions



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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