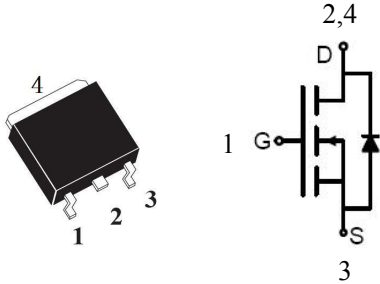


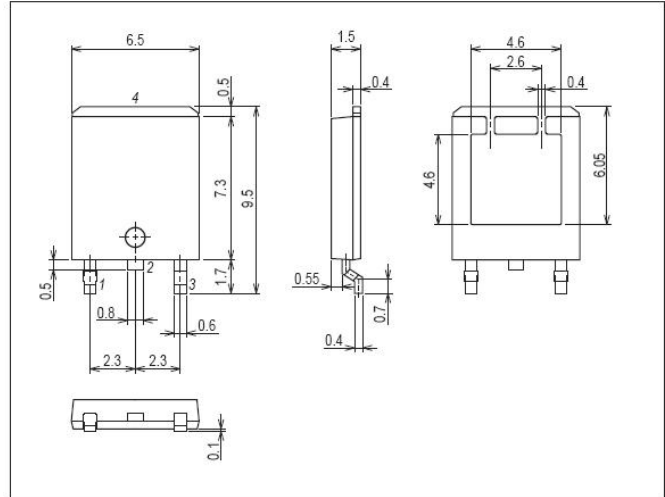
### Features

- Low On resistance.
- 4.5V drive.
- RoHS compliant.



### Package Dimensions

TO-252



### Specifications

**Absolute Maximum Ratings** at  $T_a=25^{\circ}C$

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	$V_{DSS}$		60	V
Gate-to-Source Voltage	$V_{GSS}$		+20	V
Drain Current (DC)	$I_D$		30	A
Drain Current (Pulse)	$I_{DP}$	$PW \leq 10\mu S$ , duty cycle $\leq 1\%$	50	A
Allowable Power Dissipation	$P_D$	Mounted on a ceramic board (1000mm <sup>2</sup> ×0.8mm) 1unit	40	W
Total Dissipation	$P_T$	Mounted on a ceramic board (1000mm <sup>2</sup> ×0.8mm)	40	W
Channel Temperature	$T_{ch}$		150	°C
Storage Temperature	$T_{stg}$		-55~+150	°C

**Electrical Characteristics** at  $T_a=25^{\circ}C$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu A$ , $V_{GS}=0V$	60	-	-	V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V$ , $V_{GS}=0V$	-	-	1	uA
Gate-to-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 8V$ , $V_{DS}=0V$	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ , $I_D=250\mu A$	1	-	3	V
Static Drain-to-Source On-State Resistance	$R_{DS(ON)}$	$I_D=15A$ , $V_{GS}=10V$	-	30	35	mΩ
	$R_{DS(ON)}$	$I_D=7A$ , $V_{GS}=4.5V$	-	35	50	mΩ
Input Capacitance	$C_{iss}$	$V_{DS}=30V$ , $V_{GS}=0V$ , $f=1MHz$	-	510	-	pF
Output Capacitance	$C_{oss}$	$V_{DS}=30V$ , $V_{GS}=0V$ , $f=1MHz$	-	60	-	pF
Reverse Transfer Capacitance	$C_{rss}$	$V_{DS}=30V$ , $V_{GS}=0V$ , $f=1MHz$	-	23	-	pF

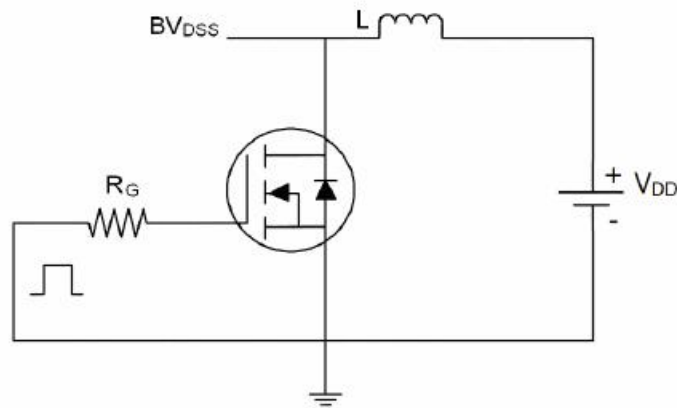
# Si6040

## Electrical Characteristics at $T_a=25^{\circ}\text{C}$ (Continued)

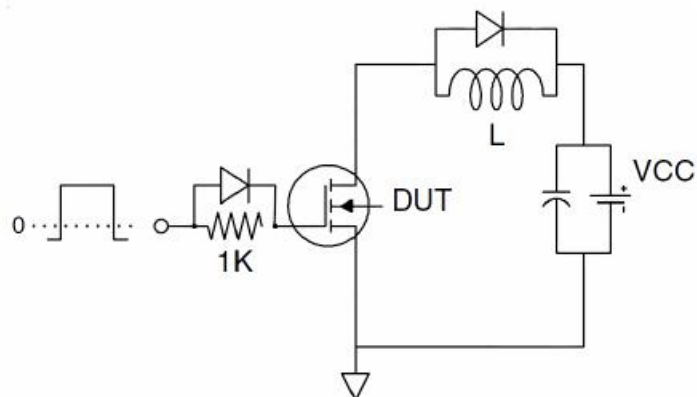
Parameter	Symbol	Conditions	Ratings			Unit
			min	Typ	max	
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=30\text{V}, I_D=1.5\text{A}, R_{GEN}=1\Omega,$ $V_{GS}=10\text{V}$	-	6	-	nS
Rise Time	$t_r$		-	3	-	nS
Turn-off Delay Time	$t_{d(off)}$		-	16	-	nS
Fall Time	$t_f$		-	2.8	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=30\text{V}, V_{GS}=4.5\text{V}, I_D=3\text{A}$	-	11	-	nC
Gate-to-Source Charge	$Q_{gs}$		-	5	-	nC
Gate-to-Drain "Miller" Charge	$Q_{gd}$		-	4.8	-	nC
Diode Forward Voltage	$V_{SD}$	$I_S=3\text{A}, V_{GS}=0\text{V}$	-	-	1.2	V

## Test circuit

### 1) $E_{AS}$ test Circuits



### 2) Gate charge test Circuit:



Typical Characteristics at  $T_a=25^{\circ}\text{C}$

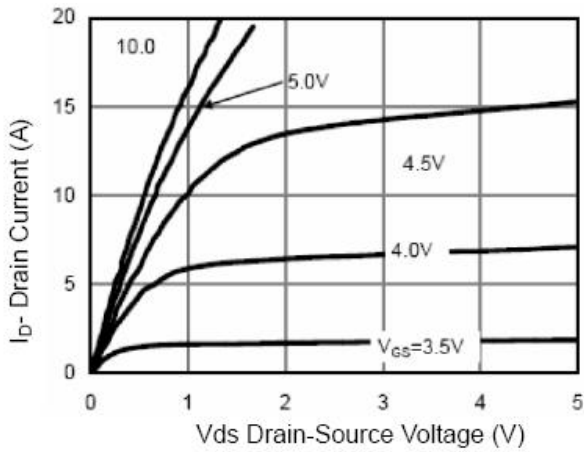


Figure 1 Output Characteristics

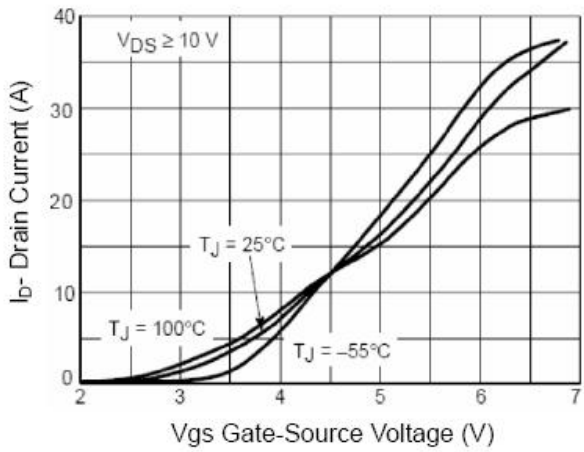


Figure 2 Transfer Characteristics

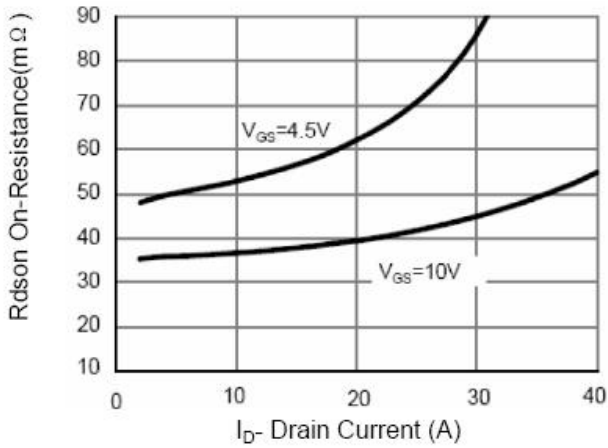


Figure 3  $R_{DS(on)}$ - Drain Current

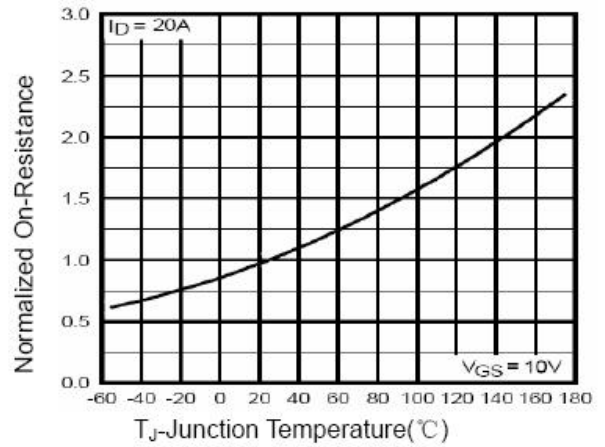


Figure 4  $R_{DS(on)}$ -Junction Temperature

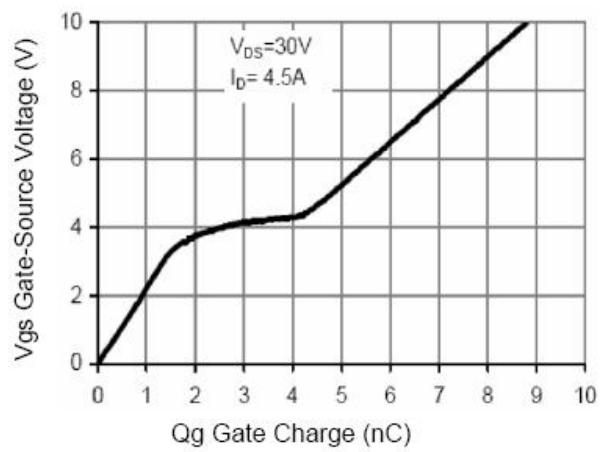


Figure 5 Gate Charge

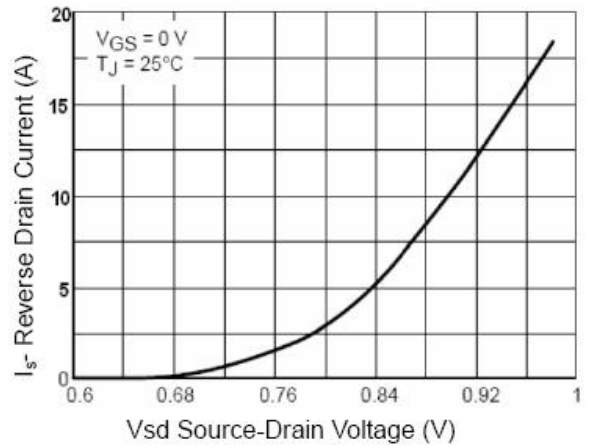


Figure 6 Source- Drain Diode Forward

Typical Characteristics at  $T_a=25^{\circ}\text{C}$  (Continued)

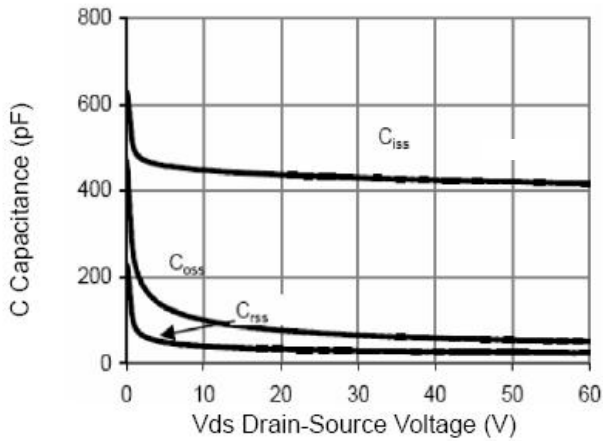


Figure 7 Capacitance vs Vds

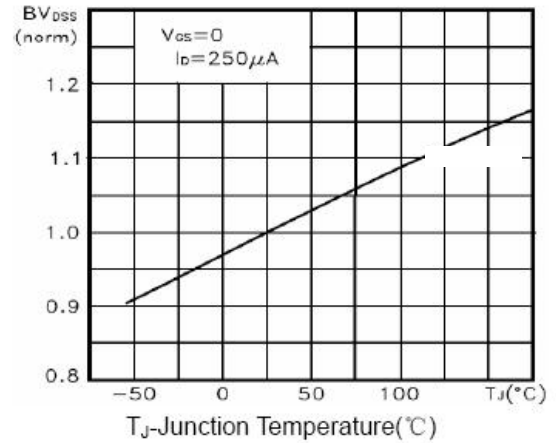


Figure 9  $BV_{DSS}$  vs Junction Temperature

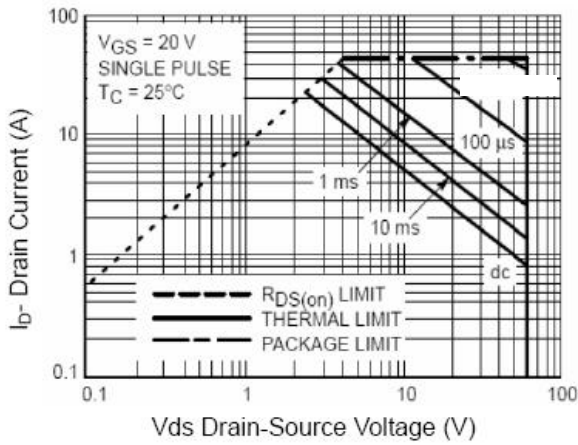


Figure 8 Safe Operation Area

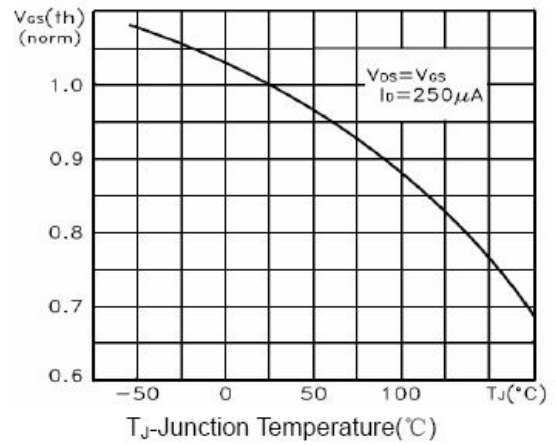


Figure 10  $V_{GS(th)}$  vs Junction Temperature

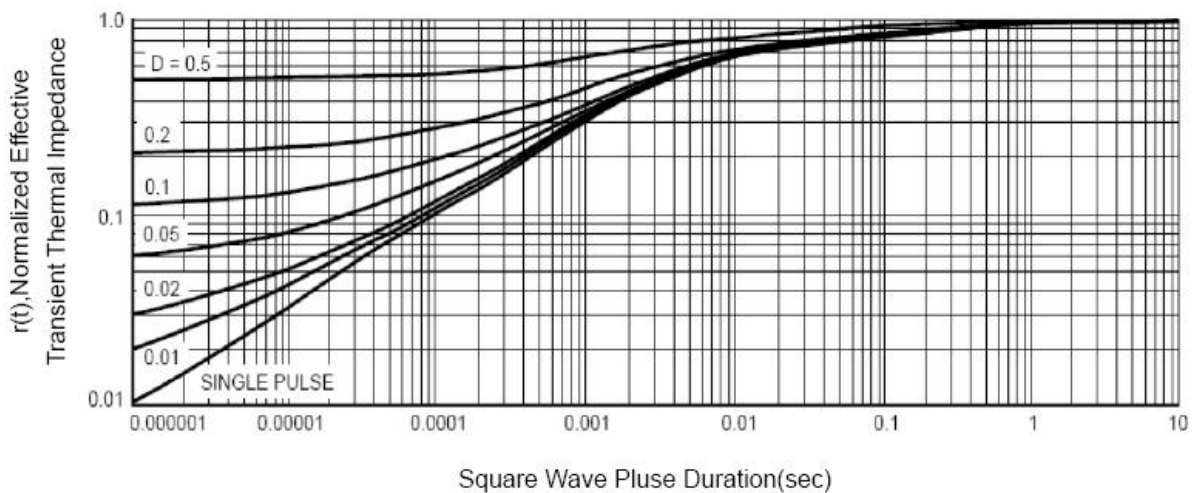


Figure 11 Normalized Maximum Transient Thermal Impedance