

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
40V	6mΩ@10V	70A

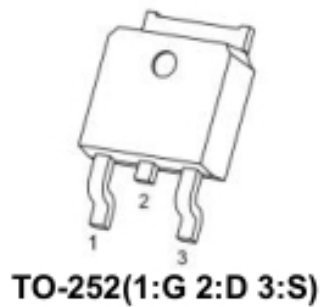
## Feature

- $V_{DS} = 40V, I_D = 70A$
- $R_{DS(ON)} < 8.5m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 12m\Omega @ V_{GS} = 4.5V$
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

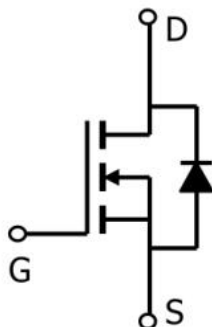
## Application

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

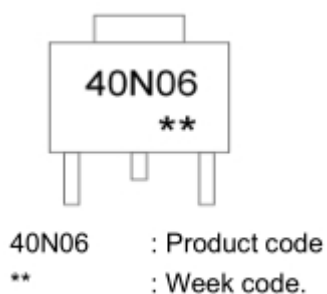
## Package



## Circuit diagram



## Marking



## Absolute maximum ratings

(T<sub>a</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous	I <sub>D</sub>	70	A
Drain Current-Continuous(T <sub>C</sub> =100°C)		130	
Pulsed Drain Current	I <sub>DM</sub>	200	A
Maximum Power Dissipation	P <sub>D</sub>	44.6	W
Single pulse avalanche energy <sup>(1)</sup>	E <sub>AS</sub>	400	
Thermal Resistance,Junction-to-Case <sup>(2)</sup>	R <sub>θJC</sub>	2.3	°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

## Electrical characteristics

( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

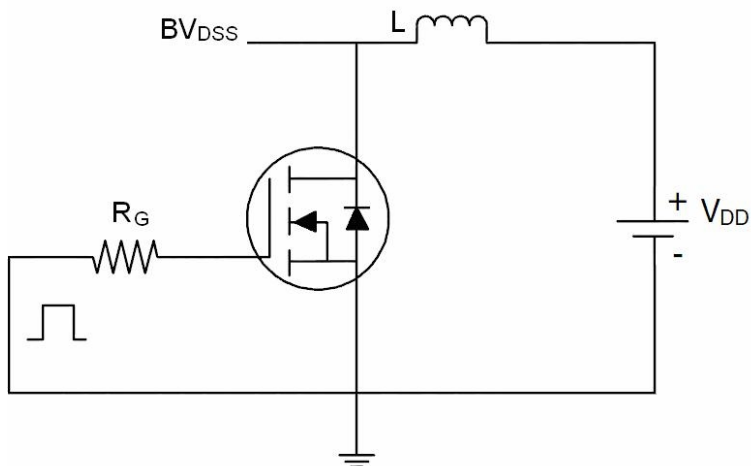
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV (BR)DSS	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	40			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V,V <sub>GS</sub> = 0V			1	uA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V			±100	uA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.5	V
Drain-Source On-State Resistance <sup>3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =12A		6	8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A		8	12	
Dynamic Characteristics <sup>(4)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz		1800		pF
Output Capacitance	C <sub>oss</sub>			280		
Reverse Transfer Capacitance	C <sub>rss</sub>			190		
Switching Characteristics <sup>(4)</sup>						
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =20V, I <sub>D</sub> =2A, R <sub>L</sub> =1Ω, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω		6.4		nS
Rise Time	T <sub>r</sub>			17.2		
Turn-Off Delay Time	T <sub>d(off)</sub>			29.6		
Fall Time	T <sub>f</sub>			16.8		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =20V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V		29		pF
Gate-Source Charge	Q <sub>gs</sub>			4.5		
Gate-Drain Charge	Q <sub>gd</sub>			6.4		
Diode Characteristics						
Diode Forward Voltage <sup>(3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 20A di/dt = 100A/μs <sup>(3)</sup>		29		nS
Reverse Recovery Charge	Q <sub>rr</sub>			26		nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

### Notes:

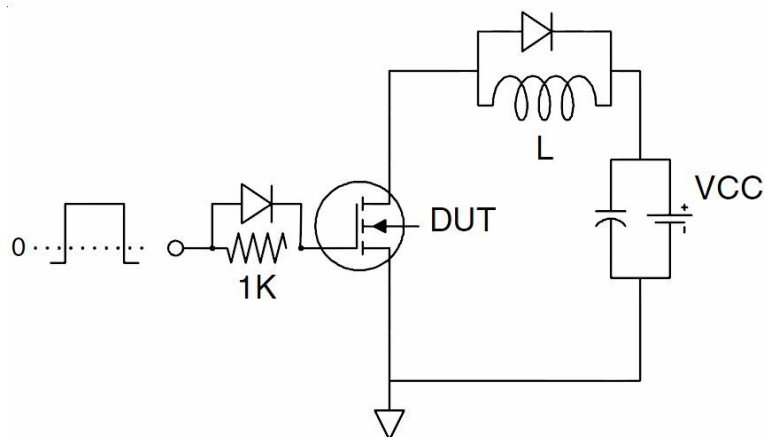
1.  $E_{AS}$  condition :  $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, V_G = 10V, L = 1mH, R_g = 25\Omega$ .
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

## Test Circuits

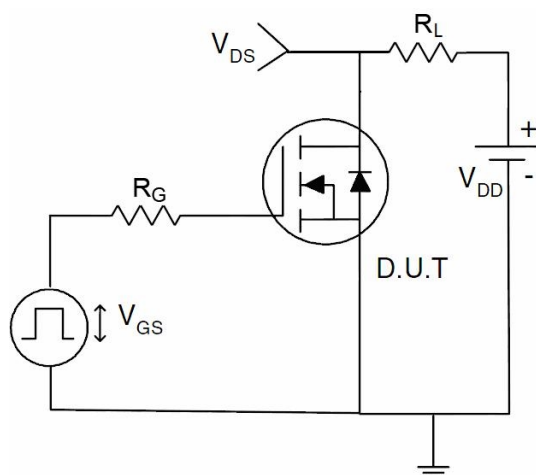
- EAS Test Circuits



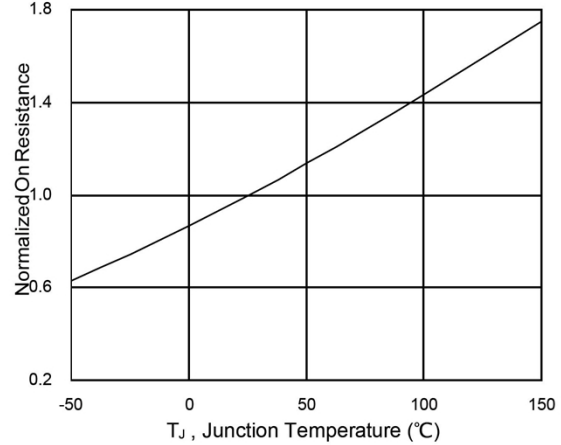
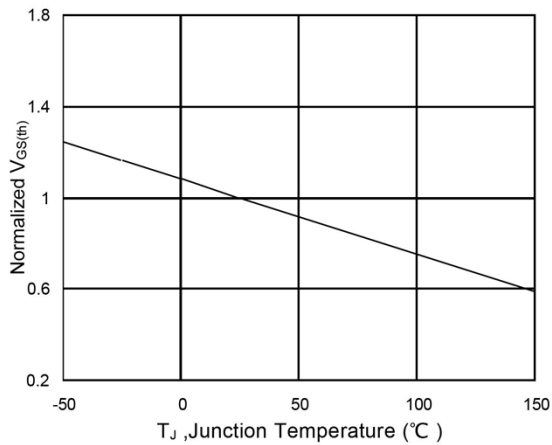
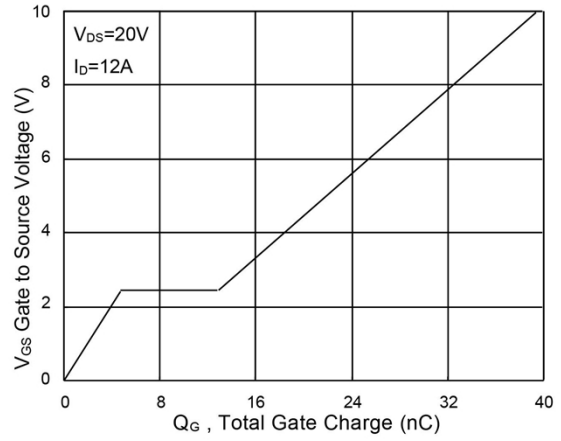
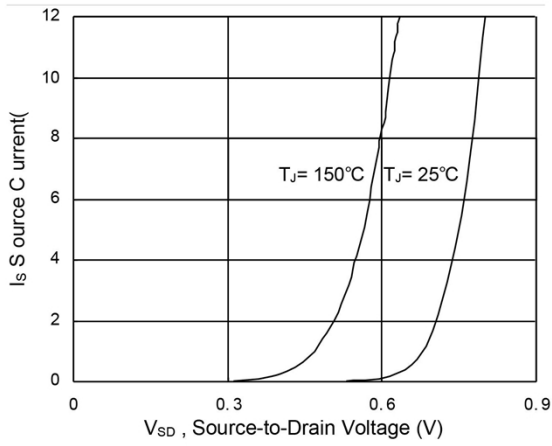
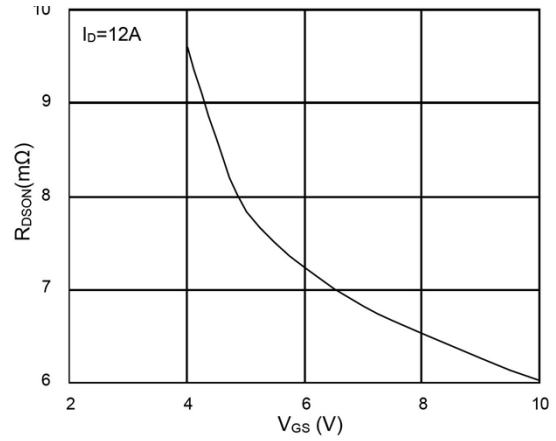
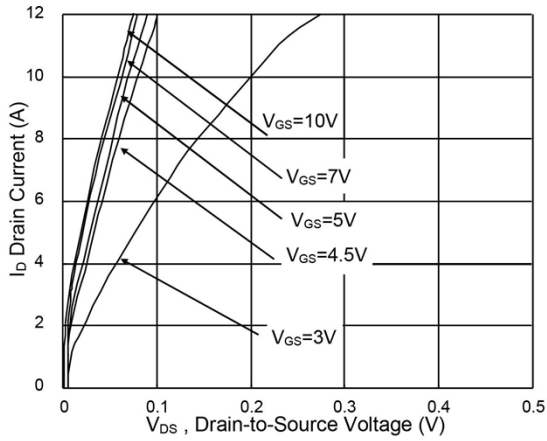
- Gate Charge Test Circuit



- Switch Time Test Circuit



## Typical Characteristics



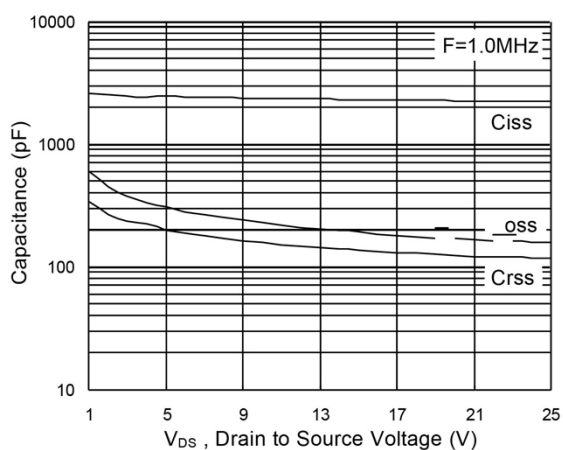


Fig.7 Capacitance

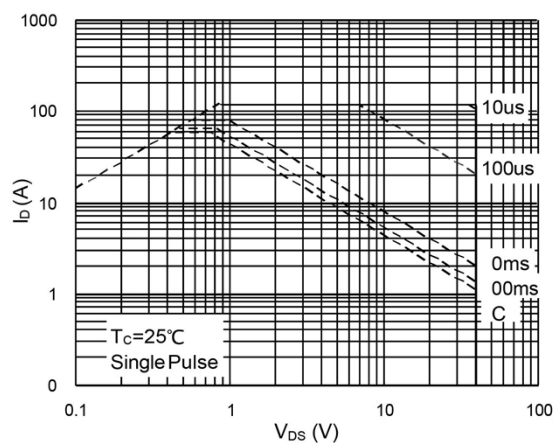


Fig.8 Safe Operating Area

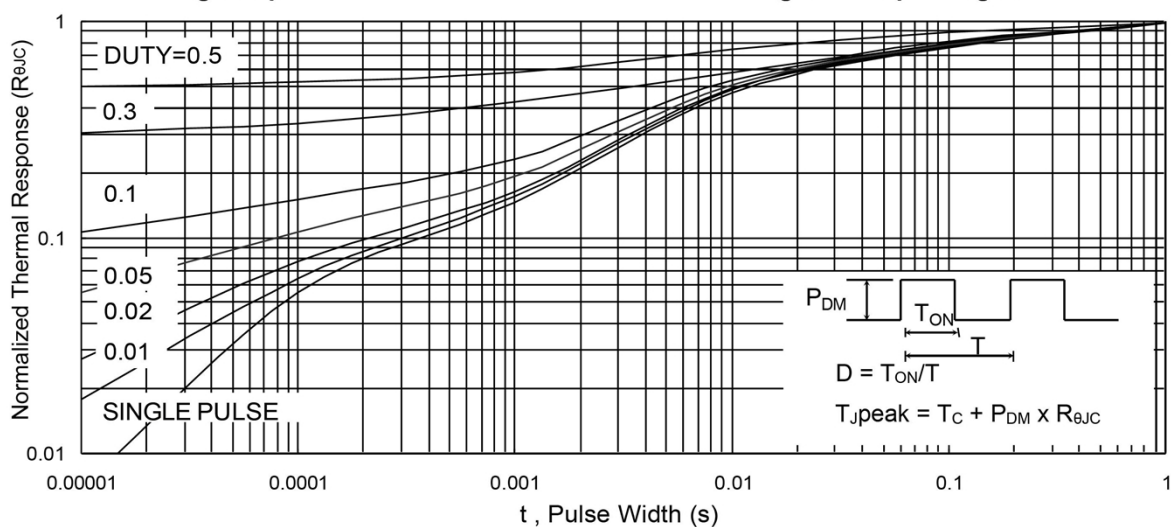


Fig.9 Normalized Maximum Transient Thermal Impedance

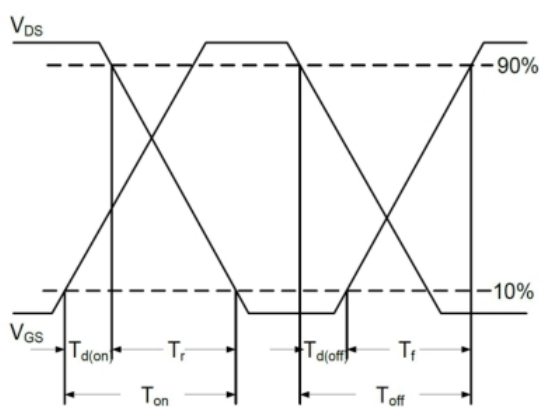


Fig.10 Switching Time Waveform

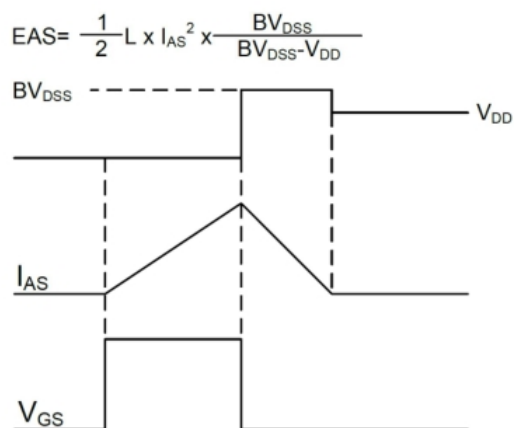
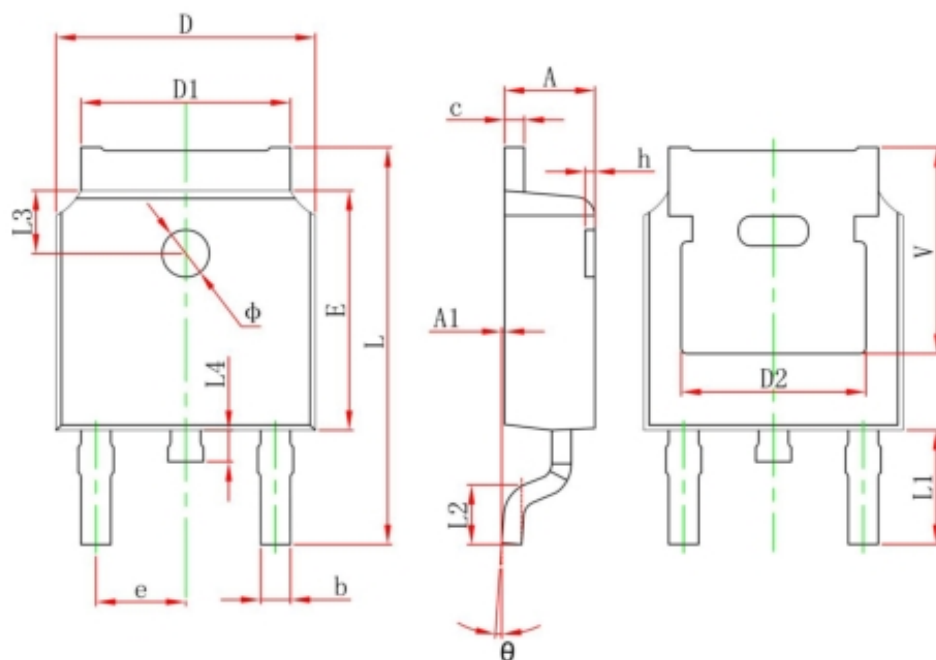


Fig.11 Unclamped Inductive Waveform

## TO-252-2L(4R) 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.	